



TransGrid

**TransGrid Revenue Proposal
2018/19 – 2022/23**

Appendix S

Frontier Economics:

The market risk premium



The market risk premium

REPORT PREPARED FOR TRANSGRID

January 2017

The market risk premium

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1 Executive summary

1.1 Instructions

1 Frontier Economics has been retained by TransGrid to provide our views on the approach to estimating the market risk premium (MRP) for use in the Capital Asset Pricing Model (CAPM).

2 Specifically, we have been asked to:

- a. Explain where the estimation of the MRP fits within the AER's regulatory framework;
- b. Explain the approach to estimating the MRP that the AER set out in its 2013 Rate of Return Guideline;
- c. Summarise the evolution of the relevant evidence and empirical estimates since 2013;
- d. Explain the implications of applying a constant, or substantially constant, MRP to contemporaneous estimates of the MRP; and
- e. Provide a current estimate of the MRP by applying the approach set out in the AER's 2013 Rate of Return Guideline to the updated evidence.

1.2 Primary conclusions

Final conclusion

3 We have identified the considerations that the AER applied when selecting its Guideline MRP of 6.5%. If we apply those same considerations to the current evidence that the AER has compiled, the result is an estimate of approximately 7.5%.

4 If the MRP is set to 7.5%, the implied market return is 9.4%¹ which is still materially below the 10.5%² allowed market return at the time of the Guideline. That is, setting the current MRP to 7.5% implies that the required return on equity has reduced materially since the Guideline, but less than one-for-one with the fall in the risk-free rate.

The regulatory task

5 The MRP varies over time and that the regulatory task is to adopt a forward-looking estimate of the MRP that is commensurate with the prevailing conditions in the market for equity funds.

¹ 1.9% + 7.5%.

² 4.0% + 6.5% = 10.5%.

The Guideline approach

6 The approach to estimating the MRP that is set out in the AER's Rate of Return Guideline is to give:

- a. Greatest³ consideration to the long-run mean of historical excess returns;
- b. Significant⁴ consideration to its dividend growth model (DGM) estimates;⁵ and
- c. Some⁶ or limited⁷ consideration to other evidence including surveys, independent expert reports, conditioning variables, and other regulators' allowances.

7 The Guideline approach to setting the MRP allowance involves two steps:

- a. Set a range based on the aggregated ranges of its historical excess returns and DGM estimates; and
- b. Select a point estimate from within that range.

8 In its Guideline, the AER set the allowed MRP to 6.5% on the basis that:

This point estimate lies between the historical average range and the range of estimates produced by the DGM. This reflects our consideration of the strengths and limitations of each source of evidence.⁸

How the Guideline approach achieves the regulatory task

9 The historical excess returns approach estimates the MRP by taking the mean excess return over a long historical period. Self-evidently, this estimate must reflect the average market conditions over the historical period that was used. Logically, this approach can only produce a forward-looking estimate that is commensurate with the prevailing conditions in the market in two circumstances:

- a. Investors always require the same MRP in all market conditions; or

³ AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 95.

⁴ AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 97.

⁵ The AER publishes estimates for two-stage and three-stage versions of its DGM. In both cases, the estimates of the dividend growth rate are taken from analyst forecasts for the first two years. The two-stage DGM applies a long-run growth rate from year 3 whereas the three-stage DGM applies a long-run growth rate from year 10, with linear interpolation between years 2 and 10. For both variants of the model, the AER reports results for three different long-run growth rates, thus producing a range of estimates.

⁶ AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 97.

⁷ AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 97.

⁸ AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 97.

b. The current market conditions are the same as the average market conditions over the historical period.⁹

10 Neither of these conditions is likely to hold. The AER has stated that it does not consider that the MRP is the same in all market conditions, and the current conditions are quite unlike the average historical conditions in that the current government bond yield (to which the MRP is added to produce the allowed return on equity) is at historical lows.

11 By contrast, there is broad agreement that the DGM method does produce a forward-looking MRP that is commensurate with the prevailing conditions in the market for equity funds. The AER has stated that:

...we consider DGM estimates have strong theoretical grounding and are more likely to reflect prevailing market conditions than other approaches.¹⁰

12 Indeed, the AER itself distinguishes between its historical MRP estimates on the one hand and its forward-looking DGM estimates on the other:

...we used results from both forward looking methods and historical averaging of excess returns for estimating the MRP and the results from forward looking methods unambiguously constitute estimates of the prevailing rather than the long-term average value for the MRP.¹¹

13 The AER goes on to conclude that the only reason that there is any need to rely on mean historical excess return estimates is due to concerns about relying exclusively on the forward-looking DGM estimate:

If a perfectly reliable estimate of the MRP could be generated from market prices it would be reasonable to use this estimate. However, no such estimate exists.¹²

The evolution of the AER's evidence

14 The evolution of the AER's primary MRP estimates and the AER's MRP allowance is summarised in Figure 1 below.

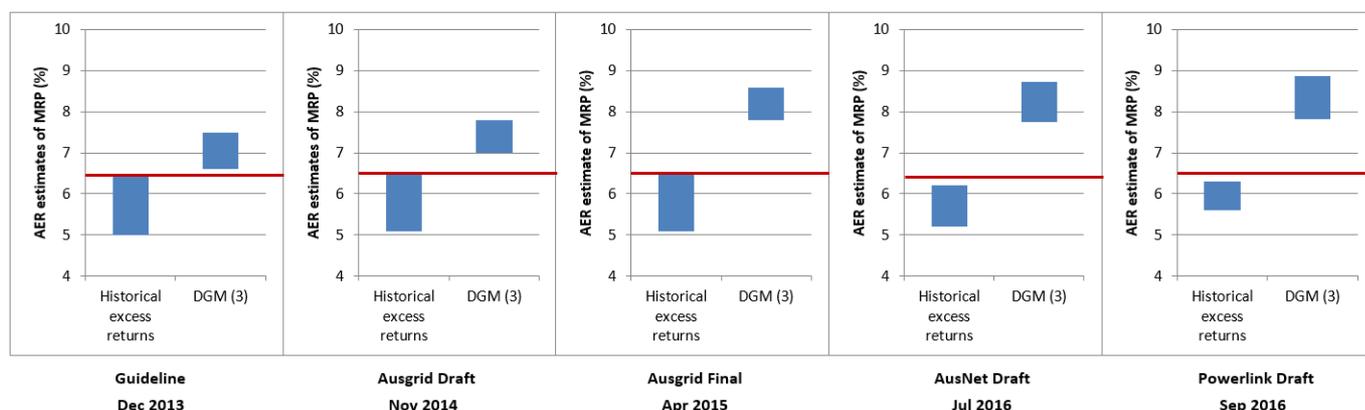
⁹ The point we are making here is that one of these two conditions must hold for the historical mean estimate to also be a forward-looking estimate that is commensurate with the prevailing conditions. A different argument is that the historical mean estimate might still be given some weight, even though it is not a forward-looking estimate, because the forward-looking estimates that are available are not sufficiently reliable to be relied on exclusively.

¹⁰ AER, 2013, Rate of Return Guideline: Explanatory Statement, Appendices, p. 85.

¹¹ AER, 2013, Rate of Return Guideline: Explanatory Statement, Appendices, p. 103.

¹² AER, 2013, Rate of Return Guideline: Explanatory Statement, Appendices, p. 110.

Figure 1: The AER's primary MRP estimates



Source: Rate of Return Guideline December 2013; Ausgrid Draft Decision November 2014; Ausgrid Final Decision April 2015; AusNet Draft Decision July 2016; Powerlink Draft Decision September 2016.

- 15 By construction, the historical excess returns estimate changes very slowly over time as an additional data point becomes available at the end of each year. From the 2013 Guideline to the Final Decisions in April 2015, the AER formed its range for the historical excess returns estimate by examining five different historical period lengths and setting the lower bound to 20 basis points above the highest geometric mean and the upper bound slightly above the highest arithmetic mean. In its AusNet Draft Decision in July 2016, the AER departed from that approach and instead stated that its range is now based on arithmetic averages.¹³ Thus, although the data has not changed materially, the way the AER summarises it has evolved. Between the AusNet and Powerlink Draft Decisions in July and September of 2016, respectively, there was no change to the historical excess returns data at all, but the AER has reported different arithmetic means for the same five historical periods, providing no explanation for the change. In summary, we note that the historical excess returns data has not changed materially since the 2013 Guideline – the only change is that the AER now summarises that same data using a slightly narrower range.
- 16 By contrast, the AER's DGM estimates of the MRP have increased materially since the Guideline and are currently higher than at any time since the Guideline.¹⁴ Although the AER has recently stated that there is no reason to decrease the weight applied to its DGM evidence,¹⁵ the allowed MRP has remained fixed at 6.5% (illustrated by the red lines above), even as the DGM evidence has become more and more inconsistent with that figure.

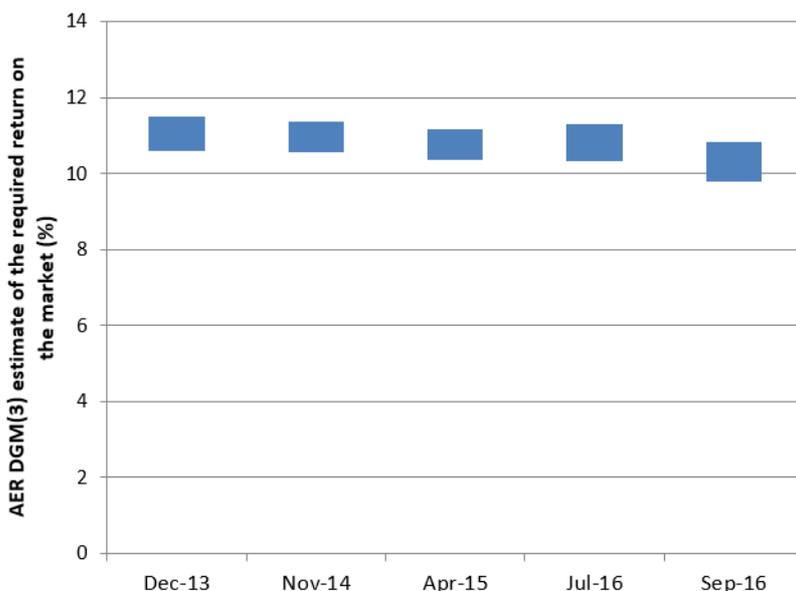
¹³ AusNet Draft Decision, 2016, Attachment 3, p. 59.

¹⁴ We explain in this report that the AER reports estimates from two-stage and three-stage specifications of the DGM. Because the AER expresses a preference for the three-stage estimates, we have displayed them in the figure above.

¹⁵ Draft Decision: AusNet Services Transmission Determination 2017-18 to 2021-22, July 2016 (AusNet Draft Decision), Attachment 3, p. 207.

- 17 The reason for the increase in the AER's DGM estimate of the MRP is that the evidence suggests that the overall required return on equity¹⁶ has remained remarkably stable since the Guideline, even as government bond yields have fallen sharply. This is illustrated in Figure 2 below.

Figure 2: AER three-stage DGM estimates of the total required return on the market



Source: AER Rate of Return Guideline December 2013; AER Ausgrid Draft Decision November 2014; AER Ausgrid Final Decision April 2015; AER AusNet Draft Decision July 2016; Powerlink Draft Decision September 2016.

The reduction in weight applied to the DGM evidence

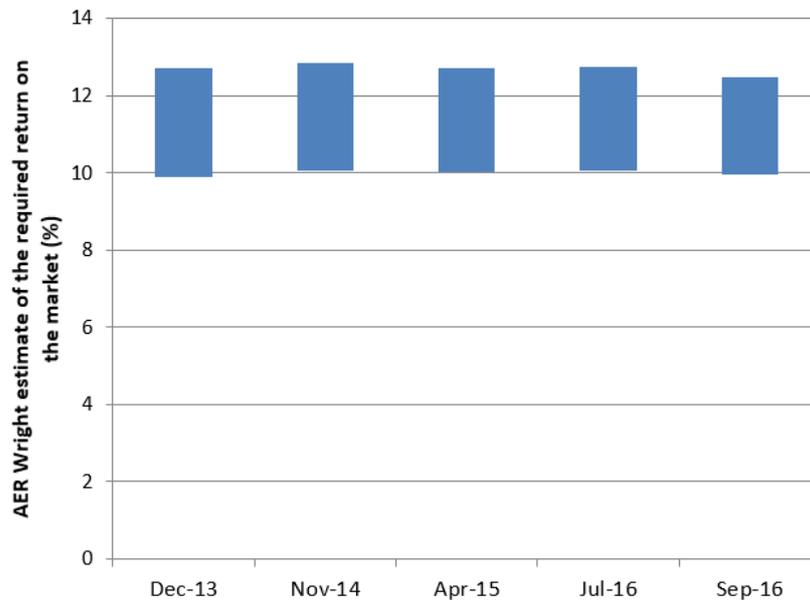
- 18 The AER's DGM estimates of the MRP have increased substantially because:
- As shown in Figure 2, the DGM approach estimates that the forward-looking required return on the market has remained stable since the Guideline; and
 - Government bond yields have fallen materially since the Guideline; and
 - The MRP is estimated by subtracting the government bond yield from the forward-looking estimate of the required return on equity.
- 19 It is difficult to reconcile the fact that the AER has maintained the same MRP allowance even as its DGM estimates have increased materially. It seems that the AER has reduced the relative weight that it applies to its own DGM estimates as they have become more and more inconsistent with its 6.5% allowance.

¹⁶ The overall required return on equity is the sum of the risk-free rate and the market risk premium. This is an estimate of the return on equity required for a firm of average risk.

Other evidence considered by the AER

20 The AER also reports that its Wright estimates of the required return on the market have remained stable since the Guideline, as summarised in Figure 3 below.

Figure 3: AER Wright estimates of the required return on the market



Source: AER Rate of Return Guideline December 2013; AER Ausgrid Draft Decision November 2014; AER Ausgrid Final Decision April 2015; AER AusNet Draft Decision July 2016; Powerlink Draft Decision September 2016.

21 The other evidence that receives some or limited consideration by the AER is also generally consistent with the notion that the required return on equity has remained quite stable since the Guideline even as government bond yields have fallen, thus implying a higher MRP. For example:¹⁷

- a. Other regulators are currently adopting higher MRP estimates;
- b. Independent experts are currently adopting higher MRP estimates; and
- c. Conditioning variables are generally consistent with a stable required return on equity and a higher MRP.

Views from the market

22 Evidence from a range of respected market participants is consistent with the weight of evidence set out above – that the required return on equity has remained relatively stable even as government bond yields have fallen. This position is supported by:

¹⁷ See Section 4.5 below.

- a. Central banks such as the Reserve Bank of Australia and the Federal Reserve Bank of New York;
- b. Other regulators such as Ofgem, FERC, the ERA, and IPART;
- c. Corporate advisory firms such as McKinsey and NERA-US; and
- d. Independent expert firms such as EY, KPMG, Deloitte, and Loneragan Edwards.

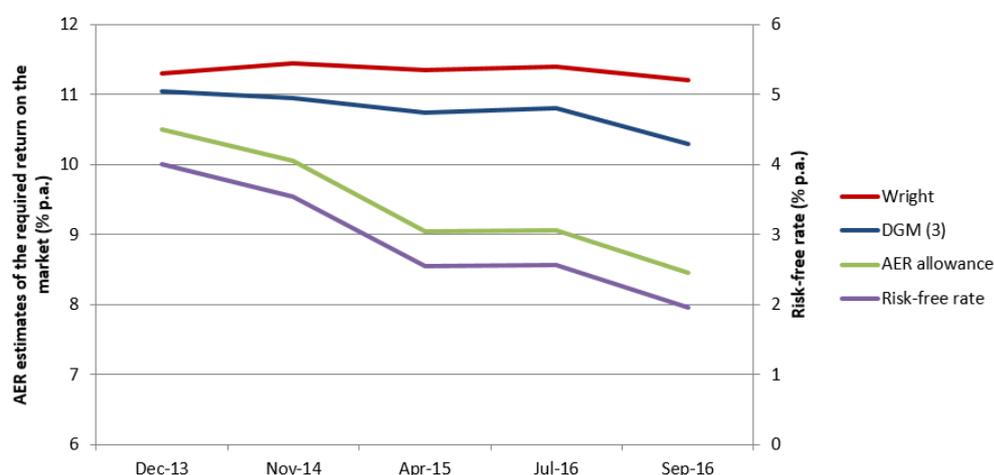
Implications of the AER's approach

23 Since its 2013 Guideline, the AER has allowed an MRP of 6.5% in every one of its draft and final decisions. The AER's advisors note that this approach results in the allowed return on equity moving one-for-one with changes in risk-free rates:

The AER decisions hold the risk premium nearly constant (although upward adjustments of 0.5% have been made). As (sic) result the regulated return tends to fall 1 for 1 with falls in the risk free rate.¹⁸

24 The inevitable consequence of setting a nearly constant MRP is that the allowed return on equity falls one-for-one with falls in government bond yields. Since government bond yields have fallen sharply since the Guideline, the AER's allowed return on equity has also fallen correspondingly. This occurs in spite of the evidence set out above – including the AER's own DGM estimates – that the required return on equity has remained remarkably stable since the Guideline. The distinction between the AER's estimates and its regulatory allowance is summarised in Figure 4 below.

Figure 4: The required return on the market – AER estimates and allowances



Source: Rate of Return Guideline, Explanatory Statement, Appendix December 2013; Ausgrid Draft Decision Attachment 3 November 2014; Ausgrid Final Decision Attachment 3 April 2015; AusNet Draft Decision Attachment 3 July 2016; Powerlink Draft Decision September 2016.

25 Since its Guideline in December 2013, the yield on 10-year government bonds has fallen from approximately 4.1% to 1.95% in its September 2016 Powerlink Draft Decision. The AER has maintained the same 6.5% MRP in every one of its

¹⁸ Partington and Satchell (2016), p. 17.

decisions since December 2013, so the allowed return on equity falls one-for one with changes in the risk-free rate. Thus, the AER considers that the required return on equity for the average firm¹⁹ has fallen from 10.6%²⁰ in December 2013 to 8.4%²¹ now. This represents a decline of more than 25% over the last two and a half years.

26 By contrast, as set out above, there is a substantial body of evidence to support the proposition that the required return on equity has **not** fallen by over 25% in the last two and a half years.²²

27 The broader effect of the AER's approach to distilling the MRP evidence into a single regulatory allowance is illustrated in Figure 5. That figure contrasts the AER's allowance for the required return on the market with mid-point estimates from the AER's three-stage DGM.²³

28 The most obvious point of departure is during the global financial crisis (GFC) in late 2008. The AER approach implies that the required return on equity *fell* dramatically during the peak of the GFC – as investors moved funds into government bonds, lowering yields. Such an outcome is implausible – the required return on equity capital does *not* fall materially during financial crises. But that is precisely what the AER's approach to setting the MRP suggests. By contrast, the AER's own forward-looking DGM method suggests that the required return on equity increased during the GFC.

¹⁹ Which, under the CAPM, is equal to the sum of the risk-free rate and the MRP.

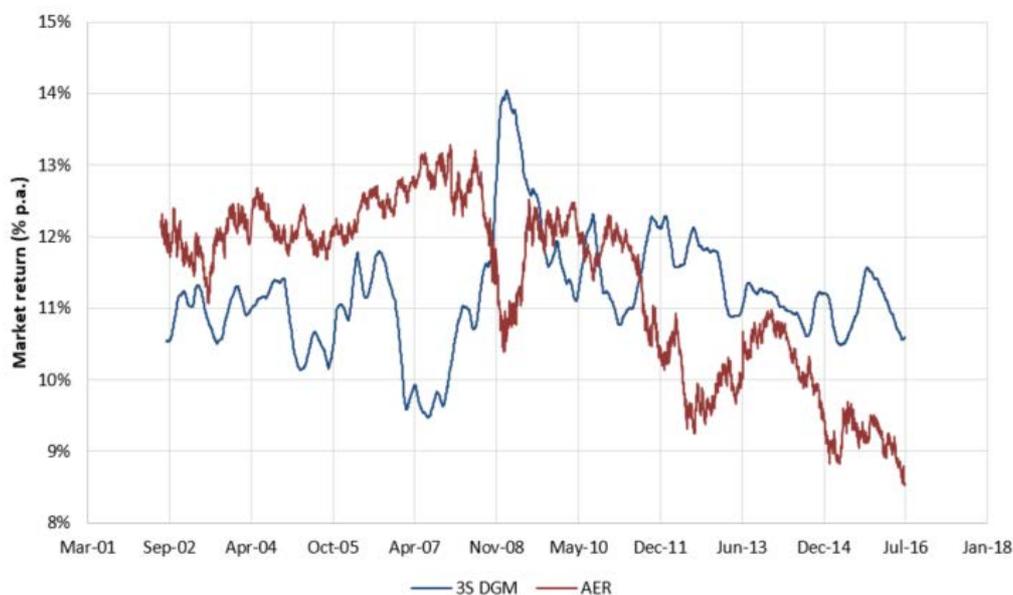
²⁰ 4.1% + 6.5%.

²¹ 1.95% + 6.5%.

²² See also Section 0 below.

²³ That is, estimates based on the AER's specification and implementation of the DGM with a long-run growth rate of 4.6%.

Figure 5: The required return on the market – AER mid-point DGM estimates and regulatory allowances



Source: Frontier Economics.

- 29 Figure 5 also shows that the divergence between the two methods is not confined to the peak of the GFC. For example, throughout 2007 when equity prices were very high and it is widely accepted that equity capital was relatively cheaper, the AER approach suggests that the cost of equity capital was very high.
- 30 Importantly, the two approaches currently suggest very different required returns. Whereas the DGM method suggests that the required return on equity has remained quite stable since 2013 (hovering around 11%), the AER allowance suggests a material decline in the cost of equity to the lowest level ever on record.

The problem with a constant MRP allowance

- 31 The problem with the application of the AER's approach to date is that its decisions imply that the required return on equity **always** falls one-for one with **every** decline in government bond yields. This fixed relationship between allowed returns and government bond yields leads to implausible estimates in some market conditions, including the current market conditions.
- 32 In this regard, Partington and Satchell (2016) have recently advised the AER that:

We begin by stating our position that it seems likely that the risk premium changes over time. It is also entirely possible that the risk premium sometimes changes at the same time as interest rates change, but that change may either be in the same direction as the interest rates, or in the opposite direction. At any point in time, there are three possibilities for the market risk premium, it may remain unchanged, it may go down, or it may increase. There is no compelling

reason for an interest rate decrease to automatically be associated with an increase in the market risk premium.²⁴

33 We agree with everything that Partington and Satchell have said in the above paragraph. However, just as there is “no compelling reason for an interest rate decrease to automatically be associated with an increase in the market risk premium,” there is equally no compelling reason for an interest rate decrease to *never* be associated with an increase in the market risk premium.

34 This is the crux of the problem with the AER’s nearly constant MRP. Even though government bond yields have halved since the Guideline, and even though there is strong evidence that the real-world required return from equity holders has not fallen one-for-one with those yields, the AER has maintained the same MRP allowance.

35 We do not suggest that the AER should *always* increase the MRP allowance *whenever* the government bond yield falls or that any increase should completely offset the fall in yields. We simply suggest that the AER should *sometimes* increase the MRP allowance to *partially* offset the fall in yields – when objective evidence supports that course of action.

A current estimate of the MRP

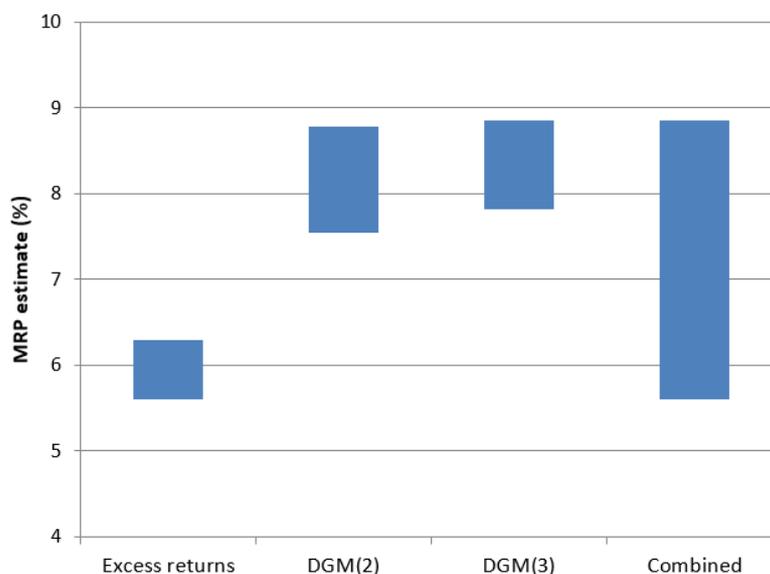
36 Consistent with the AER’s Guideline approach, we begin by constructing a combined range from the historical excess returns and DGM ranges. This is set out in Figure 6 below, where:

- a. The historical excess returns range is set to 5.5% to 6.5% with a mid-point estimate of 6.0%, as per Figure 6 below; and
- b. The DGM estimates are those reported in the AER’s most recent draft decision.²⁵

²⁴ Partington, G and S. Satchell, 2016, “Report to the AER: Cost of Equity Issues 2016 Electricity and Gas Determinations,” April, p. 17.

²⁵ Powerlink Draft Decision, Attachment 3, September 2016.

Figure 6: Current MRP range – AER Guideline approach



Source: Frontier Economics calculations based on estimates set out in the Powerlink Draft Decision, Attachment 3, September 2016.

37 The second step of the AER's Guideline approach is to select a point estimate from within the combined range. In this regard, we note that the AER's Guideline approach is to select a point estimate where:

This point estimate lies between the historical average range and the range of estimates produced by the DGM. This reflects our consideration of the strengths and limitations of each source of evidence.²⁶

38 In its Guideline, the AER adopted a point estimate MRP of 6.5%. The following factors appear to be relevant to the selection of that figure:

- a. The AER's historical excess returns mid-point estimate is 6.0%²⁷ and its mid-point three-stage DGM estimate is 7.1%.²⁸ The mid-point of these two estimates is 6.55%;
- b. The AER adopted an upper bound of 6.5% from its historical excess returns approach and a lower bound of 6.7% from its three-stage DGM approach. The mid-point of this gap between the two ranges is 6.6%;
- c. The AER's historical excess returns range and two-stage DGM range overlapped in the region of 6.1% to 6.5%. The mid-point of this region of overlap is 6.3%;
- d. The combined range adopted by the AER was 5.0% (the lower bound of the excess returns range) and 7.5% (the upper bound of

²⁶ AER Rate of Return Guideline, Explanatory Statement, p. 97.

²⁷ AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 93.

²⁸ The AER has subsequently stated its preference for the three-stage specification of the DGM. See, for example, AER, 2014, Draft Decision: Jemena Gas Networks (NSW) Ltd Access Arrangement 2015-20, (JGN Draft Decision), Attachment 3, Appendix C, p. 222.

the DGM range). The mid-point of the combined range is 6.3%; and

- e. If the historical excess returns range is based on arithmetic means, consistent with the AER's subsequent decisions, the combined range is 5.7%²⁹ to 7.5%, with a mid-point of 6.6%.

39 In summary, the approach to the MRP that is set out in the AER's Rate of Return Guideline is to rely primarily on the historical excess returns method and the DGM method (particularly the three-stage method) to specify a range for the MRP and to select a point estimate from within that range. Other evidence is considered to be "less informative"³⁰ and is given only "some"³¹ or "limited"³² consideration.

40 In relation to the current estimates set out above, we note that:

- a. The AER stated that its preferred historical excess returns estimate is 6.0%³³ and its most recent mid-point three-stage DGM estimate is 8.5%.³⁴ The mid-point of these two estimates is 7.3%;
- b. The upper bound of the AER's historical excess returns approach is 6.5% and the lower bound from the AER's three-stage DGM approach is 7.8%. The mid-point of this gap between the two ranges is 7.2%;
- c. At the time of the Guideline, the AER's historical excess returns range and its two-stage DGM range overlapped. In the current market conditions, the upper bound of the historical excess returns range is 6.5% and the lower bound of the two-stage DGM range is 7.5%. The mid-point of the gap between these two ranges is 7.0%; and
- d. The combined range is from 5.5% (the lower bound of the excess returns range) and 8.9% (the upper bound of the DGM range³⁵). The mid-point of the combined range is 7.2%.

41 We note that the ranges set out above are downwardly biased relative to the AER's Guideline approach in the sense that the lower bound DGM estimates are based on a long-run dividend growth rate of 3.8% compared with the Guideline figure

²⁹ AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 93.

³⁰ AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 96.

³¹ AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 97.

³² AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 97.

³³ AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 97.

³⁴ The AER has subsequently stated its preference for the three-stage specification of the DGM. See, for example, JGN Draft Decision, 2014, Attachment 3, Appendix C, p. 222. The most recent DGM estimates are taken from the September 2016 Powerlink Draft Decision.

³⁵ Note that the upper bound is currently the same for the AER's two-stage and three-stage DGM approaches.

of 4.0%. That is, the lower figure that the AER currently adopts is a departure from the Guideline approach and results in lower MRP estimates.

42 We also note that those regulators who seek to obtain an estimate of the MRP that is commensurate with the prevailing conditions in the market are currently adopting higher estimates. We explain in this report that:

- a. The ERA adopted MRP estimates of 7.6% and 7.4% in its recent ATCO Gas and DBP decisions;
- b. IPART has adopted an MRP estimate of 7.3%, which it applies to a risk-free rate set 120 basis points above the contemporaneous yield in its most recent update – an effective MRP of 8.5%;
- c. Ofgem has recently adopted an effective MRP of 7.1%; and
- d. FERC has recently adopted an effective estimate of 8.3%.

43 Finally, we note that the most recent independent expert valuation reports adopt an average effective MRP of 7.9%. We note that this is an estimate that does not reflect any assumed benefits of dividend imputation credits, so the with-imputation MRP (comparable to the AER's allowance) would be even higher than 7.9%.

44 In summary, we have identified the considerations that the AER applied when selecting its Guideline MRP of 6.5%. If we apply those same considerations to the current evidence that the AER has compiled, the result is an estimate of approximately 7.5%.

45 If the MRP is set to 7.5%, the implied market return is 9.4%³⁶ which is still materially below the 10.5%³⁷ allowed market return at the time of the Guideline. That is, setting the current MRP to 7.5% implies that the required return on equity has reduced materially since the Guideline, but less than one-for-one with the fall in the risk-free rate.

46 An allowed MRP of 7.5% is an outcome that lies between:

- a. The view that the MRP is constant over all market conditions such that the required return on equity rises and falls one-for-one with changes in the risk-free rate; and
- b. The view that the required return on equity has remained stable over the period since the Guideline.

47 In our view, this is a reasonable estimate in light of the weight of evidence set out above – which supports the notion that the required return on equity has not declined materially since the Guideline.

48 Since the Guideline:

- a. The AER's own DGM estimates indicate that the MRP has increased materially;

³⁶ 1.95% + 7.5%.

³⁷ 4.0% + 6.5% = 10.5%.

- b. The AER's own DGM estimates indicate that the overall required return on equity has remained stable; and
- c. There is substantial other evidence, as set out in Section 5 below, that the overall required return on equity has remained stable.

49 In persisting with a 6.5% MRP (such that its allowed return on equity has been reduced by more than 25% since the Guideline) the AER is apparently applying no weight to any of this evidence. In particular, as the AER's own DGM estimates of the required return on equity have remained stable, it has apparently afforded that evidence progressively less weight – reducing the allowed return by more than 25%.

50 The AER's DGM results and other evidence it relies on to estimate the MRP have steadily risen since the Guideline, and these results appear to have been given progressively less weight in regulatory decisions. In our view, this approach is unreasonable – the allowed return on equity should respond to market conditions and should not be set by adding a fixed premium to the contemporaneous government bond yield.

51 We have also been asked to consider whether the 7.5% estimate is supported by all of the current evidence that we consider to be relevant. In doing this, our approach is to incorporate all of the evidence that we consider to be relevant to informing the estimate of the MRP, including reducing the theta estimate to 0.35. We conclude that the current evidence, including a theta of 0.35, supports an MRP estimate of 7.5%.

1.3 Author of report

52 This report has been authored by Professor Stephen Gray, Professor of Finance at the UQ Business School, University of Queensland and Director of Frontier Economics, a specialist economics and corporate finance consultancy. I have Honours degrees in Commerce and Law from the University of Queensland and a PhD in Financial Economics from Stanford University. I teach graduate level courses with a focus on cost of capital issues, I have published widely in high-level academic journals, and I have more than 20 years' experience advising regulators, government agencies and regulated businesses on cost of capital issues. A copy of my curriculum vitae is attached as an appendix to this report.

53 My opinions set out in this report are based on the specialist knowledge acquired from my training and experience set out above. I have been provided with a copy of the Federal Court's Expert Evidence Practice Note GPN-EXPT, which comprises the guidelines for expert witnesses in the Federal Court of Australia. I have read, understood and complied with the Practice Note and the Harmonised Expert Witness Code of Conduct that is attached to it.

2 The regulatory task

54 Within the CAPM, the MRP is a parameter that reflects the additional return, over and above the risk-free return, that investors would require from an investment of average risk.

55 It is well accepted that the MRP varies over time as market conditions change. For example, as market conditions change, investors might reassess the amount of risk that is involved in a particular investment or the return that they require for bearing risk. This is consistent with the fact that regulatory estimates of the debt risk premium have varied materially over the last 10 years – if the return premium for bearing a certain amount of risk varies materially for debt securities, it follows that it must also vary for equity securities.

56 In this regard, the Australian Energy Regulator (AER) stated in its Rate of Return Guideline materials that:

Evidence suggests the MRP may vary over time. 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.³⁸

57 In its most recent decisions, the AER states that it seeks to estimate:

...the prevailing market risk premium³⁹

which is:

...a forward-looking estimate of the risk premium.⁴⁰

58 The AER also notes that:

The Sharpe-Lintner CAPM is a forward-looking equilibrium asset pricing model and therefore requires forward looking input parameters.⁴¹

59 This is consistent with the view set out in the Guideline materials, where the AER stated that its task is to:

...determine an estimate of the 10 year forward looking risk free rate and 10 year forward looking MRP.⁴²

60 In summary, the AER has recognised that the MRP varies over time and that the regulatory task is to adopt a forward-looking estimate of the MRP that is commensurate with the prevailing conditions in the market for equity funds. We agree with this characterisation of the regulatory task.

61 The AER also notes that the market risk premium is the amount by which the required return on the market portfolio exceeds the risk-free rate.⁴³ That is, the

³⁸ AER, 2013, Rate of Return Guideline: Explanatory Statement, p. 91.

³⁹ AusNet Draft Decision, 2016, Attachment 3, p. 57.

⁴⁰ AusNet Draft Decision, 2016, Attachment 3, p. 57.

⁴¹ AusNet Draft Decision, 2016, Attachment 3, p. 188.

⁴² AER, 2013, Rate of Return Guideline: Explanatory Statement, Appendices, p. 108.

⁴³ AusNet Draft Decision, 2016, Attachment 3, p. 45.

required return on the market portfolio (which is the same as the required return on equity for a stock of average risk) is computed by adding the MRP estimate to the current risk-free rate:

$$r_m = r_f + MRP .$$

62 The resulting estimate of the required return on the market is then used in the SL-CAPM formula:

$$r_e = r_f + \beta(r_m - r_f).$$

63 That is, the regulatory task is to estimate, for an asset of average risk, the forward-looking required return on equity that is commensurate with the prevailing conditions in the market for equity funds.

64 Consequently, in the remainder of this report we consider the question of how to best estimate the forward-looking required return on equity that is commensurate with the prevailing conditions in the market for equity funds. This is equivalent to considering how to best estimate the forward-looking MRP that is commensurate with the prevailing conditions in the market for equity funds. These are equivalent considerations because the two quantities differ only by the risk-free rate, and there is no controversy about that being set to the contemporaneous yield on 10-year government bonds.

3 The AER's Guideline approach to estimating the MRP

3.1 Methods considered by the AER

65 In its Rate of Return Guideline, and in subsequent decisions, the AER has regard to a number of methods for estimating the MRP. In this section, we begin with an overview of those methods and then consider the process by which the AER distils that evidence into an estimate of the forward-looking MRP that is consistent with the prevailing conditions in the market for equity funds.

Historical excess returns

66 Prior to the 2013 Guideline, the AER set the allowed MRP on the basis of the mean of historical excess returns. This approach involves estimating the excess market return for each year of a long historical period by taking the return on a broad stock market index over the year and subtracting the return that could have been earned on government bonds over that year. The mean excess return over the historical period is then used as an estimate of the average MRP over that period.

67 The mean historical excess return ranges between approximately 6.0% and 6.5% depending on which historical period is considered. Prior to the Guideline, the AER had set the MRP to either 6.0% or 6.5% in all of its decisions.

Dividend growth model (DGM)

68 The DGM involves forecasting future dividends on the market portfolio and then solving for the discount rate that equates the present value of those dividends with current stock prices. This approach provides a direct estimate of the required return on the market portfolio. Subtracting the current risk-free rate then produces an estimate of the MRP.

69 In its Guideline materials, the AER stated that the main change to its approach to estimating the MRP was that it intended to apply more weight to DGM estimates of the MRP. In endorsing the use of DGM estimates, the AER stated that:

- a. DGM estimates “may reflect current market conditions more closely”;⁴⁴
- b. “DGMs are recognised financial models that are commonly used in practice;”⁴⁵ and

⁴⁴ AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 96.

⁴⁵ AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 96.

- c. “DGMs are suited to the estimation of the rate of return from current market information, as demonstrated by US regulators using them for this purpose.”⁴⁶

70 In its Guideline, the AER set out its preferred DGM specification, concluding that:

...we have greater confidence in the symmetry of this information through time and give these estimates greater consideration than we have in the past.⁴⁷

Historical real returns (Wright)

71 Another approach for estimating the MRP is what has become known as the “Wright” approach in the Australian regulatory setting. This involves taking the average real return on a broad stock market index over a long historical period and increasing it for expected inflation to obtain an estimate of the required return on the market. Subtracting the current risk-free rate then produces an estimate of the MRP.

72 The AER computes and publishes Wright approach estimates of the MRP, but does not use these estimates to inform its MRP allowance. That is, the AER does not compare its MRP allowance with the Wright estimate of the MRP. Rather, the AER compares:

- a. Its MRP allowance multiplied by its beta estimate of 0.7; with
- b. Its Wright estimate of the MRP multiplied by a beta of 0.4,

and concludes that if the latter is smaller than the former, the Wright evidence will have no impact on its allowed return on equity.⁴⁸

73 This has the effect of ensuring that the Wright evidence will never have any impact on the allowed return on equity.

Other evidence

74 The AER indicates that it has some limited regard to surveys, although the AER states that it:

...consider[s] this evidence less informative than historical averages and DGM estimates.⁴⁹

75 The AER also states that independent expert valuation reports “should play a role in our estimation of the expected return on equity,”⁵⁰ cautioning that they must be contemporaneous:

⁴⁶ AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 96.

⁴⁷ AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 96.

⁴⁸ AusNet Draft Decision, 2016, pp. 192-193.

⁴⁹ AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 96.

⁵⁰ AER, 2013, Rate of Return Guideline, Explanatory Statement, Appendices, p. 28.

Expert reports are credible, verifiable, and clearly sourced. Against this, expert reports are not released at regular intervals. Consequently, some estimates may be out of date.⁵¹

76 The AER also states that it gives “limited consideration”⁵² to conditioning variables and other regulators’ estimates:

We also give some consideration to conditioning variables and other regulators’ MRP estimates. These sources of evidence are subject to various limitations and should be used with caution.⁵³

3.2 Distilling the evidence into a single MRP allowance

77 In its Guideline materials, the AER stated that, when setting the allowed MRP, it relies primarily on its historical excess returns and DGM estimates:

...we give greatest consideration to historical averages followed by estimates of the MRP from DGMs and then surveys. We also give some consideration to conditioning variables and other regulators’ estimates of the MRP.⁵⁴

78 The AER further states that it gives:

...significant consideration to DGM estimates of the MRP,⁵⁵

and described its development of a preferred approach for implementing the DGM as:

...the most significant development in this area.⁵⁶

79 The AER also notes that it gives “some”⁵⁷ consideration to surveys and “limited”⁵⁸ consideration to other evidence. In this regard, the AER states that:

We also give consideration to survey estimates of the MRP but consider this evidence less informative than historical averages and DGM estimates,⁵⁹

and:

We also give some consideration to conditioning variables and other regulators’ MRP estimates. These sources of evidence are subject to various limitations and should be used with caution.⁶⁰

⁵¹ AER, 2013, Rate of Return Guideline, Explanatory Statement, Appendices, p. 28.

⁵² AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 97.

⁵³ AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 97.

⁵⁴ AER, 2103, Rate of Return Guideline, Explanatory Statement, p. 95.

⁵⁵ AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 97.

⁵⁶ AER, 2013, Rate of Return Guideline, Explanatory Statement, Appendices, p. 89.

⁵⁷ AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 97.

⁵⁸ AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 97.

⁵⁹ AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 96.

⁶⁰ AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 97.

80 Thus, when setting the allowed MRP, the AER relies primarily on its historical excess returns and DGM estimates.

81 The AER begins by setting a range for the MRP:

The AER proposes to estimate a range for the MRP, and then select a point estimate from within that range.⁶¹

82 The AER's MRP range is the aggregation of ranges from the historical excess returns and DGM methods. In its Guideline materials, the AER concludes that:

- a. The historical excess returns method supports a range of 5.0% to 6.5%;⁶² and
- b. The DGM method supports a range of 6.1% to 7.5%.⁶³

83 The AER then combines these two ranges into a single combined range of 5.0% to 7.5%.⁶⁴

84 We summarise the AER's Guideline approach to setting the MRP in Figure 7 below. The AER computes DGM estimates using a two-stage specification and a three-stage specification, but has concluded that:

...a three stage DGM is conceptually better than a two stage DGM⁶⁵

and that:

We use a three stage model because we consider the three stage model more plausible. This is because we expect it to take some time for the short term growth in dividends to transition to the long term growth.

In addition to the three stage model, we also consider a two stage model...given the way the short term growth rate is calculated, the two stage model should be used as a cross check.⁶⁶

85 Consequently, we show the full range of the AER's DGM estimates as well as the range from the three-stage specification.

⁶¹ AER, 2013, Rate of Return Guideline, p. 16.

⁶² AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 95.

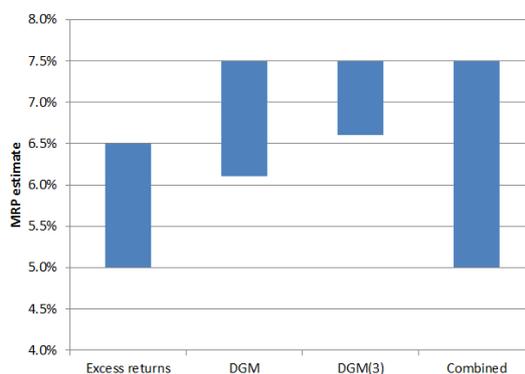
⁶³ AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 97.

⁶⁴ AER, 2103, Rate of Return Guideline, Explanatory Statement, p. 97.

⁶⁵ JGN Draft Decision, 2014, Attachment 3, Appendix C, p. 222.

⁶⁶ JGN Draft Decision, 2014, Attachment 3, Appendix C, p. 222.

Figure 7: AER Guideline MRP ranges



Source: AER Rate of Return Guideline, December 2013.

86 In its Guideline materials, the AER set the allowed MRP to 6.5%. In selecting this figure, the AER noted that there was some overlap between the historical excess returns and DGM ranges at 6.5%:

We consider an MRP estimate of 6.5 per cent provides an appropriate balance between the various sources of evidence. This point estimate lies between the historical average range and the range of estimates produced by the DGM. This reflects our consideration of the strengths and limitations of each source of evidence.⁶⁷

87 Moreover, the AER stated that its preferred historical excess returns estimate is 6.0%⁶⁸ and has since stated that its preferred approach to the DGM is the three-stage specification,⁶⁹ which has a mid-point estimate of 7.1%. The final MRP allowance of 6.5% is approximately the mid-point between these two point estimates.

88 In summary, the approach to the MRP that is set out in the AER's Rate of Return Guideline is to rely primarily on the historical excess returns method and the DGM method (particularly the three-stage method) to specify a range for the MRP and to select a point estimate from within that range. Other evidence is considered to be "less informative"⁷⁰ and is given "some"⁷¹ or "limited"⁷² consideration.

3.3 A forward-looking estimate that is commensurate with the prevailing conditions

89 As set out in Section 2 above, there is broad agreement that the regulatory task is to estimate a forward-looking MRP that is commensurate with the prevailing conditions in the market for equity funds. In this section, we consider how the

⁶⁷ AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 97.

⁶⁸ AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 97.

⁶⁹ JGN Draft Decision, 2014, Attachment 3, Appendix C, p. 222.

⁷⁰ AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 96.

⁷¹ AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 97.

⁷² AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 97.

historical excess returns and DGM methods are able to contribute to this regulatory task.

90 We begin by noting that there is broad agreement that the DGM method does produce a forward-looking MRP that is commensurate with the prevailing conditions in the market for equity funds. In this regard, the AER states that:

The DGM method is a theoretically sound estimation method for the MRP. As DGM estimates incorporate prevailing market prices, they are more likely to reflect prevailing market conditions. DGM estimates are also clearly forward looking as they estimate expectations of future cash flows and equate them with current market prices through the discount rate.⁷³

and:

...we consider DGM estimates have strong theoretical grounding and are more likely to reflect prevailing market conditions than other approaches.⁷⁴

91 The historical excess returns approach estimates the MRP by taking the mean excess return over a long historical period. Self-evidently, this estimate must reflect the average market conditions over the historical period that was used. Logically, this approach can only produce a forward-looking estimate that is commensurate with the prevailing conditions in the market in two circumstances:

- a. Investors always require the same MRP in all market conditions; or
- b. The current market conditions are the same as the average market conditions over the historical period.

92 In relation to the conjecture that investors always require the same MRP in all market conditions, the AER notes that:

Although the [historical excess returns] estimate changes slowly over time, we consider it is likely to reflect prevailing market conditions if investor expectations are guided by historical excess returns.⁷⁵

93 However, the prospect that investors always require the same risk premium in all market conditions is inconsistent with the generally accepted view that risk premiums are higher during recessions and financial crises and lower during economic expansions. It is also inconsistent with the AER's own view that the MRP likely varies over time⁷⁶ and with the following advice from the AER's consultant:

...the AER believes that the historic average of excess returns may be used by investors to estimate the future MRP and therefore would be a forward-looking methodology if investors acted in this way. Whether investors act in this way is debatable.⁷⁷

⁷³ AER, 2013, Rate of Return Guideline: Explanatory Statement, Appendices, p. 84.

⁷⁴ AER, 2013, Rate of Return Guideline: Explanatory Statement, Appendices, p. 85.

⁷⁵ AER, 2013, Rate of Return Guideline: Explanatory Statement, Appendices, p. 78.

⁷⁶ AER, 2013, Rate of Return Guideline: Explanatory Statement, p. 91.

⁷⁷ Lally, M., 2013, Review of the AER's Methodology, March, p. 6.

94 The alternative motivation for the use of mean historical excess returns is that the current market conditions are the same as the average market conditions over the historical period. However, the prevailing market conditions are very different from the average historical conditions in that the yield on government bonds is lower than at any time in history. The yield on 10-year government bonds at the time of the AER’s most recent draft decision was 1.95%⁷⁸ whereas the average yields over the various historical periods that the AER considers are several times greater than this, as set out in Table 1 below.

Table 1: Mean historical excess return estimates

Historical period	Mean excess return	Mean government bond yield
1883-2015	6.3%	5.6%
1937-2015	6.0%	6.5%
1958-2015	6.5%	7.6%
1980-2015	6.2%	8.4%
1988-2015	5.6%	6.9%

Source: Frontier calculations.

95 Of course, there are many dimensions to “market conditions” and many variables can be used to provide an indication of whether the prevailing conditions differ from the historical average market conditions. We consider that the 10-year government bond yield is the most directly relevant and important indicator because it is the figure that is added to the MRP estimate to produce the allowed return on equity.

96 Thus, the approach of adding the (effectively constant) mean historical excess return estimate to the prevailing government bond yield currently produces an historically low allowed return on equity – due to the historically low government bond yield. This would only be appropriate if the cost of equity capital really was at historical lows. The evidence that we report in Sections 4 and 5 below, as well as the AER’s own DGM evidence, is inconsistent with the notion that the cost of equity capital is currently at historical lows. Rather, the evidence suggests that the cost of equity capital has been quite stable over recent years, even as government bond yields have fallen materially.

97 Because:

- a. Investors do *not* always require the same MRP in all market conditions; and
- b. The current market conditions are *not* the same as the average market conditions over the historical period,

⁷⁸ Powerlink Draft Decision, Attachment 3, p. 9.

there is no reason to conclude that the historical excess returns approach would, in the current circumstances, produce a forward-looking MRP that is commensurate with the prevailing conditions in the market for equity funds.

98 Indeed, the AER itself distinguishes between its historical MRP estimates on the one hand and its forward-looking DGM estimates on the other:

Rather, we used results from both forward looking methods and historical averaging of excess returns for estimating the MRP and the results from forward looking methods unambiguously constitute estimates of the prevailing rather than the long-term average value for the MRP.⁷⁹

99 The AER goes on to conclude that the only reason that there is any need to rely on mean historical excess return estimates is due to concerns about relying exclusively on the forward-looking DGM estimate:

If a perfectly reliable estimate of the MRP could be generated from market prices it would be reasonable to use this estimate. However, no such estimate exists.⁸⁰

⁷⁹ AER, 2013, Rate of Return Guideline, Explanatory Statement, Appendices, p. 103.

⁸⁰ AER, 2013, Rate of Return Guideline, Explanatory Statement, Appendices, p. 110.

4 The evolution of the evidence on which the AER relies

4.1 The evolution of the AER's range of estimates

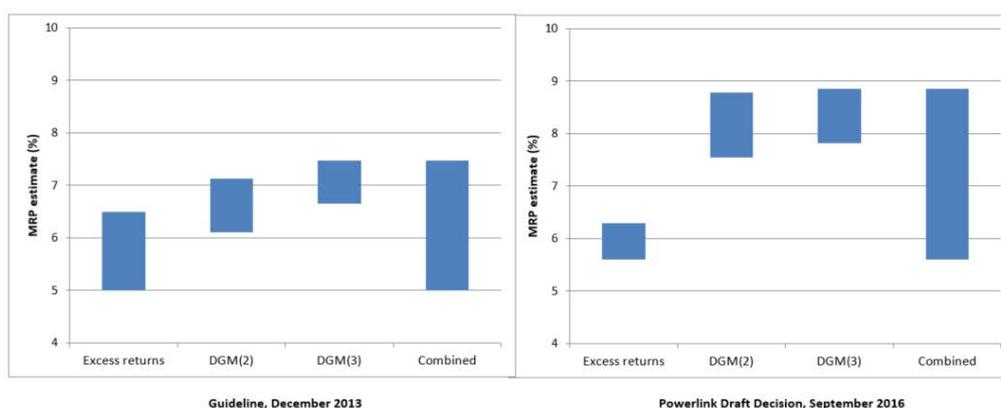
100 In this section, we show that the evidence on which the AER relies has changed materially since the publication of the Guideline in 2013. However, the AER has maintained the same MRP allowance of 6.5% in every decision since the Guideline.

101 As set out in Section 3 above, the AER's Guideline approach to the MRP is to form a range based on the combined range of its historical excess returns and DGM estimates. The resulting ranges from the evidence at the time of the Guideline and the current evidence are set out in Figure 8 below.

102 Clearly, the evidence has changed materially since the time of the Guideline. The estimates from the AER's forward-looking DGM specifications have increased substantially, so the top end of the combined range is now materially higher than at the time of the Guideline.

103 Whereas the Guideline and subsequent AER decisions specified a range of 5.0% to 6.5% for the historical excess returns estimates, the AER's recent decisions no longer specify a range. Rather, the AER states that its "range for historical returns is based on arithmetic averages." The arithmetic averages that the AER reports in its recent decisions range between 5.6% and 6.3%, depending on which historical period is considered.⁸¹ This is the range that we have displayed in Figure 8 below.

Figure 8: AER MRP ranges

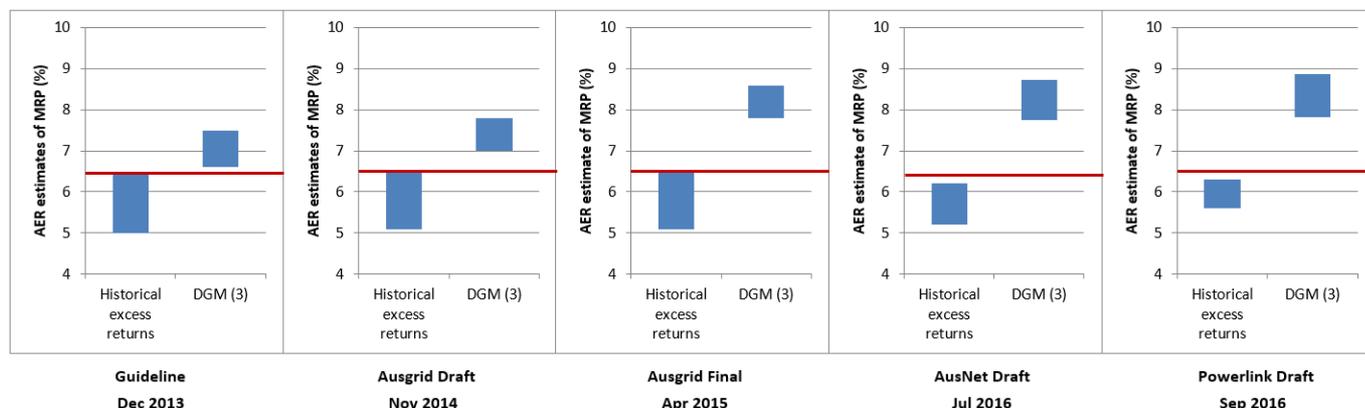


Source: AER Rate of Return Guideline, December 2013; Powerlink Draft Decision, September 2016.

104 We summarise the evolution of the AER's primary MRP estimates and the AER's MRP allowance in Figure 9 below.

⁸¹ Powerlink Draft Decision, 2016, Attachment 3, Table 3-16, pp. 104 to 105.

Figure 9: The AER's primary MRP estimates



Source: Rate of Return Guideline December 2013; Ausgrid Draft Decision November 2014; Ausgrid Final Decision April 2015; AusNet Draft Decision July 2016; Powerlink Draft Decision September 2016.

105 Figure 9 shows that:

- The AER's historical excess returns estimate has not changed materially since the Guideline;⁸²
- The AER's DGM estimates of the MRP have increased materially since the Guideline and are currently higher than at any time since the Guideline; and
- The AER's allowed MRP (the red line in the figure) has remained constant since the Guideline.

106 That is, Figure 9 shows that the AER's DGM estimates appear to have little or no impact on the AER's MRP allowance – the AER's DGM estimates have increased materially, but this has had no impact on the AER's MRP allowance.

107 We note that, in its recent final decisions, the AER has stated that it has not departed from its Guideline approach to the MRP⁸³ and that:

We have not changed the weight we apply to the dividend growth model.⁸⁴

108 That is, the AER's approach to processing the relevant evidence and the weight that it applies to the DGM evidence has not changed since the Guideline. This can only be reconciled with the evidence in Figure 9 above if the DGM evidence plays only a minor role in determining the allowed MRP, with the vast majority of weight being applied to historical excess returns.⁸⁵ Although the AER's own DGM

⁸² We consider this source of evidence in more detail in Section 4.2 below.

⁸³ AusNet Draft Decision, 2016, Attachment 3, p. 61.

⁸⁴ AusNet Draft Decision, 2016, Attachment 3, p. 207.

⁸⁵ We have previously submitted that the AER appears to use the DGM for no purpose other than selecting a point estimate at the top of its primary range based on historical excess returns. However, the AER has stated that it does not use its DGM evidence in this way. See, for example, Ausgrid Final Decision, 2016, Attachment 3, pp. 368-369.

estimates have diverged materially since the Guideline, its MRP allowance remains anchored to the historical excess returns estimate.

109 In summary, the AER's MRP allowance appears to be based almost exclusively on the historical excess returns estimate – which, by its nature, is guaranteed to remain very stable over time and is independent of the prevailing market conditions. If material weight is assigned only to methods that produce essentially constant estimates over time, it is impossible for there to be any result other than a constant allowed MRP.

110 This contrasts with the regulatory task of estimating a forward-looking MRP that is commensurate with the prevailing conditions in the market for equity funds. The AER's DGM estimates suggest that the forward-looking MRP that is commensurate with the prevailing conditions has increased materially since the Guideline, but the AER's MRP allowance has remained fixed.

111 In the remainder of this section, we summarise the evolution of the MRP estimates from each of the methods that the AER set out in its Guideline. In general, we report that:

- a. The long-run mean of historical excess returns has remained stable due to its nature as a long-run mean; and
- b. The other evidence suggests that since the Guideline, the overall required return on equity has remained quite stable even as government bond yields have fallen – implying that the MRP has increased.

4.2 The AER's historical excess returns estimates

112 In its Rate of Return Guideline, the AER set out estimates of the arithmetic and geometric mean of excess returns over various historical periods.⁸⁶ The AER concluded that the mean historical excess returns supported an MRP range of 5.0% to 6.5%.

113 The top of that range was set slightly above the highest arithmetic mean estimate, presumably in recognition of the fact that no mean estimate is perfectly precise, but has a statistical confidence interval around it.⁸⁷

114 The bottom of that range was set to 20 basis points above the highest geometric mean estimate due to concerns about the geometric estimate:

...there are concerns with using the geometric mean as a forward looking estimate. Therefore, we consider a reasonable estimate of the lower bound will be above the geometric average. However, we give some weight to geometric

⁸⁶ AER, 2013, Rate of Return Guideline, Explanatory Statement, Appendices, Table D.2, p. 83.

⁸⁷ This is not to say that the 6.5% figure is based formally on any confidence interval. Given the high volatility in annual excess returns, the standard error of the mean estimates is large and statistical confidence intervals are very wide.

mean estimates. Therefore, we consider a lower bound estimate of 5.0 per cent appropriate.⁸⁸

115 In its November 2014 draft decisions and its April 2015 final decisions, the AER followed the Guideline in setting the top of the range to 6.5% and the bottom of the range to 20 basis points above the highest geometric mean:

Consistent with the approach in the Guideline, we set the bottom of the range as 20 basis points above the highest estimate from the range of geometric averages.⁸⁹

116 In its May 2016 final decisions, the AER appeared to change its approach to reporting the evidence from historical excess returns:

Historical excess returns provide our baseline estimate and indicates a market risk premium of approximately 5.5 to 6.0 per cent from a range of 4.8 per cent to 6.0 per cent. We consider both geometric and arithmetic averages of historical returns. However, we consider there may be evidence of bias in the geometric averages. Therefore, our range for historical returns is based on arithmetic averages.⁹⁰

117 The AER has adopted the same approach in its July 2016 draft decisions.⁹¹

118 Having concluded that there may be evidence of bias in the geometric averages, the AER states that its “range for historical returns is based on arithmetic averages.”⁹² The arithmetic averages that the AER now reports range between 5.6% and 6.3%, depending on which historical period is considered.⁹³ This is the range that we have displayed in Figure 9 above.

119 Our estimates of the mean historical excess return for various sample periods are set out in Figure 10 below. For each period, we display the mean estimate and a confidence interval one standard error either side of the mean. In our view, a reasonable characterisation of this evidence is a range of 5.5% to 6.5%.

⁸⁸ AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 93.

⁸⁹ AER, 2014, Draft Decision: Ausgrid Distribution Determination 2015-16 to 2018-19, November, (Ausgrid Draft Decision), Attachment 3, p. 193; AER, 2015, Final Decision: Ausgrid Distribution Determination 2015-16 to 2018-19, April, (Ausgrid Final Decision), Attachment 3, p. 115.

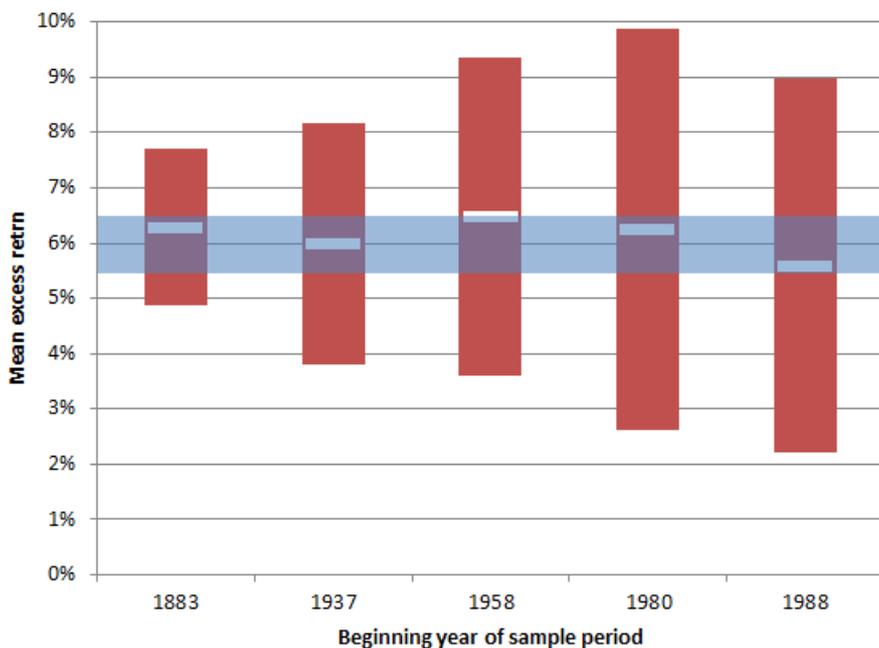
⁹⁰ AusNet Draft Decision, 2016, Attachment 3, p. 59.

⁹¹ AusNet Draft Decision, 2016, Attachment 3, p. 59.

⁹² AusNet Draft Decision, 2016, Attachment 3, p. 59.

⁹³ Powerlink Draft Decision, 2016, Attachment 3, Table 3-16, p. 104 to 105.

Figure 10: Proposed range of historical excess returns estimates



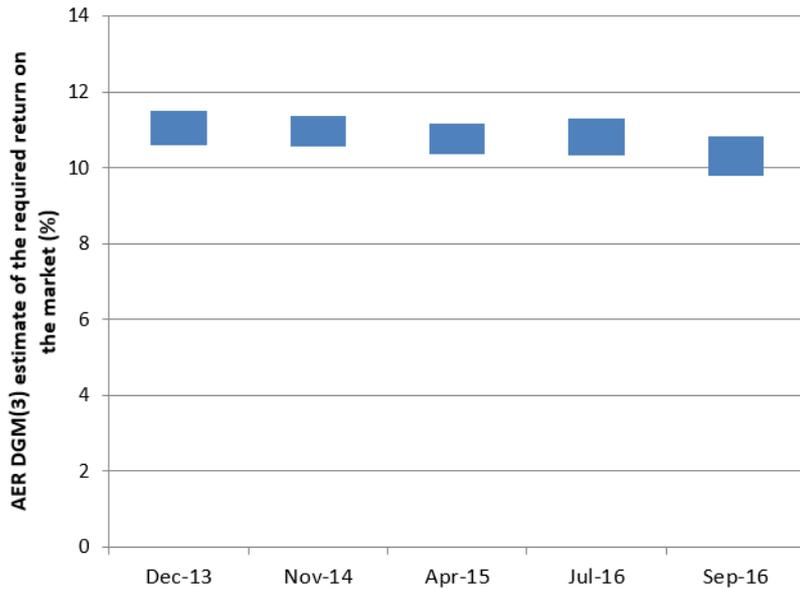
Source: Frontier Economics calculations.

4.3 The AER’s DGM estimates

120 The evolution of the AER’s DGM estimates of the MRP is summarised in Figure 9 above. It is clear that these estimates have increased materially since the Guideline.

121 The reason for the increase in these estimates of the MRP is that the overall required return on equity has remained stable while the government bond yield has fallen materially. Figure 11 below shows that the AER’s own DGM estimates of the required return on equity have not changed between the Guideline in December 2013 and the AER’s recent May 2016 decisions, and remain the same when applied to current data. Since an ever decreasing government bond yield is being subtracted from a stable estimate of the required return on equity, the result is an increasing estimate of the MRP.

Figure 11: AER three-stage DGM estimates of the required return on the market

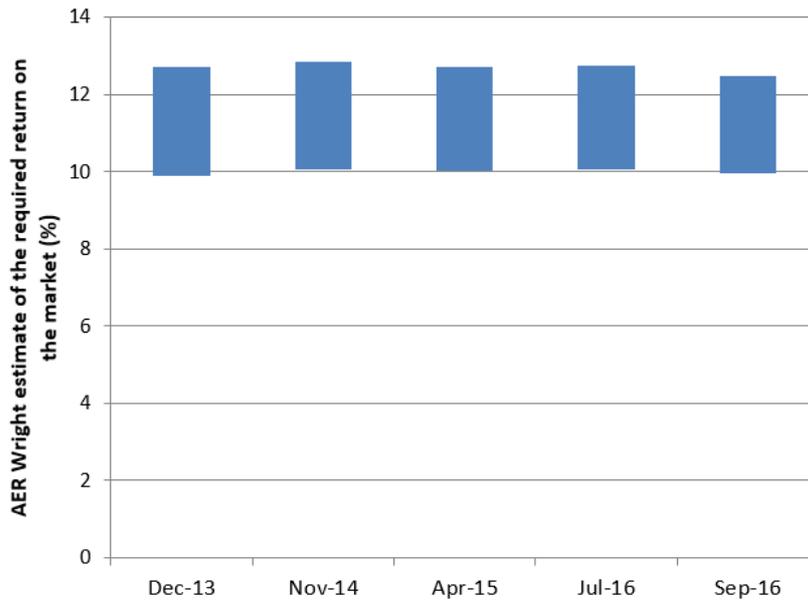


Source: AER Rate of Return Guideline December 2013; AER Ausgrid Draft Decision November 2014; AER Ausgrid Final Decision April 2015; AER AusNet Draft Decision July 2016; Powerlink Draft Decision September 2016.

4.4 The AER’s Wright estimates

122 The AER reports that its Wright estimates of the required return on the market have remained stable since the Guideline, as summarised in Figure 12 below.

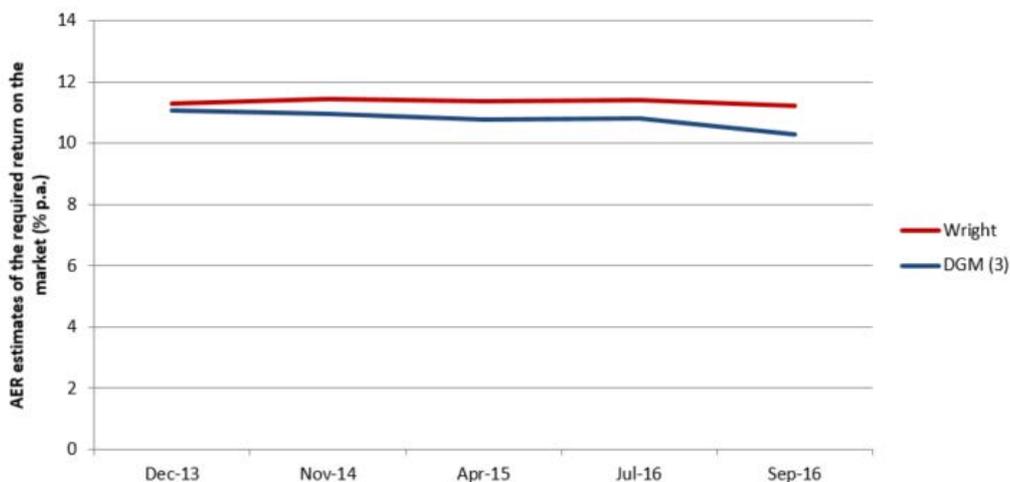
Figure 12: AER Wright estimates of the required return on the market



Source: AER Rate of Return Guideline December 2013; AER Ausgrid Draft Decision November 2014; AER Ausgrid Final Decision April 2015; AER AusNet Draft Decision July 2016; Powerlink Draft Decision September 2016.

123 This is consistent with the AER's DGM estimates above. Since the Guideline, the AER's mid-point estimates of the required return on the market have remained remarkably constant, as summarised in Figure 13 below.

Figure 13: The AER's DGM and Wright estimates of the required return on the market



Source: AER Rate of Return Guideline December 2013; AER Ausgrid Draft Decision November 2014; AER Ausgrid Final Decision April 2015; AER AusNet Draft Decision July 2016; Powerlink Draft Decision September 2016.

4.5 Other considerations

124 Whereas the AER has regard to a number of other considerations when setting its MRP allowance, none of these have led the AER to make any adjustment to its preliminary estimate that is based primarily on historical excess returns. The fact that the other considerations do not have any material influence serves to reinforce the stability in the MRP allowance. In this section, we analyse updated data in relation to items that the AER has considered in its recent decisions.

Regulatory determinations

125 When determining its MRP allowance, the AER has some regard to MRP allowances from other regulators.⁹⁴ Table 2 below sets out recent allowances from a number of regulators.

⁹⁴ AusNet Draft Decision, 2016, Attachment 3, p. 229.

Table 2: Other regulator's MRP allowances

Regulator	Determination	Date	MRP allowance	Details
ERA	ATCO Gas Final Decision	06/2015	7.6%	5.5 to 8.9% historical returns (excess returns and Wright approach). 5.6% to 9.7% DGM.
	DBP Final Decision	06/2016	7.4%	5.4 to 8.5% historical returns (excess returns and Wright approach). 7.6% to 8.8% DGM.
IPART	Semi-annual WACC Update	08/2016	7.3%	6.0% historical average. 8.6% prevailing conditions. IPART adds its MRP estimate to a risk-free rate that is 120 basis points above the prevailing government bond yield.
ESC	Goulburn-Murray Water Draft Determination	02/2016	6.0%	Not a current market estimate; taken from ACCC Water Pricing Principles
ESCOSA	SA Water Final determination	06/2016	6.0%	Based entirely on historical excess returns
QCA	DBCT Draft Decision	06/2016	6.5%	6.4% historical excess returns 5.4% adjusted historical excess returns 6.0% surveys 8.2% adjusted DGM 7.4% Wright (as at August 2014)
Ofgem (UK)	RIIO-ED1	11/2014	7.1%	Allowed real return on the market of 6.5%, inflation forecast of 2.4%, contemporaneous 10-year government bond yield of 2.2%.
FERC (US)	Baltimore Gas et al	02/2016	8.3%	Allowed nominal return on equity of 10.0%, contemporaneous 10-year government bond yield of 1.7%.

Source: Regulatory determinations; Frontier calculations.

126 When interpreting the figures set out in Table 2, it is important to bear in mind that:

- a. The process of regulators relying on estimates of other regulators has an element of circularity about it;
- b. It is important to consider any differences in the basis for the other MRP allowances and any differences in how the other MRP allowances are used; and
- c. The required return on the market may differ across countries.

127 For example, in relation to the second point above we note that:

- a. The ERA's decisions have been made under the National Electricity Rules and National Gas Rules and so are the decisions that are most comparable to those of the AER. Specifically, like

the AER, the ERA is obliged to have regard to the prevailing conditions in the market for equity funds.⁹⁵

- b. IPART currently uses a risk-free rate that is 120 basis points above the prevailing government bond yield. This equates to an MRP of 8.5% in the case where the risk-free rate is set equal to the prevailing government bond yield;
- c. The ESC has noted that it is required to follow the ACCC's Water Pricing Principles⁹⁶ which requires that an MRP of 6.0% must be used.⁹⁷ The Water Pricing Principles were set in July 2011 and the 6.0% figure was based on data through to 2008,⁹⁸ and
- d. ESCoSA has adopted an MRP allowance based entirely on historical excess returns and gives no weight to any method that has regard to the prevailing conditions in the market for equity funds.

128 It is also important to understand that the Ofgem and FERC estimates set out above are figures that have been derived to be comparable with the AER's MRP allowance. Specifically, under the AER's approach the nominal allowed return on the market is computed as the sum of the contemporaneous 10-year nominal government bond yield and the allowed MRP of 6.5%.

129 The Ofgem approach is to set an allowed real return on the market of 6.5%.⁹⁹ We add to this an estimate of 10-year "breakeven inflation" of 2.8%, estimated using the relevant data from the Bank of England as at the date of the Ofgem decision, and using the approach set out by Ofgem.¹⁰⁰ This produces a nominal market return of 9.3%. From this, we subtract the contemporaneous 10-year nominal government bond yield of 2.2%, obtained from the Bank of England.¹⁰¹ This produces a MRP allowance of 7.1% that is on the same basis as the AER's 6.5% allowance. Both are figures that can be added to the contemporaneous 10-year government bond yield to produce an estimate of the nominal required return on the market.

130 We also note that, in this decision, Ofgem has stated that:

Our advisors argue and we accept that the equity market return does not necessarily decline with the risk free rate.¹⁰²

⁹⁵ NER 6.5.2(g); NGR 87(7).

⁹⁶ ESC, 2016, Goulburn-Murray Final Decision, p. 1.

⁹⁷ ACCC, 2011, Water Pricing Principles, Table 1, p. 28.

⁹⁸ ACCC, 2011, Water Pricing Principles, p. 31.

⁹⁹ Ofgem, 2014, RIIO-ED1 Draft Determinations for the slow-track electricity distribution companies: Financial issues, p. 7.

¹⁰⁰ Ofgem, 2010, 31 March, RIIO-T1 and RIIO-GD1 Review – Glossary of terms, p. 2.

¹⁰¹ <http://www.bankofengland.co.uk/statistics/pages/yieldcurve/default.aspx>.

¹⁰² Ofgem, Methodology for assessing the equity market return, February 2014, p. 17.

131 The FERC approach is to allow a nominal return on equity for the regulated business. In its approval of the return on equity in the recent Baltimore Gas case, the nominal allowed return on equity was 10.0%, with a further 0.5% available for becoming a member of a regional transmission organisation.¹⁰³ We take the allowed nominal return on equity and subtract the contemporaneous 10-year government bond yield of 1.7% to produce an estimate of the MRP of 8.3%.¹⁰⁴

Surveys

132 The AER summarises the results of a number of surveys in its recent final decisions.¹⁰⁵ Shortly after the preparation of those decisions, Pablo Fernandez disseminated the 2016 version of his MRP survey in working paper form. The relevant outcomes of that survey are summarised in Table 3 below.

Table 3: Recent survey outcomes

Survey	Number of responses	Mean (%)	Median (%)
Fernandez et al (2016)	87	6.0%	6.0%

Source: Fernandez, P., A. Ortiz and I F Acin, *Market risk premium used in 71 countries in 2016*, Unpublished working paper, University of Navarra, Spain.

133 We note that we have previously recommended that surveys of this type should be given no material weight because:

- a. There is no information about the qualifications or expertise of the respondents;
- b. There is no information about the survey response rate, or about whether there is any bias in the response rates of different groups;
- c. The survey does not ask respondents about what they use the MRP for (e.g., classroom examples or pricing infrastructure assets);
- d. The survey does not ask respondents whether they use the MRP in the CAPM, or some other model;
- e. The survey does not ask the respondents whether they pair their MRP response with the contemporaneous government bond yield or a higher number (as is the observed practice of many independent expert valuation professionals);

¹⁰³ 154 FERC 61,125, February 23 2016, p. 2.

¹⁰⁴ Note that this is conservative in that it assumes that an equity beta of 1.0 has been used for the utility. FERC does not publish a CAPM beta point estimate, but rather sets the allowed return on equity based on consideration of a number of different models.

¹⁰⁵ AusNet Draft Decision, 2016, Attachment 3, Table 3-33, p. 218.

- f. The survey does not ask participants whether they have grossed-up their estimate for some assumed value of imputation credits, and if so whether they applied a theta of 0.6 or something else; and
- g. There is no information about when the survey was conducted, or about the level of government bond yields at the time the survey was conducted.

134 Although the surveys tend to be silent on whether or not the reported figures include any assumed benefit from imputation credits, it is most likely that survey respondents have provided ex-imputation estimates – it seems unlikely that survey respondents would gross-up their estimates of the MRP to include their assessment of the benefits of imputation credits when the survey document is entirely silent on imputation credits. There is no reasonable likelihood that all survey respondents have grossed-up estimates to reflect the AER’s assumed value of imputation credits, so the survey estimates cannot be compared with the AER’s estimates. Consequently, before they can be compared to the AER’s (with-imputation) 6.5% allowance, the survey estimates must be adjusted. By way of example, the QCA has concluded that this adjustment requires the addition of 83 basis points.¹⁰⁶

Independent expert valuation reports

135 We have conducted a search for independent expert valuation reports that were released in 2016 and which pertained to transactions in excess of \$100 million. Since independent experts generally apply consistent approaches over time, we consider only one report per expert firm. This process produced four recent independent expert reports, as set out in Table 4 below.

Table 4: Recent independent expert valuation reports

Company name	Independent expert	Report date	Transaction value (\$ millions)
Ethane Pipeline Income Fund	Loneragan Edwards ¹⁰⁷	31/03/2016	122
Pacific Brands Ltd	Grant Samuel ¹⁰⁸	20/05/2016	1,055
Patties Foods Ltd	Deloitte ¹⁰⁹	15/07/2016	197
STW Communications Group Ltd	KPMG ¹¹⁰	29/02/2016	338

Source: Connect 4.

¹⁰⁶ QCA, 2014, Aurizon Network, UT4 Draft Decision, p. 232.

¹⁰⁷ Lonergan Edwards, 2016, Independent Expert Report on Ethan Pipeline Income Fund, April.

¹⁰⁸ Grant Samuel, 2016, Independent Expert Report on Pacific Brands Ltd, May.

¹⁰⁹ Deloitte, 2016, Independent Expert Report on Patties Foods Ltd, July.

¹¹⁰ KPMG, 2016, Independent Expert Report on STW Communications Group Ltd, March.

136 All four experts set the required return on equity materially above the figure that would be obtained from inserting the current government bond yield and a 6.5% MRP into the SL-CAPM formula. The independent expert reports achieve the higher estimates of the required return on equity in three different ways:

- a. By using an estimate of the MRP higher than 6.5%;
- b. By using a risk-free rate above the contemporaneous government bond yield; and
- c. By applying an ad hoc increase to the mechanistic CAPM estimate.

137 For example, Grant Samuel begins with a mechanistic CAPM estimate of the required return on equity using the contemporaneous government bond yield and a MRP based on historical excess returns, concludes that the outcome is implausible in the prevailing market conditions, and makes a material upward adjustment.

138 Lonergan Edwards state:

In our view, the application of the current (very low) government bond yields and long-term average MRP is inappropriate in the context of determining required equity rates of return (discount rates). Theoretically, the anomalous currently low government bond interest rates could be allowed for by increasing the MRP. However, as it is difficult to reliably measure short-term movements in the MRP, we have instead increased the risk-free rate for the purposes of estimating required rates of return.¹¹¹

139 KPMG also use a risk-free rate that is higher than the contemporaneous government bond yield. They specifically note that the MRP and risk-free rate must be considered jointly and not in isolation:

...the individual variables should not be considered in isolation but rather be viewed as components appropriate for the construction of a discount rate as a whole...Consideration of these components in isolation may result in an inappropriate discount rate being determined.¹¹²

140 For this reason, we consider the sum of the risk-free rate and MRP and define that to be the “required market return.” We then subtract the contemporaneous government bond yield to obtain an estimate of the “effective MRP.” These calculations are set out in Table 5 below.¹¹³

¹¹¹ Lonergan Edwards, 2016, p. 47.

¹¹² KPMG, 2016, p. 85.

¹¹³ Grant Samuel applies an upward adjustment at the WACC level. To find the required return on the market, we simply strip out the return on debt component for the case where beta is set to 1.

Table 5: The effective MRP used in recent independent expert valuation reports

Independent expert	Required market return	Contemporaneous government bond yield	Effective MRP
Lonergan Edwards	10.0%	3.1%	6.9%
Grant Samuel	11.2%	2.5%	8.7%
Deloitte	9.6%	1.8%	7.8%
KPMG	10.4%	2.4%	8.0%

Source: Connect 4.

141 The evidence in Table 5 is that independent experts are using estimates of the required return on equity that are materially higher than those being allowed by the AER's approach of adding a fixed 6.5% premium to the prevailing government bond yield.

142 Moreover, the MRP figures set out in Table 5 are ex-imputation estimates. Consequently, before they can be compared to the AER's 6.5% allowance, they must be grossed-up to reflect the AER's assumed value of imputation credits. By way of example, the QCA has concluded that this adjustment requires the addition of 83 basis points.

143 On the issue of imputation credits, Lonergan Edwards specifically states that its WACC parameter estimates have been derived:

...without adjustment for imputation.¹¹⁴

and Grant Samuel conclude that:

While acquirers are undoubtedly attracted by franking credits there is no clear evidence that they will actually pay extra for them or build it into values based on long term cash flows. Accordingly, it is Grant Samuel's opinion that it is not appropriate to make any adjustment.¹¹⁵

144 Our preferred approach is to use estimates of the risk-free rate and MRP that are commensurate with the prevailing conditions in equity markets. In our view, the MRP that is commensurate with the prevailing conditions is materially higher than the AER's 6.5% allowance, in which case the required return on equity is materially higher than the AER's allowance.

145 Although some independent experts take a different path, they all reach the same conclusion – in the prevailing conditions in the market for equity funds, the required return on equity is materially higher than the AER's allowance.

¹¹⁴ Lonergan Edwards, 2016, p. 45.

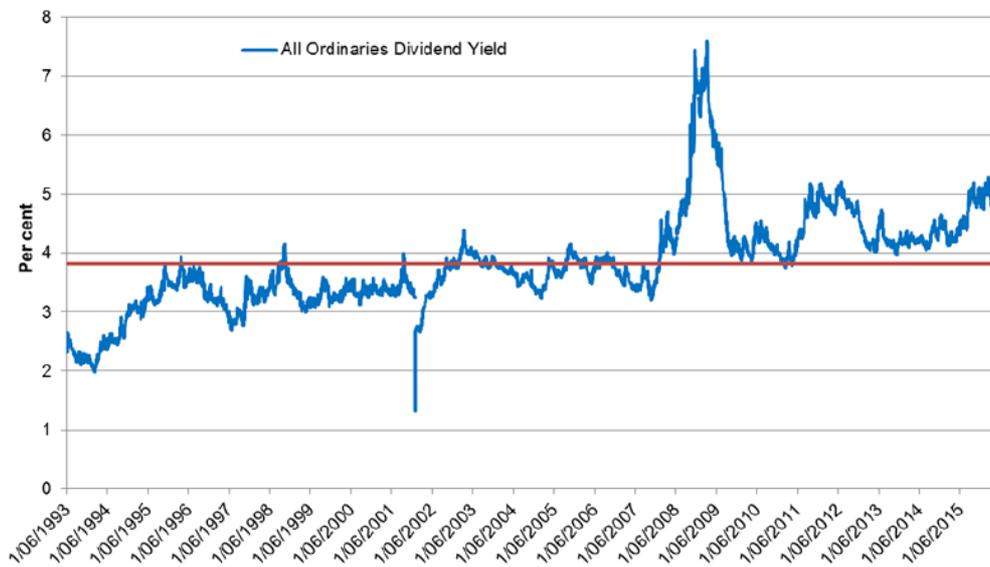
¹¹⁵ Grant Samuel, 2016, p. 11.

Conditioning variables

146 In its recent final decisions, the AER has regard to a number of conditioning variables as a qualitative cross check of its return on equity allowance.¹¹⁶ We set out below updated estimates of the conditioning variables that the AER considers.

147 The ERA has recently published updated figures for the dividend yield on the broad Australian market. We reproduce that data in Figure 14 below and note that dividend yields are not as high as during the peak of the GFC but are well above pre-GFC levels and the levels that were observed during 2013-14.

Figure 14: ERA updated dividend yield figures

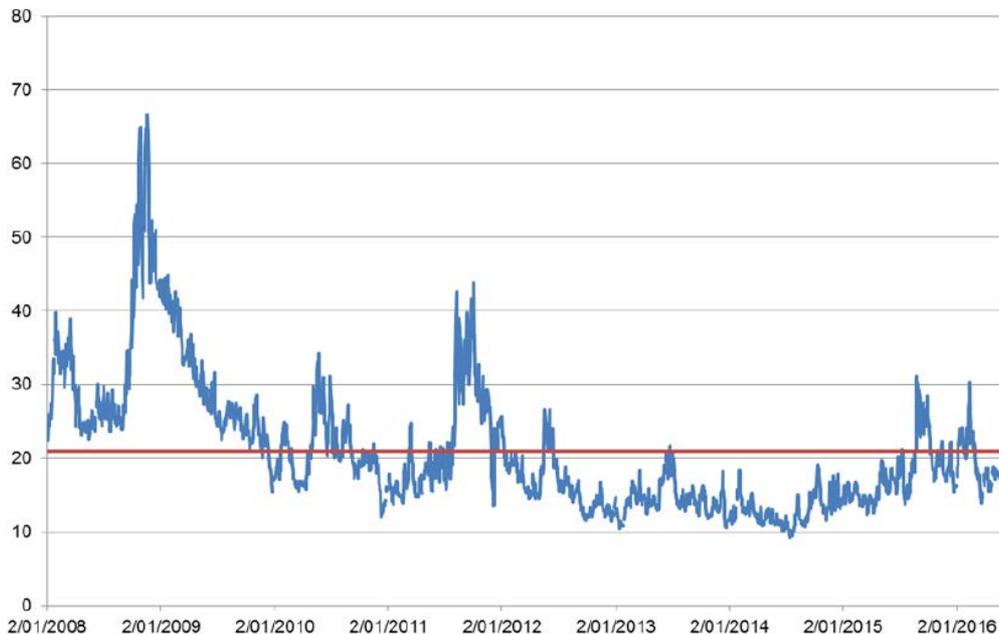


Source: ERA DBP Final Decision, 2016, Appendix 4, p. 121. Data from Bloomberg. The red line is the mean estimate over the data period shown in the graph.

148 Figure 15 below sets out implied volatilities from stock index options with 30 days to maturity. This data provides an indication of expected market volatility over the subsequent month. These implied volatilities have varied within a relatively narrow band since the GFC.

¹¹⁶ AusNet Draft Decision, 2016, Attachment 3, beginning on p. 208.

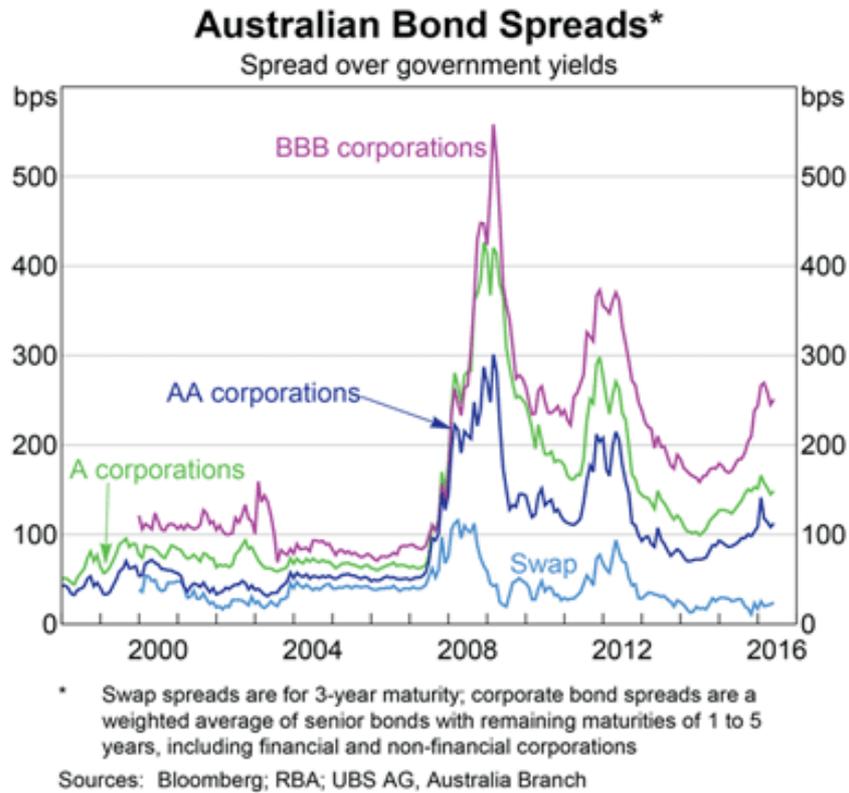
Figure 15: ERA updated option implied volatility figures



Source: ERA DBP Final Decision, 2016, Appendix 4, p. 121. Data from Bloomberg. The vertical scale is annual implied stock return volatility in per cent per annum (e.g., 30 represents an annualised standard deviation of stock returns of 30%). The red line is the mean estimate over the data period shown in the graph.

149 Figure 16 below sets out RBA estimates of corporate bond spreads. This figure shows that spreads have reduced since the GFC, but have increased over the last year.

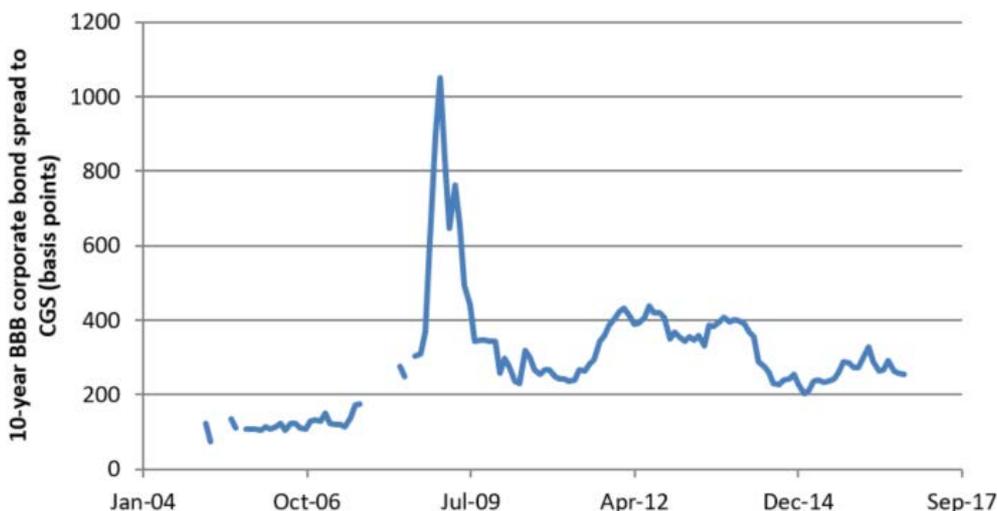
Figure 16: RBA bond spread estimates



Source: RBA Chart Pack, August 2016.

150 Figure 17 below sets out RBA estimates of 10-year BBB corporate bond spreads. This figure also shows that spreads have reduced since the GFC, but have increased over the last year.

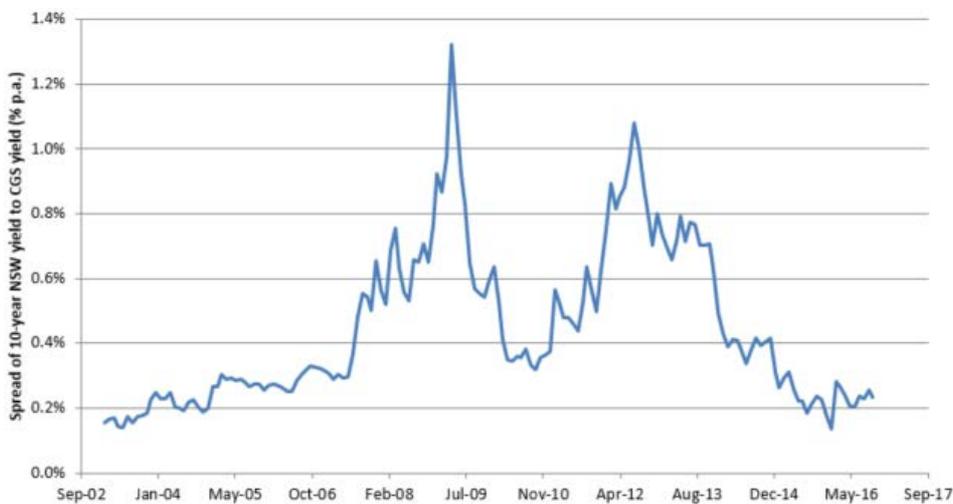
Figure 17: 10-year BBB corporate bond spreads



Source: RBA Table F3; Frontier calculations using AER approach to extrapolating bond yield estimates to 10-year maturity.

151 Figure 18 below sets out RBA estimates of the spread between 10-year NSW government bonds and 10-year Commonwealth government securities. This figure shows that the spread has returned to pre-GFC levels.

Figure 18: 10-year NSW-CGS bond spreads



Source: RBA Table F3.

152 In the absence of a formal econometric mapping of these conditioning variables to a point estimate of the MRP, it is difficult to know what to make of this evidence. In the prevailing market conditions of record low government bond yields, the challenge of mapping conditioning information to a point estimate of the MRP is particularly difficult. This is because some of the conditioning variables relate to required returns whereas others relate to risk premiums. For example, the dividend yield is related to overall required returns – a higher yield implies that a given set of dividends is being discounted at a higher rate. By contrast, corporate bond spreads relate to risk-premiums.

153 When government bond yields are near their long-run average levels, this distinction is much less important as risk premiums in the current and the historical data are computed by subtracting the same base risk-free rate. The analysis in the prevailing market conditions is complicated by the fact that current government bond yields are so far below the historical average over the period for which conditioning information is available.

154 Nevertheless, one conclusion that can be confidently drawn from the conditioning variable information is that it does not support the proposition that the required return on equity has plummeted by 25% since the Guideline – which is the implication of the AER’s recent decisions, as set out in Section 6 below.

The application of ‘cross checks’ at the equity risk premium level

155 The AER has also adopted the practice of applying a number of ‘cross checks’ to its equity risk premium, which is defined as the product of beta and the MRP. In our view, there are a number of problems with this approach.

There is no apparent mechanism for cross checks to have any influence on allowed returns

156 Logically, the AER’s allowed return will either pass or fail each cross check:

- a. If the allowed return passes the cross check, it is maintained and the cross check has had no impact on what the allowed return would otherwise have been;
- b. If the allowed return fails the cross check, logically, there are two possible approaches:
 - i. No adjustment is made to the original allowed return – in which case there is no point in performing the cross check; or
 - ii. An adjustment *is* made to make the allowed return consistent with the cross check – in which case the cross check overrides the primary evidence.

Since neither of these options is palatable, there is strong incentive to conclude that the allowed return passes every cross check that is applied.

157 By contrast, our preferred approach is to simply set out all of the relevant evidence and to weight each piece according to its relative strengths and weaknesses.

Applying the cross check at the ‘equity risk premium’ level can be misleading

158 The AER’s approach has been to conduct cross checks using independent expert reports and broker research at the equity risk premium level. The AER has defined the product of beta and the MRP as the equity risk premium and makes comparisons at that level. We provide two specific examples of why the AER’s application of this approach has, to date, resulted in misleading outputs.

The AER's approach has disregarded adjustments to historical estimates to account for the prevailing market conditions

159 The first example is the Grant Samuel independent expert report for Envestra Ltd.¹¹⁷ Grant Samuel begins with what it calls “a mechanistic application of formulae”¹¹⁸ which involves inserting long-run historical average figures into the CAPM formula. This produces an equity risk premium range of 3.6% to 4.2%.¹¹⁹ Grant Samuel makes a point of stating that this is an ex-imputation estimate.¹²⁰ The AER acknowledges that its allowed equity risk premium is a with-imputation estimate, and makes an adjustment to the Grant Samuel estimate accordingly. Adding the AER's assumed value of imputation credits to the Grant Samuel estimates produces an equity risk premium range of 4.1% to 4.8%.¹²¹ The AER then concludes that, because its allowed equity risk premium of 4.55%¹²² lies within the Grant Samuel range, it passes this cross check.

160 However, Grant Samuel goes on explain why its mechanistic application is unlikely to reflect the prevailing market conditions and that “reasonable discount rates to apply to discounted cash flow analysis for regulated energy assets in current market conditions”¹²³ are much higher. In reaching this conclusion, Grant Samuel refers to:

- a. DGM estimates of the required return on equity currently being higher than mechanistic CAPM estimates;
- b. The need to increase MRP estimates in the current market conditions;
- c. The fact that government bond yields were at historical lows such that a higher estimate may be warranted for the risk-free rate; and
- d. The fact that other market participants are using higher costs of equity capital in the current market conditions.¹²⁴

161 Grant Samuel then report an increased WACC range that it considers to be consistent with the “current market conditions.”¹²⁵ The equity risk premium that is consistent with this increased range, grossed up to include the AER's adjustment for imputation, is 5.8% to 8.2%. The lower bound of this range is materially above

¹¹⁷ Grant Samuel, 2014, Independent Expert Report on Envestra Ltd., March.

¹¹⁸ Grant Samuel (2014), Appendix 3, p. 1.

¹¹⁹ This is produced from a beta range of 0.6 to 0.7 and a MRP of 6.0%. See Grant Samuel (2014), Appendix 3, p. 7.

¹²⁰ This is produced from a beta range of 0.6 to 0.7 and a MRP of 6.0%. See Grant Samuel (2014), Appendix 3, pp. 9-10.

¹²¹ AusNet Draft Decision, 2016, Attachment 3, p. 223.

¹²² Produced from a beta of 0.7 and a MRP of 6.5%.

¹²³ Grant Samuel (2014), Appendix 3, p. 9.

¹²⁴ Grant Samuel (2014), Appendix 3, pp. 8-9.

¹²⁵ Grant Samuel (2014), Appendix 3, p. 9.

the AER's allowance and the mid-point of this range is more than 50% above the AER's allowance.

162 In our view, the conclusion that this cross check has been passed because the AER's allowed equity risk premium is within a range that Grant Samuel has specifically disavowed as being inappropriate in the current market conditions, and which Grant Samuel corrected before using it in their valuation, is highly misleading. Even the lower bound of the range that Grant Samuel actually adopted as being appropriate for the current market conditions is materially above the AER's allowance.

The AER's approach disregards uplifts to the risk-free rate

163 A second example comes from the February 2016 Macquarie Research report for DUET.¹²⁶ That report sets out an equity risk premium (adjusted to reflect the AER's assumed value of imputation credits) of 4.7%,¹²⁷ which is only marginally above the AER's allowance of 4.55%.

164 However, that report adopts a risk-free rate that is 1.3%¹²⁸ above the contemporaneous 10-year government bond yield. Thus, the premium to the contemporaneous 10-year government bond yield is 6.0%, which is materially above the AER's allowance.

The AER's reasons for disregarding uplifts

165 In its recent decisions, the AER has explained its reasons for disregarding the evidence of independent experts and brokers applying uplifts to mechanistic CAPM estimates in the current market conditions as follows:

Uplifts applied by brokers and valuers to initial estimates may be inconsistent with the ARORO. They may reflect non-systematic risks, or be designed to account for risks not addressed in cash flow forecasts, or (to the extent there is any) the expectation of outperformance of regulatory allowances. They may also reflect the term structure of the proxies used to estimate the risk free rate and/or market risk premium, the relevant investment period exceeding the term of the proxies, and the one-off nature of transactions on which they are advising (which differs from our regulatory task where the rate of return is re-assessed for each regulatory control period).¹²⁹

166 The AER has provided no evidence that any of the conjectured issues have actually affected any of the reports that it considers. By contrast, the Grant Samuel Envestra report clearly states that the uplift is made because the mechanistic CAPM approach (on which the AER relies) does not produce appropriate estimates in the current market conditions – as set out above. In our view, the evidence that the independent expert has made an adjustment to its mechanistic

¹²⁶ Macquarie Research, 2016, DUET Group, February.

¹²⁷ $0.8 \times (5.0\% + 0.83\%) = 4.7\%$.

¹²⁸ 3.8% vs. 2.5%.

¹²⁹ AusNet Draft Decision, 2016, Attachment 3, p. 84.

CAPM estimate because it considers that to be required in the prevailing market conditions is relevant evidence that should not be disregarded.

167 Moreover, in its recent decisions, the AER has established a seemingly impossible burden of proof in relation to adjustments to the risk-free rate. On this point, the AER conjectures that it is possible that brokers and experts may adopt a risk-free rate above the contemporaneous government bond yield, not because they think that is required to produce sensible estimates of the required return in the prevailing market conditions, but because they use a term structure whereby they apply a lower discount rate to cash flows over the next 10 years. The AER provides no evidence of any broker or independent expert making any mention of this conjectured term structure approach. The AER then states that it will continue to disregard the uplifts that brokers and independent experts apply to the risk-free rate because no stakeholder has “provided compelling evidence that valuers do not adjust risk free rate estimates to account for term structure.”¹³⁰ That is, the task for stakeholders is to prove a negative – that valuers have not used an approach that none of them have mentioned.

Cross checks should not be applied at the ‘equity risk premium’ level

168 NER 6.5.2(f) and 6.5.2(g) state that:

(f) The return on equity for a *regulatory control period* must be estimated such that it contributes to the achievement of the *allowed rate of return objective*.

(g) In estimating the return on equity under paragraph (f), regard must be had to the prevailing conditions in the market for equity funds.

169 That is, the Rules require that the *return on equity* must be commensurate with the efficient financing costs of the benchmark efficient entity and with the prevailing conditions in the market. By contrast, the equity risk premium is only one part of the overall return on equity. Even if it were the case that the equity risk premium allowed by the AER were consistent with that adopted by some market practitioners, the task would not finish there – it would still be necessary to consider the other elements of the return on equity. As set out above, there is evidence that market practitioners regularly adopt higher risk-free rates and apply other uplifts to the return on equity. Moreover, these adjustments and uplifts tend to increase in frequency and magnitude as government bond yields fall – as they have in the prevailing market conditions. Thus, a cross check that ignores these elements will be incomplete.

170 In summary, we cannot test whether the *return on equity* is commensurate with the efficient financing costs of the benchmark efficient entity and with the prevailing conditions without considering the entire return on equity. A cross check of one component of the return on equity will be incomplete – and the problem is likely to be exacerbated in the current market conditions where government bond yields are at record lows.

¹³⁰ AusNet Draft Decision, 2016, Attachment 3, p. 84.

Comparing ‘with imputation’ estimates with ‘ex imputation’ estimates is misleading

171 The AER notes that its equity risk premium figures include its assumed value of imputation credits whereas the figures reported by independent experts and brokers do not. Thus, the AER makes an adjustment for imputation to provide a like-with-like comparison. However, the AER continues to report the ex-imputation estimates, giving them equal billing (and apparently equal weight) with the properly adjusted and comparable with-imputation estimates.¹³¹

172 The AER states that its continued reliance on ex-imputation adjustments is on the basis that the MRP estimates may have been supplied to the broker or independent expert by some third party, who might have grossed them up to account for the value of imputation credits that the AER has used such that the estimates are in fact already comparable:

...it is unclear the extent to which these estimates may be based on third party estimates that already account for the value of imputation credits.¹³²

173 However, by way of one example, Grant Samuel very clearly state that their estimates have not been adjusted for any assumed benefit of imputation in any way,¹³³ and this is the standard approach adopted by independent experts.

¹³¹ See, for example, AusNet Draft Decision, 2016, Attachment 3, pp. 221-223.

¹³² AusNet Draft Decision, 2016, Attachment 3, p. 85.

¹³³ Grant Samuel (2014), Appendix 3, p. 10.

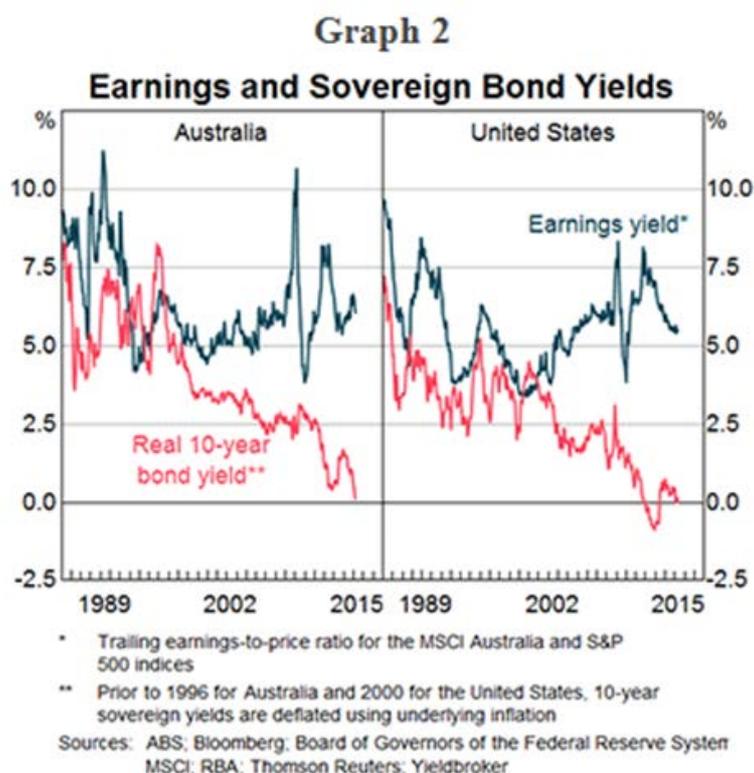
5 Views from the market

174 Evidence from a range of market participants is consistent with the weight of evidence set out above – that the required return on equity has remained relatively stable even as government bond yields have fallen. Market participants do not agree with the AER's view that the GFC, and the recent dramatic decline in government bond yields, resulted in a material one-for-one fall in the required return on equity.

5.1 Reserve Bank of Australia

175 In April 2015, Reserve Bank Governor Glenn Stevens stated that the equity risk premium appears to have risen to offset the recent falls in the risk-free rate such that the required return on equity has not fallen:

...post-crisis, the earnings yield on listed companies seems to have remained where it has historically been for a long time, even as the return on safe assets has collapsed to be close to zero (Graph 2). **This seems to imply that the equity risk premium observed *ex post* has risen even as the risk-free rate has fallen and by about an offsetting amount.**¹³⁴



176 Governor Stevens went on to note that the returns on equity required by investors have not shifted even though risk-free rates have fallen to exceptionally low levels:

¹³⁴ Glenn Stevens, Speech to the Australian American Association, New York, 21 April 2015. Emphasis added.

...it might be explained simply by stickiness in the sorts of ‘hurdle rates’ that decision makers expect investments to clear. I cannot speak about US corporates, but this would seem to be consistent with the observation that we tend to hear from Australian liaison contacts that **the hurdle rates of return that boards of directors apply to investment propositions have not shifted, despite the exceptionally low returns available on low-risk assets.**¹³⁵ [Emphasis added]

177 He goes on to further consider the explanation that:

...the risk premium being required by those who make decisions about real capital investment has risen by the same amount that the riskless rates affected by central banks have fallen.¹³⁶

5.2 The Federal Reserve Bank

178 In a recent paper for the Federal Reserve Bank of New York, Duarte and Rosa (2015)¹³⁷ estimate 20 models of the MRP (which they call “ERP” for equity risk premium). They conclude that the ERP is currently at elevated levels – even above the levels reached during the GFC:

In this article, we estimate the ERP by combining information from twenty prominent models used by practitioners and featured in the academic literature. Our main finding is that the ERP has reached heightened levels. The first principal component of all models –a linear combination that explains as much of the variance of the underlying data as possible– places the one-year-ahead ERP in June 2012 at 12.2 percent, above the 10.5 percent that was reached during the financial crisis in 2009.¹³⁸

179 They conclude that the reason for the elevated ERP is that the required return on equity remains at normal levels even as government bond yields have fallen to exceptionally low levels:

Our analysis provides evidence that the current level of the ERP is consistent with a bond-driven ERP: expected excess stock returns are elevated not because stocks are expected to have high returns, but because bond yields are exceptionally low. The models we consider suggest that expected stock returns, on their own, are close to average levels.¹³⁹

¹³⁵ Glenn Stevens, Speech to the Australian American Association, New York, 21 April 2015. Emphasis added.

¹³⁶ Glenn Stevens, Speech to the Australian American Association, New York, 21 April 2015.

¹³⁷ Duarte, F. and C. Rosa, 2015, “The Equity Risk Premium: A Review of Models,” Federal Reserve Bank of New York Staff Reports, No 714, February.

¹³⁸ Duarte and Rosa (2015), p. 1.

¹³⁹ Duarte and Rosa (2015), p. 20.

5.3 McKinsey Inc.

180 Dobbs, Koller and Lund (2014)¹⁴⁰ from McKinsey Inc. examine the impact of the recent world-wide decline in government bonds yields. Like the Reserve Bank and independent valuation experts, they note that the required return on equity appears to be quite stable even as government bond yields decline materially. They observe that equity investors and corporate managers have maintained stable required returns – they have not reduced required returns one-for-one with recent declines in government bond yields:

...a “rational expectations” investor who takes a longer-term view should regard today’s ultra-low rates as temporary and therefore likely will not reduce the discount rate used to value future cash flows. Moreover, such investors may assign a higher risk premium in today’s environment. Our conversations with management teams and corporate boards suggest that they take a similar approach when they consider investment hurdle rates. None of those with whom we spoke have lowered the hurdle rates they use to assess potential investment projects, reflecting their view that low rates will not persist indefinitely.¹⁴¹

181 Dobbs, Koller and Lund (2014) also note that the empirical evidence supports the proposition that the required return on equity has remained stable, even as government bond yields have fallen:

Empirically, if investors did reduce their discount rate on future corporate-earning streams, we would expect to see P/E¹⁴² ratios rise. Over the last several years of QE,¹⁴³ however, P/E ratios have remained within their long-term average range.¹⁴⁴

182 That is, if the required return on equity had fallen in line with the fall in government bond yields (as the AER’s allowed returns would suggest), we would see an increase in price/earnings (P/E) ratios. However, in the prevailing conditions in the Australian market, the exact opposite has occurred – P/E ratios have generally *fallen* with the recent decline in government bond yields, as set out in Figure 19 below. This is consistent with recent increases, rather than decreases, in required returns. Indeed, the correlation between Australian P/E ratios and the 10-year government bond yield has been positive 0.65 in the period since November 2012.

¹⁴⁰ Dobbs, R., T. Collier and S. Lund, 2014, “What effect has quantitative easing had on your share price?” McKinsey on Finance, 49, Winter 2014.

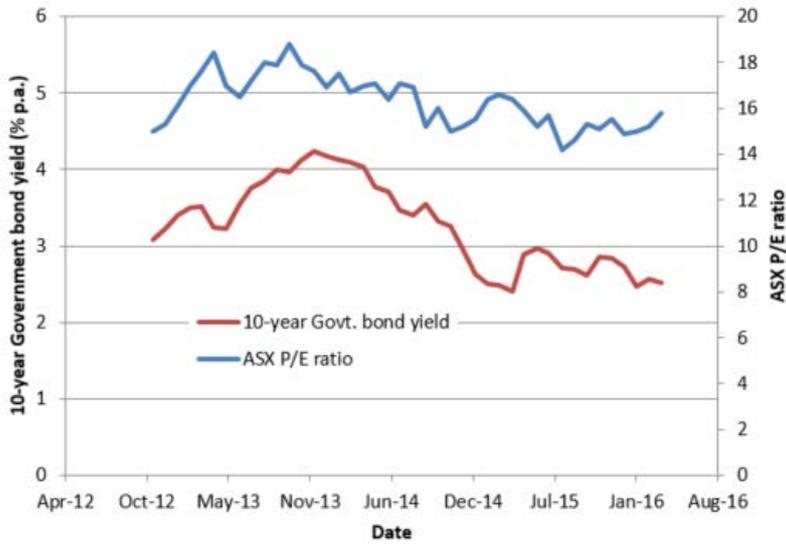
¹⁴¹ Dobbs, Koller and Lund (2014), p. 17.

¹⁴² This is a reference to the price-earnings ratio, the ratio of the price per share to earnings per share. It is the inverse of the earnings yield that is the subject of Figure 2 in Stevens (2015).

¹⁴³ Quantitative easing is a reference to the expansive monetary policy that has been employed by many central banks since the onset of the GFC.

¹⁴⁴ Dobbs, Koller and Lund (2014), p. 17.

Figure 19: Australian P/E ratios and government bond yields



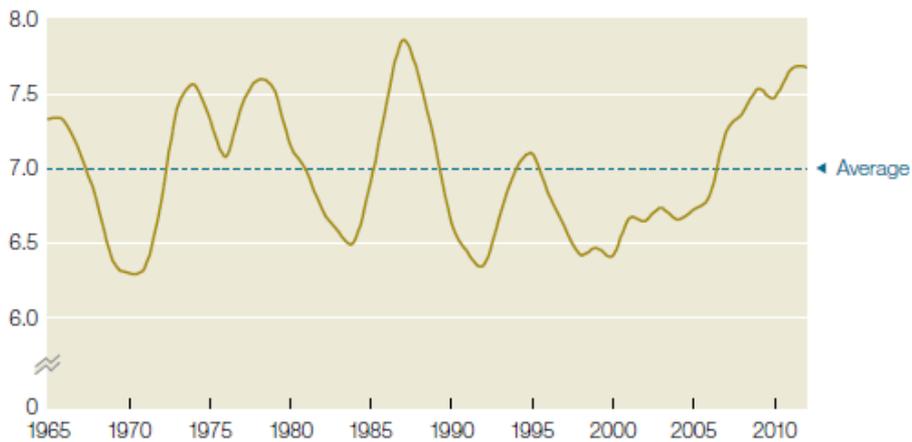
Source: RBA Tables f07 and f02.

183 Dobbs, Koller and Lund (2014) go on to report that the implied real required return on equity has remained stable – within a narrow band even as government bond yields have varied materially. They summarise this evidence in Figure 20 below.

Figure 20: Implied real required return on equity

The implied real cost of equity in the United States has remained within the historical norms.

Implied real cost of equity, 3-year moving average, %



Source: Dobbs, Koller and Lund (2014), Exhibit 2, p. 17.

184 They conclude that this evidence suggests that equity investors have offset the decline in government bond yields by adopting a higher market risk premium – leaving the required return on equity largely unchanged:

Since 2000, this implied real cost of equity has been rising steadily, but it has remained well within the historical range since the start of the crisis (Exhibit 2).

This implies that even if investors believe the risk-free rate has fallen, they have offset this with a higher equity risk premium.¹⁴⁵

In another very recent McKinsey publication, Dobbs, Koller, Lund, Ramaswamy, Harris, Krishnan and Kauffman (2016)¹⁴⁶ also conclude that the cost of equity capital has not declined with the recent declines in government bond yields:

...our analysis shows that over the past 50 years the real cost of equity has usually stayed within a narrow band of 6 to 8 percent, averaging about 7 percent. This has remained the case even with ultra-low interest rates. This indicates that even if investors believe the risk-free rate has fallen because of a decline in government bond yields, they have offset this with a higher equity risk premium. Alternately, it may be that investors do not view the government bond rate as the appropriate proxy for the risk-free rate, particularly in today's environment.²⁰ In either case, the total cost of equity for the average company does not appear to have benefited from ultra-low interest rates. If it had, we would expect to see PE ratios and stock prices substantially above today's levels. This is consistent with the discount rates we observe companies and bankers using to evaluate and price acquisitions. It is also consistent with our observation that most management teams and corporate boards have not reduced their investment hurdle rates or minimum returns for projects.¹⁴⁷

5.4 NERA – US

185 In a report titled *The decoupling of treasury yields and the cost of equity for public utilities*, Strunk (2014)¹⁴⁸ begins by identifying that current financial market conditions are unique in terms of an:

...unprecedented trend in the current capital markets—specifically, intervention by the Federal Reserve in the government bond market. The current capital market conditions are unique from a historical perspective.¹⁴⁹

186 He goes on to note that government bond yields are currently at historical lows, and thus questions the use of the historical excess returns approach to estimating the MRP in the current market conditions:

Current capital market conditions raise doubts about whether the risk premium, measured using historical data, is applicable today. Rate-of-return models that rely upon the historical premium assume that investors' total return expectations move in lock step with treasury yields. Hence, if the historic premium is still valid, it implies a significant decrease in required returns on equity for both industrial firms and public utilities.¹⁵⁰

¹⁴⁵ Dobbs, Koller and Lund (2014), pp. 17-18.

¹⁴⁶ Dobbs, R., T. Koller, S. Lund, S. Ramaswamy, J. Harris, M. Krishnan, D. Kauffman, 2016, "Diminishing Returns," McKinsey Global Institute, May.

¹⁴⁷ Dobbs, Koller, Lund, Ramaswamy, Harris, Krishnan and Kauffman (2016), p. 12.

¹⁴⁸ Strunk, K. G., 2014, "The decoupling of treasury yields and the cost of equity for public utilities," NERA Energy Policy Briefing Note, June.

¹⁴⁹ Strunk (2014), p. 1.

¹⁵⁰ Strunk (2014), p. 1.

187 He proposes that the DGM method is likely to produce a more reliable estimate of the MRP in the current market conditions:

NERA estimates the forward-looking risk premium using the well-established dividend growth model...This approach has the advantage that it incorporates the most recent information from capital markets and thus is most consistent with the intent of any cost of equity calculation, which is to reflect current forward-looking expectations.¹⁵¹

188 Of course, in conditions where the required return on equity is remaining quite stable while government bond yields are falling, the DGM method produces higher estimates of the MRP:

In its most recent analysis, NERA found the forward-looking risk premium to be 8.36 percent, which compares to a historic risk premium of 6.70 percent, a difference of 166 basis points. This shows that the use of a historic risk premium would significantly understate the cost of equity for utilities.¹⁵²

189 Strunk goes on to note that US regulators have factored this evidence into recent rate decisions by setting an allowed return on equity that has been very stable over time, even as government bond yields have declined materially. He shows that the average allowed return on equity has varied within a narrow range of 10 to 10.5 per cent even as government bond yields declined from 4.91% to 2.92%.¹⁵³ A stable return on equity allowance is achieved by adopting a higher MRP in the current market conditions of low government bond yields:

...regulators implicitly recognize the higher equity risk premium that prevails in today's market. They do so by approving rates-of-return that contain a higher premium over government bond yields than has historically prevailed.¹⁵⁴

190 Strunk concludes that:

Most important is making sure that the rate of return somehow incorporates the current forward-looking investor expectations and does not rely solely upon unadjusted historic expectations.¹⁵⁵

5.5 The Economic Regulation Authority

191 In its recent ATCO Gas Final Decision,¹⁵⁶ the ERA increased its MRP estimate from 5.5% to 7.6% to offset the fall in its estimate of the risk-free rate, stating that:

...the Authority has now concluded that it is not reasonable to constrain the MRP to a fixed range over time. The erratic behaviour of the risk free rate in Australia to date, and more particularly, its pronounced decline in the current economic environment, leads to a situation where the combination of a fixed range for the

¹⁵¹ Strunk (2014), p. 2.

¹⁵² Strunk (2014), p. 2.

¹⁵³ Strunk (2014), Table 1, p. 2.

¹⁵⁴ Strunk (2014), p. 3.

¹⁵⁵ Strunk (2014), p. 3.

¹⁵⁶ Economic Regulation Authority of Western Australia, 2015, Final Decision on Proposed Revisions to The Access Arrangement for the Mid-West and South-West Gas Distribution Systems, June.

MRP and prevailing risk free rate may not result in an outcome which is consistent with the achievement of the average market return on equity over the long run.¹⁵⁷

5.6 IPART

192 IPART applies a default 50% weight to forward-looking estimates of the MRP – primarily a number of DGM specifications.¹⁵⁸ In its most recent update,¹⁵⁹ IPART adopts a contemporaneous MRP of 8.6%.¹⁶⁰

5.7 Ofgem

193 In a report for UK regulator Ofgem, Wright and Smithers (2014)¹⁶¹ consider how the recent decline in government bond yields might affect the approach to estimating the MRP.

194 They begin with a consideration of the earlier Smithers & Co report by Wright, Mason and Miles (2003),¹⁶² which proposes that the real required return on equity should be assumed to be constant on the basis of data from long-term historical averages of realised stock returns. Wright and Smithers note that this approach (which the AER refers to as the “Wright approach”) has been employed consistently by UK regulators since then.

195 Wright and Smithers (2014) conclude that:

... the [UK’s Competition Commission] has given at least some weight to a model in which the expected market return is assumed to have been pulled down by falls in the risk-free rate. In Mason et al we argued against this model, pointing to the lack of any historical stability in the risk-free rate, and hence in estimates of the market equity premium. We believe that recent events have simply added to the weight of evidence against this approach.

In contrast the Mason et al/Ofgem approach implies a counter-cyclical equity premium, which is consistent with some more recent academic research, and with recent patterns in observable proxies for risk premia such as corporate bond spreads. It also has the advantage of providing stability in the regulatory process.

We conclude that there is no plausible case for any further downward adjustment in the assumed market cost of equity based on recent [downward] movements in risk-free rates.¹⁶³ [Emphasis added]

¹⁵⁷ ERA (WA), 2015, Final Decision on Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution Systems, 30 June, (ATCO Gas Final Decision), Paragraph 1173.

¹⁵⁸ IPART, Review of WACC Methodology, December 2013.

¹⁵⁹ IPART, 2016, WACC Biannual Update, February.

¹⁶⁰ IPART, WACC Biannual update, August 2016.

¹⁶¹ Wright, S. and A. Smithers, 2014, “The cost of equity capital for regulated companies: A review for Ofgem,”

¹⁶² Wright and Smithers (2014) refer to this earlier paper as “Mason et al.” The full reference is Wright, S., R. Mason and D. Miles, 2003, *A study into certain aspects of the cost of capital for regulated utilities in the UK*, Report for UK economic regulators and the Office of Fair Trading, 13 February.

¹⁶³ Wright and Smithers (2014), p. 2.

196 They go on to conclude that:

Thus both historical and more recent evidence point to the same conclusion: in contrast to the stock return there is no evidence of stability in the risk-free rate, at any maturity. As a direct implication, there is no evidence of stability of the market equity premium. Without such evidence, **there is no empirical basis for the assumption that falls in risk-free rates should translate to falls in expected market returns.**¹⁶⁴ [Emphasis added]

5.8 Federal Energy Regulatory Commission (FERC): New England rate case

197 In a recent decision, the US Federal Energy Regulatory Commission (FERC) noted that its previous approach had been to adjust the allowed return on equity (ROE) in lockstep with changes in the relevant government bond yield, the practice that has been maintained by the AER since its 2013 Guideline:

The Commission's practice traditionally has been to adjust the ROE using a 1:1 correspondence between the ROE and the change in U.S. Treasury bond yields—i.e., for every basis point change in the U.S. Treasury bond yield the Commission would adjust the ROE by one basis point.¹⁶⁵

198 However, FERC concluded that in the prevailing market conditions such an approach “may not produce a rational result,”¹⁶⁶ and that:

Upon consideration of the record evidence in this proceeding, and in light of the economic conditions since the 2008 market collapse more generally, U.S. Treasury bond yields do not provide a reliable and consistent metric for tracking changes in ROE.¹⁶⁷

199 The primary reason for FERC's conclusion is that:

The capital market conditions since the 2008 market collapse and the record in this proceeding have shown that there is not a direct correlation between changes in U.S. Treasury bond yields and changes in ROE.¹⁶⁸

5.9 Federal Energy Regulatory Commission (FERC): New York rate case

200 In another recent decision, FERC concluded that inserting the historical excess returns estimate of the MRP into the CAPM is likely to produce an unreliable estimate of the required return on equity:

¹⁶⁴ Wright and Smithers (2014), p. 15.

¹⁶⁵ FERC Opinion 531, Docket EL11-66-001, June 2014, Paragraph 159.

¹⁶⁶ FERC Opinion 531, Docket EL11-66-001, June 2014, Paragraph 159.

¹⁶⁷ FERC Opinion 531, Docket EL11-66-001, June 2014, Paragraph 160.

¹⁶⁸ FERC Opinion 531, Docket EL11-66-001, June 2014, Paragraph 158.

Given the recent trends of near-historic low yields for long-term U.S. Treasury bond rates, the CAPM's input for the "risk-free" rate, we find that it is a reasonable assumption that the current equity risk premium (which is added to the risk-free rate to calculate the cost of equity data point that determines the slope of the CAPM curve) exceeds the 86-year historical average used as the consultants' CAPM input.¹⁶⁹

201 FERC identified the problem with a mechanistic implementation of the CAPM as follows:

The current low treasury bond rate environment creates a need to adjust the CAPM results, consistent with the financial theory that the equity risk premium exceeds the long-term average when long-term US Treasury bond rates are lower than average, and vice-versa.¹⁷⁰

202 FERC allowed a return on equity of 12.5%:

We find that NYISO's¹⁷¹ proposed ROE¹⁷² value of 12.5 percent is adequately supported by substantial evidence.¹⁷³

5.10 Federal Energy Regulatory Commission (FERC): New York rate case

203 In the *Bangor Hydro* case that addresses a range of issues relating to setting the allowed return on equity, FERC noted that it had previously rejected CAPM analyses that were "based on historic market risk premiums." FERC accepted the CAPM analysis in the current case because the present:

CAPM analysis is based on forward-looking investor expectations for the market risk premium.¹⁷⁴

¹⁶⁹ FERC Docket ER14-500-000, January 2014, pp. 35-36.

¹⁷⁰ FERC Docket ER14-500-000, January 2014, pp. 35-36.

¹⁷¹ New York Independent System Operator.

¹⁷² Allowed return on equity.

¹⁷³ FERC Docket ER14-500-000, January 2014, pp. 35-36.

¹⁷⁴ FERC Docket EL11-66-001, June 2014, p. 71.

6 The implications of a “nearly constant” approach to the MRP

6.1 The AER’s approach is to set a nearly constant MRP allowance

204 Since the Guideline, the AER has allowed an MRP of 6.5% in every one of its draft and final decisions. The AER also adopted an MRP of 6.5% in its previous review of WACC parameters in 2009. In every decision since its inception, the AER has allowed an MRP of either 6.0% or 6.5%.

205 Although the AER’s position is that “the MRP likely varies over time,”¹⁷⁵ the AER’s consultants now recognise that the AER’s approach is to set an effectively constant MRP allowance:

The AER decisions hold the risk premium nearly constant (although upward adjustments of 0.5% have been made). As (sic) result the regulated return tends to fall 1 for 1 with falls in the risk free rate.¹⁷⁶

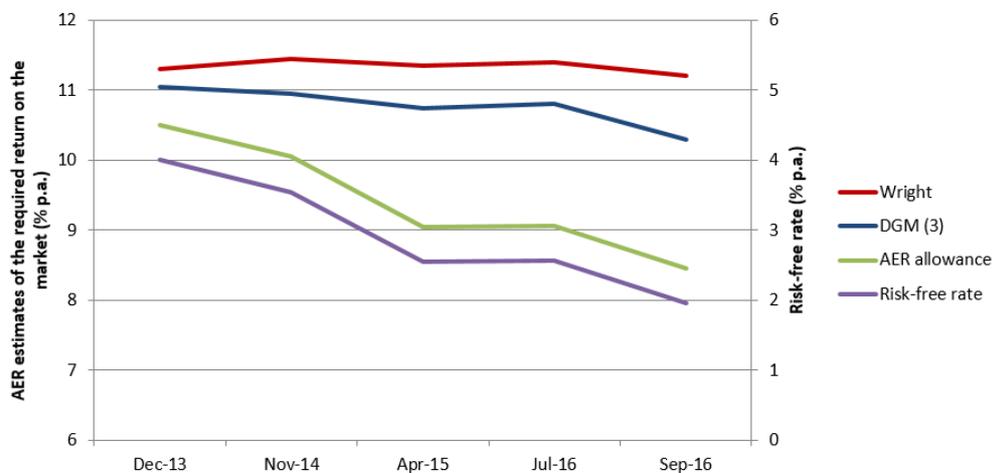
6.2 The allowed return on equity falls one-for one with falls in government bond yields

206 As Partington and Satchell (2016) note above, the inevitable consequence of setting a nearly constant MRP is that the allowed return on equity falls one-for-one with falls in government bond yields. The AER adds its constant risk premium to the contemporaneous government bond yield and the sum is adopted as the allowed return on equity. Since government bond yields have fallen sharply since the Guideline, the AER’s allowed return on equity has also fallen correspondingly. This occurs in spite of the evidence set out above – including the AER’s own DGM estimates – that the required return on equity has remained remarkably stable since the Guideline. The distinction between the AER’s estimates and its regulatory allowance is summarised in Figure 21 below.

¹⁷⁵ AER, 2013, Rate of Return Guideline: Explanatory Statement, p. 91.

¹⁷⁶ Partington and Satchell (2016), p. 17.

Figure 21: The required return on the market – AER estimates and allowances



Source: Rate of Return Guideline, Explanatory Statement, Appendix December 2013; Ausgrid Draft Decision Attachment 3 November 2014; Ausgrid Final Decision Attachment 3 April 2015; AusNet Draft Decision Attachment 3 July 2016; Powerlink Draft Decision September 2016.

207 Since its Guideline in December 2013, the yield on 10-year government bonds has fallen from 4.1% to 1.95%.¹⁷⁷ The AER has maintained the same 6.5% MRP in every one of its decisions since December 2013. Thus, the AER considers that the required return on equity for the average firm¹⁷⁸ has fallen from 10.6%¹⁷⁹ in December 2013 to 8.4%¹⁸⁰ now. This represents a decline of more than 25% over the last two and a half years, as illustrated in Figure 22 below.

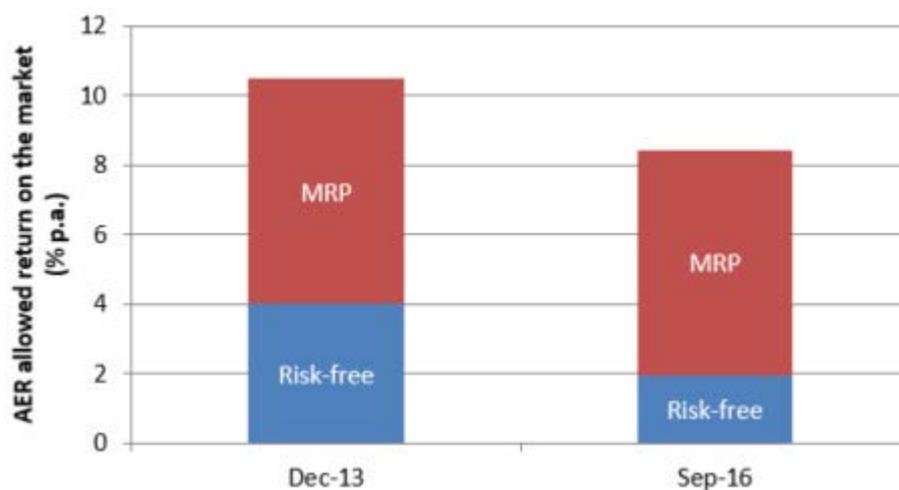
¹⁷⁷ Powerlink Draft Decision, September 2016..

¹⁷⁸ Which, under the CAPM, is equal to the sum of the risk-free rate and the MRP.

¹⁷⁹ 4.1% + 6.5%.

¹⁸⁰ 1.9% + 6.5%.

Figure 22: AER estimate of the required return on equity for an average firm



Source: AER Rate of Return Guideline, December 2013; Powerlink Draft Decision, September 2016.

208 By contrast, as set out above, there is a substantial body of evidence to support the propositions that:

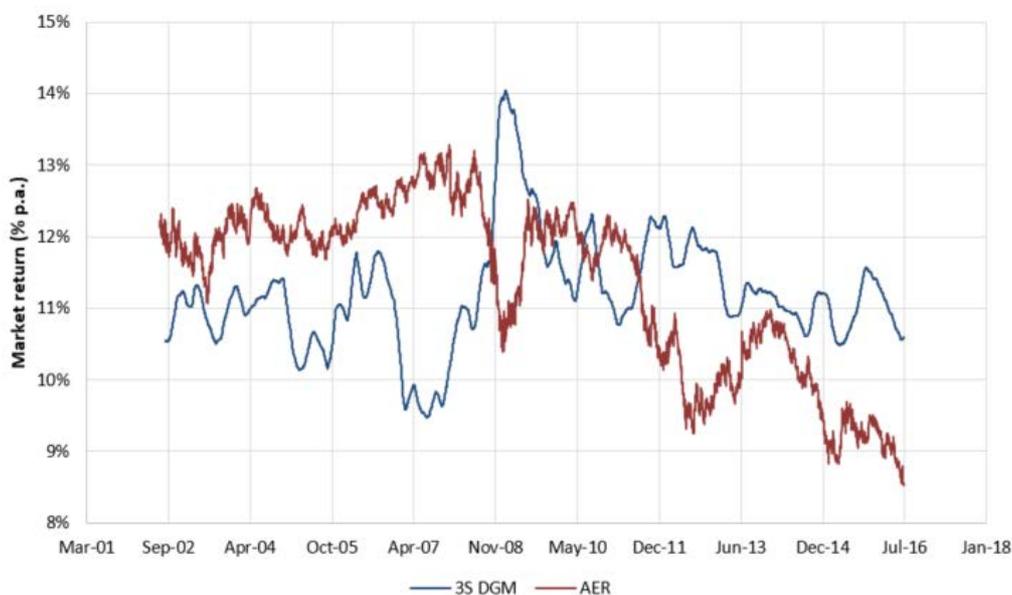
- a. Real-world investors do **not** determine the return that they require by simply adding a constant figure to the contemporaneous government bond yield; and
- b. The required return on equity has **not** fallen by over 25% in the last two and a half years.

209 The broader effect of the AER's approach to distilling the MRP evidence into a single regulatory allowance is illustrated in Figure 23. That figure contrasts the AER's allowance for the required return on the market with mid-point estimates from the AER's three-stage DGM.¹⁸¹

210 The most obvious point of departure is during the global financial crisis (GFC) in late 2008. The approach of applying a fixed premium to the contemporaneous government bond yield implies that the required return on equity *fell* dramatically during the peak of the GFC – as investors moved funds into government bonds, lowering yields. Such an outcome is implausible – the required return on equity capital does *not* fall materially during financial crises. But that is precisely what the 'fixed premium' approach to setting the MRP suggests. By contrast, the AER's own forward-looking DGM method suggests that the required return on equity increased during the GFC.

¹⁸¹ That is, estimates based on the AER's specification and implementation of the DGM with a long-run growth rate of 4.6%.

Figure 23: The required return on the market – AER mid-point DGM estimates and regulatory allowances



Source: Frontier Economics.

- 211 Figure 23 also shows that the divergence between the two methods is not confined to the peak of the GFC. For example, throughout 2007 when equity prices were very high and it is widely accepted that equity capital was relatively cheap, the AER-style fixed premium approach suggests that the cost of equity capital was very high.
- 212 During average market conditions, when government bond yields are closer to their long-run mean, both approaches produce similar estimates of the required return on equity. This is the case through 2002-2005.
- 213 Importantly, the two approaches currently suggest very different required returns. Whereas the DGM method suggests that the required return on equity has remained quite stable since 2013 (hovering around 11%), the AER allowance suggests a material decline in the cost of equity.

6.3 The source of the problem

- 214 We have shown above that the AER's approach to setting the MRP allowance produces implausible outcomes in some market conditions, including the current market conditions. These implausible outcomes arise because the AER's estimation approach produces a nearly constant estimate of the MRP – either 6.0% or 6.5% in every decision since its inception. This results in an allowed return on equity that is volatile – it rises and falls one-for-one with every change in government bond yields.
- 215 In some market conditions, the true required return on equity may well fall when government bond yields fall. However, in other market conditions the required return on equity may stay constant, or even rise, as government bond yields fall. It depends on the reasons why the government bond yield has fallen.

216 The problem with the AER approach is that it assumes that the required return on equity **always** falls one-for one with **every** decline in government bond yields. This unwavering assumption leads to implausible estimates in some market conditions, including the current market conditions.

217 In this regard, Partington and Satchell (2016) have recently advised the AER that:

We begin by stating our position that it seems likely that the risk premium changes over time. It is also entirely possible that the risk premium sometimes changes at the same time as interest rates change, but that change may either be in the same direction as the interest rates, or in the opposite direction. At any point in time, there are three possibilities for the market risk premium, it may remain unchanged, it may go down, or it may increase. There is no compelling reason for an interest rate decrease to automatically be associated with an increase in the market risk premium.¹⁸²

218 We agree with everything that Partington and Satchell have said in the above paragraph. However, just as there is “no compelling reason for an interest rate decrease to automatically be associated with an increase in the market risk premium,” there is equally no compelling reason for an interest rate decrease to *never* be associated with an increase in the market risk premium.

219 This is the crux of the problem with the AER’s nearly constant MRP. Even though government bond yields have halved since the Guideline, and even though there is strong evidence that the real-world required return from equity holders has not fallen one-for-one with those yields, the AER has maintained the same MRP allowance.

220 We do not suggest that the AER should *always* increase the MRP allowance *whenever* the government bond yield falls or that any increase should completely offset the fall in yields. We simply suggest that the AER should *sometimes* increase the MRP allowance to *partially* offset the fall in yields – when objective evidence supports that course of action. The problem is that the historical experience has been that the AER’s approach has not permitted *any* increase in the MRP to offset *any* of the material decline in government bond yields that has occurred since the Guideline. In our view, the prevailing market conditions support an increase in the MRP to partially offset the recent material decline in government bond yields.

¹⁸² Partington and Satchell (2016), p. 17.

7 The reliability of DGM estimates of the MRP

7.1 Context

221 Because the long-run mean of historical excess returns is effectively constant over time, if the MRP is set predominantly on the basis of that evidence the allowed MRP will be nearly constant over time – reflecting the long-run average of historical outcomes.

222 To obtain an estimate of the MRP that is forward-looking and commensurate with the prevailing conditions in the market, some material weight would have to be applied to forward-looking estimates that are based on prevailing market prices.

223 In this regard, the AER has stated that, but for some concerns about DGM estimates not being perfectly reliable, it would adopt the DGM estimate as the allowed MRP:

If a perfectly reliable estimate of the MRP could be generated from market prices it would be reasonable to use this estimate. However, no such estimate exists.¹⁸³

224 The AER has further stated that, while it has some concerns about the reliability of input assumptions, those concerns must be weighed against the positive features of DGM estimates:

Notwithstanding our concerns about the reliability of input assumptions, we consider DGM estimates have strong theoretical grounding and are more likely to reflect prevailing market conditions than other approaches.¹⁸⁴

225 This has led the AER to adopt a preferred approach to implementing the DGM to minimise its concerns. The AER describes its preferred approach as:

...the most significant development in this area¹⁸⁵

and states that it gives:

...significant consideration to DGM estimates of the MRP.¹⁸⁶

226 The AER has also noted that it is important for it to have regard to information “symmetrically” through time:

...it is important we apply different sources of evidence symmetrically through time to avoid bias...Asymmetric application of evidence may lead to biased outcomes. In contrast, we propose to consider each source of evidence symmetrically through time.¹⁸⁷

and that its preferred DGM specification enables the AER to consider the DGM evidence symmetrically:

¹⁸³ AER, 2013, Rate of Return Guideline: Explanatory Statement, Appendices, p. 110.

¹⁸⁴ AER, 2013, Rate of Return Guideline: Explanatory Statement, Appendices, p. 85.

¹⁸⁵ AER, 2013, Rate of Return Guideline, Explanatory Statement, Appendices, p. 89.

¹⁸⁶ AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 97.

¹⁸⁷ AER, 2013, Rate of Return Guideline: Explanatory Statement, p. 92.

...we have greater confidence in the symmetry of this information through time and give these estimates greater consideration than we have in the past.¹⁸⁸

227 Consistent with a symmetric approach to the evidence, the AER has stated in its most recent decisions that:

We have not changed the weight we apply to the dividend growth model.¹⁸⁹

228 In summary:

- a. The AER has stated that the DGM approach has the attractive features of being a forward-looking estimate that is more likely to reflect the prevailing market conditions than other approaches;
- b. The AER has expressed some concerns about the reliability of input parameters, but states that these concerns are mitigated by its preferred implementation; and
- c. The AER applies “significant” weight to its DGM evidence and has not reduced that weight since the Guideline.

7.2 AER concerns

229 In this sub-section, we consider each of the concerns that the AER has documented in relation to the DGM estimates of the MRP. The AER’s four concerns have recently been set out in its May 2016 Final Decisions.

Slow-changing dividends

230 The AER correctly points out that corporate dividends are more stable over time than corporate earnings. Thus, it is possible that a firm may seek to maintain its dividend through a period of weaker earnings. Of course, this is only possible for a short period – if earnings are persistently weak, maintaining the dividend becomes unsustainable. Thus, if a firm is anticipating weaker earnings for a prolonged period, it is highly unlikely that it would *increase* its dividend.

231 On this point, the AER notes¹⁹⁰ our submission that analysts are currently forecasting growth in dividends and earnings over the standard two-year forecast period. This is inconsistent with the notion that dividends are currently being artificially sustained in the face of what is expected to be weak earnings in the future.

232 In response, the AER posits that it is possible that, although analysts are forecasting robust earnings growth over the next two years, they may consider that earnings in the more distant future are likely to be insufficient to sustain the current

¹⁸⁸ AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 96.

¹⁸⁹ AusNet Draft Decision, 2016, Attachment 3, p. 207.

¹⁹⁰ AusNet Draft Decision, 2016, Attachment 3, p. 206.

level of dividends.¹⁹¹ While this is a theoretical possibility, it seems highly unlikely that analysts would forecast dividend growth based on strong earnings over the short term if they considered those dividends to be unsustainable in the longer term. Moreover, the AER has provided no evidence to support its conjecture.

233 The AER also refers to a figure in the RBA Chartpack¹⁹² and concludes that:

RBA data suggests that forecast growth in earnings per share will likely slow over the 2015-16 and 2016-17 financial years.¹⁹³

234 The AER appears to have interpreted the figure in question incorrectly. The figure clearly shows that analysts are currently forecasting 2017 earnings to be higher than 2016 earnings and that has been the case for all of the last year.¹⁹⁴

235 Moreover, the ‘sticky dividends’ issue would only be material if future dividends were likely to fall so materially as to make the current dividend unsustainable, and there is no evidence to support that conjecture.

236 Finally, we note that there is no reason to suggest that this issue is any more or less important than at the time of the Guideline.

Bias in analyst forecasts

237 In its recent final decisions, the AER notes that any upward bias in analyst forecasts will result in a higher estimate of the required return on the market. The AER also notes¹⁹⁵ our previous submission that any such bias is irrelevant – if analyst forecasts are taken to be an estimate of the market’s expectation of future dividends and the current price is taken to be an estimate of the market’s expectation of the current value, it follows mechanically that the implied discount rate must be an estimate of the market’s required return on equity. The AER’s response on this point is that:

If analysts’ dividend and price forecasts are biased, it is also plausible that the analysts’ implied return on equity is biased.¹⁹⁶

238 This response seems to miss the point. The AER seems to suggest that the market (proxied by analysts) should have forecasted lower dividends but maintained the same stock price, thus producing a lower implied return. But what we are seeking to estimate is the implied return that equates the dividend forecast that the market actually uses to the actual stock price – not the dividend forecast that the AER thinks the market should have used.

¹⁹¹ AusNet Draft Decision, 2016, Attachment 3, p. 206.

¹⁹² <http://www.rba.gov.au/chart-pack/share-markets.html>.

¹⁹³ AusNet Draft Decision, 2016, Attachment 3, p. 62.

¹⁹⁴ <http://www.rba.gov.au/chart-pack/share-markets.html>.

¹⁹⁵ AusNet Draft Decision, 2016, Attachment 3, p. 62.

¹⁹⁶ AusNet Draft Decision, 2016, Attachment 3, p. 62.

239 Our previous submission also noted that any analyst forecast bias applied equally at the time of the Guideline, so would not be a reason for now placing less weight on the DGM estimates. The AER's response on this point is:

Frontier has not provided any evidence that bias has not increased.¹⁹⁷

240 To examine the very recent extent of any analyst forecast bias in Australia, we collected data on 'earnings surprises' for the most recent financial year¹⁹⁸ for the stocks in the ASX 20 index.¹⁹⁹ The earnings surprise is actual earnings per share less forecasted earnings per share, expressed as a percentage. Half of the firms had positive surprises and half had negative surprises and the mean surprise was 2.37%, meaning that actual earnings were slightly *above* the forecast. This high-level evidence is inconsistent with the proposition that forecast earnings are becoming more optimistic over time.

Dividends as a proxy for free cash flow on equity

241 In its recent final decisions, the AER cites a submission from McKenzie and Partington (2014)²⁰⁰ in relation to the effect of the financing of dividends.²⁰¹ McKenzie and Partington posit that if a firm routinely issues new shares,²⁰² that could affect the long-run dividend growth rate. However, this is already accounted for – the AER already makes a downward adjustment to the long-run growth rate for this effect.

242 Moreover, McKenzie and Partington (2014, p.29) conclude on this point that “it may be less of a problem at the level of the market” which is relevant when the DGM is being used to estimate the MRP.

243 Finally, we note that there is no reason to suggest that this issue is any more or less important than at the time of the Guideline.

Term structure for required return on equity

244 In its recent final decisions, the AER considers the question of a term structure in the required return on equity.²⁰³ The idea is that rather than estimating a single required return on equity, one could assume that investors require a relatively higher return beyond Year 10 and a relatively lower required return before Year 10. The AER cites McKenzie and Partington (2014) on this point:

¹⁹⁷ AusNet Draft Decision, 2016, Attachment 3, p. 206.

¹⁹⁸ Financial year 2015-16.

¹⁹⁹ Source: CommSec.

²⁰⁰ McKenzie, M. and G. Partington, 2014, *Report to the AER, Part A: Return on equity*, October.

²⁰¹ AusNet Draft Decision, 2016, Attachment 3, p. 207.

²⁰² McKenzie and Partington (2014) provide a numerical example where a firm does this via a dividend reinvestment plan.

²⁰³ AusNet Draft Decision, 2016, Attachment 3, p. 207.

We do recommend that it be borne in mind that the existence of a term structure could materially change cost of equity estimates from the DGM.²⁰⁴

245 Also relevant is what McKenzie and Partington (2014) said in the passage immediately before the quote selected by the AER:

Furthermore, even if we knew that there was a term structure, we would have the problem of estimating the cost of equity that was to apply to the more distant cash flows. It is a difficult enough problem estimating one cost of equity, without complicating that problem by requiring estimation of another cost of equity to apply at the end of the growth transition period. We therefore agree with SFG (2014d, p. 20) that if a term structure of equity was applied then:

There is the risk that the regulated rate of return varies by substantial amounts over time because of estimation error, associated with whether a term structure exists and the assumption about the long term cost of equity.

Consequently we do not recommend that an estimation technique involving an equity term structure be adopted.²⁰⁵

246 In its Guideline materials, the AER explained that:

...we do not incorporate a term structure into our model because it is non-standard.²⁰⁶

247 We note that it remains equally non-standard to impose an assumed term structure when implementing the DGM approach.

Summary and conclusions

248 As set out above, we consider that the four points that the AER has raised in relation to the general reliability of DGM estimates of the MRP are overstated. To the extent that there are concerns about these points, those concerns would have to be weighed up against the strengths and weaknesses of other approaches. For example, the historical excess returns approach:

- a. Is an estimate that reflects the average conditions over the historical period, which may differ from the prevailing market conditions;
- b. Provides different estimates for different historical periods (especially the shorter periods that the AER considers);²⁰⁷
- c. Produces imprecise estimates with wide confidence intervals (especially the shorter periods that the AER considers).²⁰⁸

²⁰⁴ AusGrid Draft Decision, 2016, Attachment 3, p. 207.

²⁰⁵ McKenzie and Partington (2014), pp. 36-37.

²⁰⁶ AER, 2013, Rate of Return Guideline, Explanatory Statement, Appendices, p. 115.

²⁰⁷ For example, the shortest period that the AER considers in its recent final decisions begins in 1988 and produces an estimate that is materially different from all other estimates. See AusNet Draft Decision, 2016, Attachment 3, Table 3-25, p. 198.

²⁰⁸ For example, our estimate of the historical mean excess return since 1988 is 5.6% within a standard 95% confidence interval of 1.2% to 10.0%.

249 Our view is that the various approaches should be compared against each other in terms of their relative strengths and weaknesses. In our view, the historical excess returns approach and the DGM approach have different strengths and weaknesses, but they both have something to contribute and both should be afforded material weight. We note that the AER reached the same conclusion in its Guideline.

250 Importantly, none of the issues that the AER has raised in relation to the DGM have changed or intensified since the Guideline, so none of them provide a reason for reducing the weight that has been applied to the DGM approach. These points had already been raised at the time of the Guideline²⁰⁹ and did not appear to raise alarm bells for the AER, which stated that:

The DGM method is a theoretically sound estimation method for the MRP. As DGM estimates incorporate prevailing market prices, they are more likely to reflect prevailing market conditions. DGM estimates are also clearly forward looking as they estimate expectations of future cash flows and equate them with current market prices through the discount rate.²¹⁰

and:

...we consider DGM estimates have strong theoretical grounding and are more likely to reflect prevailing market conditions than other approaches.²¹¹

251 The AER went on to say that, regardless of the issues raised by Lally (2013)²¹² and McKenzie and Partington (2013),²¹³ it had decided to give:

...significant consideration to DGM estimates of the MRP,²¹⁴

and described its development of a preferred approach for implementing the DGM as:

...the most significant development in this area.²¹⁵

252 McKenzie and Partington (2014, pp. 27) restate their concerns about slow-changing dividends (or 'sticky dividends' as they call it in that report) and potential analyst forecast bias and they recommend against using a term structure for DGM estimates.

253 Partington (2015)²¹⁶ is an update of the McKenzie and Partington (2014) report. The section on DGM estimation is unchanged from the previous version.

²⁰⁹ When setting out the four issues in Attachment 3 to the AusNet Draft Decision (2016) at Footnote 852, the AER cites Lally, M., 2013, *The Dividend Growth Model*, and McKenzie, M. and G. Partington, 2013, *The Dividend Growth Model*.

²¹⁰ AER, 2013, Rate of Return Guideline: Explanatory Statement, Appendices, p. 84.

²¹¹ AER, 2013, Rate of Return Guideline: Explanatory Statement, Appendices, p. 85.

²¹² Lally, M., 2013, *The Dividend Growth Model*, March.

²¹³ McKenzie, M. and G. Partington, 2013, *The Dividend Growth Model*, December.

²¹⁴ AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 97.

²¹⁵ AER, 2013, Rate of Return Guideline, Explanatory Statement, Appendices, p. 89.

²¹⁶ Partington, G., 2015, *Report to the AER: Return on equity (Updated)*, April.

254 Partington and Satchell (May 2015,²¹⁷ p. 6) note that they have set out the same concerns about DGM estimates of the MRP in several prior reports and “Consequently we do not spend time recapitulating these points in the current report.”

255 Partington and Satchell (October 2015,²¹⁸ pp. 43-44) again restate the concern about ‘sticky dividends,’ citing what was said on this point by Partington (2015) six months earlier.

256 We note that in its recent decisions, the AER states that:

We consider our dividend growth model is theoretically sound but that there are many limitations in practically implementing this model. We are not confident that the recent increases in estimates of the market risk premium from these models necessarily reflect an increase in the ‘true’ expected ten-year forward looking market risk premium.²¹⁹

257 However, none of the issues that the AER raises relation to the DGM are new or different since the Guideline. Since the Guideline, the only thing that has changed in relation to the AER’s DGM estimates is that they have become more and more inconsistent with the AER’s allowed MRP of 6.5%. Of course, this alone is no reason to apply less weight to the DGM evidence and the AER has stated in its recent decisions that it has not departed from its Guideline approach to the MRP²²⁰ and that:

We have not changed the weight we apply to the dividend growth model.²²¹

258 Finally, we note that, for the reasons set out in SFG (2014),²²² our view is that the DGM estimate should be computed without making a downward adjustment to the long-run GDP growth rate. The AER makes the deduction on the basis of US evidence that corporate earnings grow at a lower rate than GDP. However, the relevant academic articles use data that is more than 20 years out of date. SFG (2014) shows that corporate earnings have in fact *exceeded* GDP growth over the last three decades,²²³ leading to the conclusion that:

...it is not appropriate to attribute a low growth estimate to market expectations (on the basis of low growth observed decades ago), and then derive the cost of equity on the basis of current prices and earnings prospects.²²⁴

259 Thus, any downward adjustment to the assumed growth rate creates a downward bias in the DGM estimates. So even if there is some degree of upward bias

²¹⁷ Partington, G. and S. Satchell, 2015, “Return of equity and comment on submissions in relation to JGN,” May.

²¹⁸ Partington, G. and S. Satchell, 2015, “Report to the AER: Analysis of criticism of 2015 determinations,” October.

²¹⁹ AusNet Draft Decision, 2016, Attachment 3, p. 59.

²²⁰ AusNet Draft Decision, 2016, Attachment 3, p. 61.

²²¹ AusNet Draft Decision, 2016, Attachment 3, p. 207.

²²² SFG, 2014, *Alternative versions of the dividend discount model and the implied cost of equity*, May.

²²³ SFG, 2014, *Alternative versions of the dividend discount model and the implied cost of equity*, May, p. 34.

²²⁴ SFG, 2014, *Alternative versions of the dividend discount model and the implied cost of equity*, May.

resulting from the issues set out above, it would have to be offset against the downward bias that arises from the explicit downward adjustment that the AER makes to the GDP growth rate.

7.3 The evolution of the AER's DGM estimates

260 We begin by noting that the DGM approach provides a direct estimate of the required return on the market and the AER's DGM estimates of the required market return have not changed since the Guideline, as set out in Figure 11 above. That is, the estimates have not changed or become extreme – they have remained remarkably stable since the Guideline.

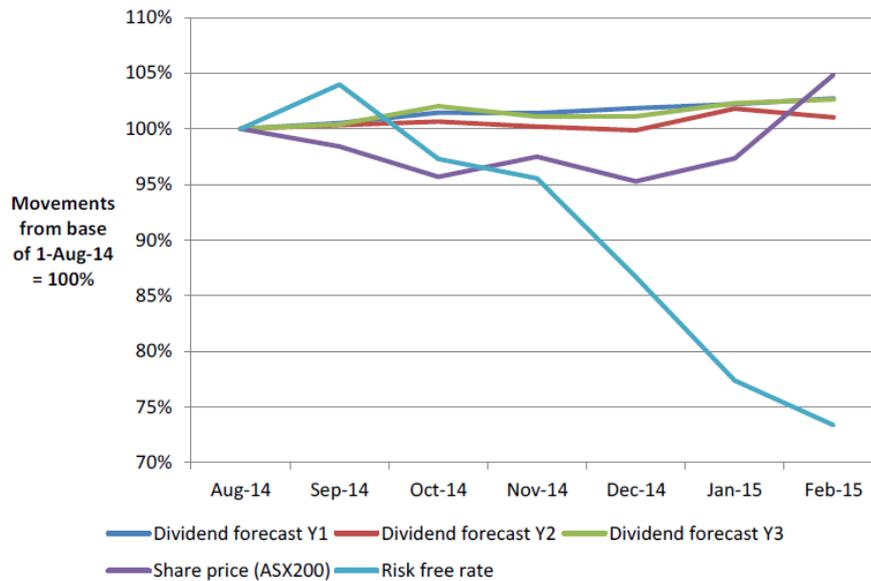
261 The AER then takes its DGM estimates and disaggregates them to separate out an MRP estimate to be inserted into the SL-CAPM formula. This is not part of the DGM – this is how the AER uses the DGM in its foundational model approach. As far as the DGM goes, nothing has changed since the Guideline, which is consistent with the above evidence of stability in investors' required return on equity. In our view, the stability of the DGM estimates does not, in itself, support the notion that the DGM method has become less reliable over time and now warrants less weight.

262 Figure 24 below sets out the AER's disaggregation of its DGM estimate of the MRP. It shows that, in the time since the Guideline forecasted dividends and share prices have both varied by less than 5%. That is, effectively nothing has changed since the Guideline. This is why the DGM estimate of the required return on the market has remained constant, even as government bond yields have fallen materially.

263 We note that this is all consistent with the external evidence set out above, which suggests that the required return on equity has remained constant even as government bond yields have declined.

264 By contrast, Figure 24 is inconsistent with the proposition that the required return on equity has declined one-for-one with the fall in government bond yields. Given that forecasted dividends are essentially constant, a material decline in the required return on equity must result in a material increase in the share price. This is because a lower discount rate would be applied to the same cash flows. However, Figure 24 shows that the share price has remained within 5% of the initial level even though government bond yields have plummeted.

Figure 24: AER decomposition of DGM estimates of the MRP



Source: Ausgrid Final Decision, April 2015, Attachment 3, p. 3-361.

265 That is, the AER's Figure 24 above is yet another piece of evidence to support the notion that the required return on equity has remained stable even as government bond yields have fallen. Importantly, this figure shows that nothing has changed materially other than the fall in the risk-free rate. The forecasted dividends have remained stable, share prices have remained stable, and the AER has maintained the same long-run growth rates. As we have shown above, this produces a stable estimate of the required return on equity. The only thing that has changed is that the yield on government bonds that the AER deducts from the estimate of the required return on the market.

8 A current estimate of the MRP

8.1 Instructions

266 In previous submissions, we have proposed that the MRP should be estimated by:

- a. Setting out all of the relevant evidence;
- b. Specifying the relative weight to be applied to each piece of evidence; and
- c. Explaining the reasons why different weight was applied to different pieces of evidence.

267 We remain of the view that this is the only way of showing how the MRP allowance was derived with the appropriate degree of transparency.

268 In this report, we have been asked to follow and update the approach set out in the AER's Guideline insofar as the approach in the Guideline was to:

- a. First form a combined range based on:
 - i. The AER's estimates of the mean historical excess return over various historical periods; and
 - ii. The AER's DGM estimates of the MRP; and
- b. To then select a point estimate that "lies between the historical average range and the range of estimates produced by the DGM."²²⁵

269 Specifically, we have been asked to:

- a. Update the historical excess returns range;
- b. Update the DGM range based on the AER's specification and parameter estimates;
- c. Construct the combined range as per the approach adopted in the Guideline; and
- d. Select a point estimate that we consider to be reasonable from within the combined range.

8.2 The range of mean historical excess returns

270 The historical excess returns range is set to 5.5% to 6.5% with a mid-point estimate of 6.0%, as per Figure 10 above.

²²⁵ AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 97.

8.3 The range of DGM estimates

271 The DGM estimate is set by using the AER's most recent DGM estimates. The relevant estimates are set out in Table 6 below.

Table 6: Contemporaneous estimates of the MRP from the AER's DGM approach

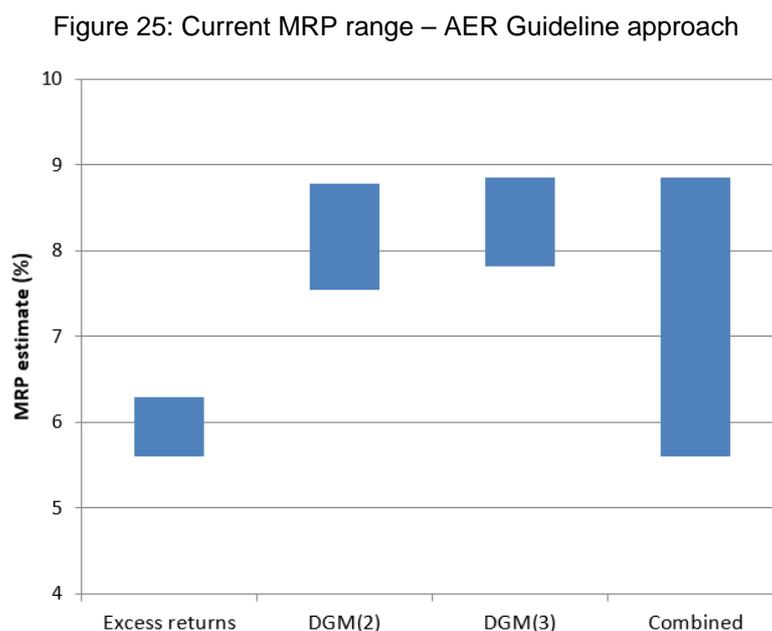
Growth rate (%)	Two-stage model MRP (%)	Three-stage model MRP (%)
3.8	7.54	7.82
4.6	8.32	8.46
5.1	8.79	8.86

Source: Powerlink Draft Decision,

272 As set out above, the AER has stated a preference for the three-stage specification. We note that this specification, together with the AER's mid-point estimate of the growth rate, produces a current point estimate of 8.46%. However, we also note that, in the current market conditions, the AER's two-stage model produces estimates of the MRP that are relatively close to those from the three-stage model.

8.4 The combined range

273 The combined range, based on updated data as at September 2016, is set out in Figure 25 below. The lower bound of the combined range is the 5.5% lower bound of the historical excess returns range and the upper bound of the combined range is the 8.9% upper bound from the AER's DGM approach.



Source: Frontier Economics calculations based on estimates set out in the Powerlink Draft Decision, Attachment 3, September 2016.

8.5 The selection of a point estimate from within the range

274 The second step of the AER's Guideline approach is to select a point estimate from within the combined range. In this regard, we note that the AER's Guideline approach is to select a point estimate where:

This point estimate lies between the historical average range and the range of estimates produced by the DGM. This reflects our consideration of the strengths and limitations of each source of evidence.²²⁶

275 In its Guideline, the AER adopted a point estimate MRP of 6.5%. The following factors appear to be relevant to the selection of that figure:

- a. The AER's historical excess returns mid-point estimate is 6.0%²²⁷ and its mid-point three-stage DGM estimate is 7.1%.²²⁸ The mid-point of these two estimates is 6.55%;
- b. The AER adopted an upper bound of 6.5% from its historical excess returns approach and a lower bound of 6.7% from its three-stage DGM approach. The mid-point of this gap between the two ranges is 6.6%;
- c. The AER's historical excess returns range and two-stage DGM range overlapped in the region of 6.1% to 6.5%. The mid-point of this region of overlap is 6.3%;
- d. The combined range adopted by the AER was 5.0% (the lower bound of the excess returns range) and 7.5% (the upper bound of the DGM range). The mid-point of the combined range is 6.3%; and
- e. If the historical excess returns range is based on arithmetic means, consistent with the AER's subsequent decisions, the combined range is 5.7%²²⁹ to 7.5%, with a mid-point of 6.6%.

276 In summary, the approach to the MRP that is set out in the AER's Rate of Return Guideline is to rely primarily on the historical excess returns method and the DGM method (particularly the three-stage method) to specify a range for the MRP and

²²⁶ AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 97.

²²⁷ AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 93.

²²⁸ The AER has subsequently stated its preference for the three-stage specification of the DGM. See, for example, JGN Draft Decision, 2014, Attachment 3, Appendix C, p. 222.

²²⁹ AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 93.

to select a point estimate from within that range. Other evidence is considered to be “less informative”²³⁰ and is given only “some”²³¹ or “limited”²³² consideration.

277 In relation to the current estimates set out above, we note that:

- a. The AER stated that its preferred historical excess returns estimate is 6.0%²³³ and its most recent mid-point three-stage DGM estimate is 8.5%.²³⁴ The mid-point of these two estimates is 7.3%;
- b. The upper bound of the AER’s historical excess returns approach is 6.5% and the lower bound from the AER’s three-stage DGM approach is 7.8%. The mid-point of this gap between the two ranges is 7.2%;
- c. At the time of the Guideline, the AER’s historical excess returns range and its two-stage DGM range overlapped. In the current market conditions, the upper bound of the historical excess returns range is 6.5% and the lower bound of the two-stage DGM range is 7.5%. The mid-point of the gap between these two ranges is 7.0%; and
- d. The combined range is from 5.5% (the lower bound of the excess returns range) and 8.9% (the upper bound of the DGM range²³⁵). The mid-point of the combined range is 7.2%.

278 We note that the ranges set out above are downwardly biased relative to the AER’s Guideline approach in the sense that the lower bound DGM estimates are based on a long-run dividend growth rate of 3.8% compared with the Guideline figure of 4.0%. That is, the lower figure that the AER currently adopts is a departure from the Guideline approach and results in lower MRP estimates.

279 We also note that those regulators who seek to obtain an estimate of the MRP that is commensurate with the prevailing conditions in the market are currently adopting higher estimates:

- a. The ERA adopted MRP estimates of 7.6% and 7.4% in its recent ATCO Gas and DBP decisions;
- b. IPART has adopted an MRP estimate of 7.3%, which it applies to a risk-free rate set 120 basis points above the contemporaneous yield in its most recent update – an effective MRP of 8.5%;
- c. Ofgem has recently adopted an effective MRP of 7.1%; and

²³⁰ AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 96.

²³¹ AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 97.

²³² AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 97.

²³³ AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 97.

²³⁴ The AER has subsequently stated its preference for the three-stage specification of the DGM. See, for example, JGN Draft Decision, 2014, Attachment 3, Appendix C, p. 222. The most recent DGM estimates are taken from the September 2016 Powerlink Draft Decision.

²³⁵ Note that the upper bound is currently the same for the AER’s two-stage and three-stage DGM approaches.

d. FERC has recently adopted an effective estimate of 8.3%.

280 Finally, we note that the most recent independent expert valuation reports adopt an average effective MRP of 7.9%. We note that this is an estimate that does not reflect any assumed benefits of dividend imputation credits, so the with-imputation MRP (comparable to the AER's allowance) would be even higher than 7.9%.

281 In summary, we have identified the sorts of considerations that the AER applied when selecting its Guideline MRP of 6.5%. If we apply those same sorts of considerations to the current evidence that the AER has compiled, the result is an estimate of approximately 7.5%.

282 If the MRP is set to 7.5%, the implied market return is 9.4%²³⁶ which is still more than 10% below the 10.5%²³⁷ allowed market return at the time of the Guideline. That is, setting the current MRP to 7.5% implies that the required return on equity has reduced materially since the Guideline, but less than one-for-one with the fall in the risk-free rate.

283 An allowed MRP of 7.5% is an outcome that lies between:

- a. The view that the MRP is constant over all market conditions such that the required return on equity rises and falls one-for-one with changes in the risk-free rate; and
- b. The view that the required return on equity has remained stable over the period since the Guideline.

284 In our view, 7.5% is a reasonable estimate in light of the weight of evidence set out above – which supports the notion that the required return on equity has not declined materially since the Guideline.

285 Since the Guideline:

- a. The AER's own DGM estimates indicate that the MRP has increased materially;
- b. The AER's own DGM estimates indicate that the overall required return on equity has remained stable; and
- c. There is substantial other evidence, as set out in Section 5 above, that the overall required return on equity has remained stable.

286 In persisting with a 6.5% MRP (such that its allowed return on equity has been reduced by more than 25% since the Guideline) the AER is apparently applying no weight to any of this evidence. In particular, as the AER's own DGM estimates of the required return on equity have remained stable, it has afforded that evidence progressively less weight – reducing the allowed return by more than 25%. As the AER's own evidence has become more and more inconsistent with its proposed regulatory allowances, that evidence has been progressively disregarded. In our

²³⁶ 1.9% + 7.5%.

²³⁷ 4.0% + 6.5% = 10.5%.

view, that approach is unreasonable – the AER’s approach of setting the allowed return on equity by adding a fixed premium to the contemporaneous government bond yield is based on assumption rather than evidence.

8.6 An appropriate forward-looking estimate that is commensurate with the prevailing conditions in the market for equity funds

287 In the previous subsection, we have identified the sorts of considerations that the AER applied when selecting its Guideline MRP of 6.5% and applied those same sorts of considerations to the current evidence that the AER has compiled, producing an MRP estimate of 7.5%. We noted that estimate implies a market cost of equity that is more than 10% below the allowance provided under the Guideline at the time of its publication.

288 In this section of the report, we have been asked to consider whether that 7.5% estimate is supported by all of the current evidence that we consider to be relevant.

289 In doing this, our approach is to make a number of changes to the approach adopted in the previous subsection in order to incorporate all of the evidence that we consider to be relevant to informing the estimate of the MRP.

290 Specifically, in determining whether the 7.5% MRP estimate is an appropriate forward-looking estimate commensurate with the prevailing conditions in the market for equity funds:

- a. Our approach is to adopt a theta of 0.35, commensurate with a gamma of 0.25, when estimating the MRP;
- b. Our approach is to place no weight on the geometric means of historical excess returns because they do not provide an appropriate estimate of the expected return for the purpose of estimating the MRP. This contrasts with the AER’s Guideline approach which was to set the lower bound of its primary range for MRP at 20 basis points above the highest geometric mean estimate.²³⁸ We note that the AER’s current approach is to base its range for historical return estimates on arithmetic averages;²³⁹
- c. Our approach is to place no weight on historical excess return estimates that use periods that begin in the 1980s because the estimates from such short periods are so imprecise as to be statistically uninformative. This contrasts with the AER’s approach, which is to make no distinction between historical excess returns estimates based on their statistical precision or the width of the relevant confidence intervals;

²³⁸ AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 93.

²³⁹ AusNet Draft Decision, 2016, Attachment 3, p. 59.

- d. Our approach is to apply the NERA adjustment to better match the dividends paid in the early part of the historical sample – for the reasons set out in SFG (2014)²⁴⁰ and because those corrected estimates have now been adopted by commercial data vendors.²⁴¹
- e. Our approach is to have regard to the Wright approach as an estimate of the MRP, consistent with the way it is used by other regulators, rather than as a return on equity cross-check – for the reasons set out in our earlier report.²⁴²
- f. We consider that the historical excess returns and Wright estimates represent two end points of a spectrum. The historical returns approach assumes that the risk premium is constant and that required returns rise and fall one-for-one with changes in the government bond yield. The Wright approach assumes that the required real return is constant and that rises and falls in the government bond yield are offset by falls and rises in the risk premium. Since the truth is likely to lie between these two end points, we would assign material weight to both.
- g. The historical mean return estimates, with the NERA correction and with theta set to 0.35, are set out in Table 7 below. We note that the most precise estimate is 6.5% from the longest available period and that the estimate from 1958 (when data quality improved) is 6.2%. We consider that this evidence conservatively supports an MRP of at least 6.2%, which (with a current government bond yield of 1.95%²⁴³) implies a required return on the market of only 8.1%.

²⁴⁰ SFG, 2014, The required return on equity for regulated gas and electricity network businesses, June, pp. 49-52. The issue here is that the return estimates for the early years of the sample period used the average dividend yield taken only over those companies that paid dividends, so an adjustment is required to reflect the proportion of firms that pay dividends. Two such adjustments have been proposed. Brailsford, T., J. Handley and K. Maheswaran, 2008, “Re-examination of the historical equity risk premium in Australia,” *Accounting and Finance* 48, 73-97 apply a single estimate from 1966 to all prior years. NERA, 2013, *The market, size and value premiums*, June apply estimates sampled uniformly from within the periods in question, so is unquestionably more accurate and more appropriate.

²⁴¹ Credit Suisse Global Investment Returns Sourcebook.

²⁴² SFG, 2015, The required return on equity for the benchmark efficient entity, February, p. 29 and following.

²⁴³ As at the time of the AER’s Powerlink Draft Decision, September 2016.

Table 7: Historical excess return estimates: NERA correction, Theta set to 0.35.

Period	Mean	Standard error
1883-2015	6.5%	1.4%
1937-2015	5.8%	2.2%
1958-2015	6.2%	2.9%

Source: Frontier calculations.

- h. The Wright estimate of the required return on the market is 11.2% without the NERA correction and 11.6% with the NERA correction – in both cases based on a theta of 0.35. With a current government bond yield of 1.95%, the Wright approach produces MRP estimates of 9.3% to 9.7%.
- i. As set out above, our view is that the historical data supports an estimate somewhere between the excess return and Wright end points on the spectrum. The mid-point between the 6.2% historical excess returns estimate and the 9.7% Wright estimate is 7.95%. Even if we apply twice as much weight to the historical excess returns estimate, the resulting point estimate is 7.4%. Consequently, we conclude that the 7.5% estimate is supported by the historical data.
- j. For the reasons set out in our earlier report,²⁴⁴ our view is that the DGM estimate should be computed without making a downward adjustment to the long-run GDP growth rate. We also agree with the AER in preferring the three-stage model. Updated results using a theta of 0.35 are set out in Table 8 below. Our preferred estimate is the three-stage estimate with no deduction to GDP growth of 9.1%, implying a required return on the market of approximately 11%. We conclude that an estimate of at least 7.5% is supported by the evidence in the table below.

²⁴⁴ SFG, 2014, Alternative versions of the dividend discount model and the implied cost of equity, May.

Table 8: DGM estimates: Theta set to 0.35.

Growth rate	Two-stage	Three-stage
3.8%	7.3%	7.6%
4.6%	8.1%	8.3%
5.1%	8.6%	8.7%
5.6%	9.0%	9.1%

Source: Frontier calculations. Data to match period used in Powerlink Draft Decision, September 2016.

- k. We note that an MRP estimate of 7.5% implies that the required return on equity across the market has fallen by more than 10% since the Guideline. For the reasons set out in Sections 4 and 5 above, we consider this to be a conservative estimate. For example, we consider that:
- i. Recent independent expert reports support an MRP of 7.5%;
 - ii. Recent Australian regulatory determinations support an MRP of 7.5%; and
 - iii. The range of evidence set out in Section 5 supports an MRP of 7.5% in that it is inconsistent with a material decline in the cost of equity capital.

291 For all of the reasons set out above, we conclude that the current evidence supports an MRP estimate of 7.5%. This conclusion, and the above calculations that support it, are based on a theta set to 0.35.

8.7 Adjustments under the AER approach for a change in theta

292 The last issue that we have been asked to consider is the extent to which a change in theta from 0.6 to 0.35 would affect the MRP as estimated in the AER's most recent decisions.

293 As we have noted above, the AER's current approach appears to apply negligible weight to its own DGM estimates. The DGM estimates have increased materially since the Guideline and are now materially inconsistent with the 6.5% MRP allowance that has remained constant since the Guideline. Rather, the AER now appears to rely almost exclusively on the AER's historical excess returns estimates.

294 As we have noted above, the short-run historical excess returns estimates that use data that begins in the 1980s are very imprecise, having relatively high standard errors and confidence intervals that include both 0% and 10%. That is, they are statistically uninformative, which is why we focus on the long-run estimates as in

Table 7 above. Those three long-run estimates fall by an average of 15 basis points if theta is changed from 0.6 to 0.35. The estimate based on the full data set falls by only 9 basis points. These changes are insignificant relative to the variation across the estimates that the AER has set out in its recent decisions. For example:

- a. The AER's arithmetic mean historical excess returns estimates vary by 70 basis points;²⁴⁵
- b. The AER's three-stage DGM estimates vary by 104 basis points;²⁴⁶
- c. The AER's two-stage DGM estimates vary by 125 basis points;²⁴⁷
- d. The difference between the AER's maximum arithmetic mean estimate and minimum DGM estimate is 124 basis points,²⁴⁸ and
- e. The width of the standard 95% confidence intervals for the historical excess returns estimates are all more than 250 basis points.

295 In summary, when determining whether, and if so to what extent, a change in the estimate of theta would impact the estimate of the MRP, it is necessary to consider the evidence on which the estimate of MRP was based. In its recent decisions, the AER appears to have based its estimate of the MRP almost exclusively on the historical excess returns evidence. The fact that these estimates are relatively insensitive to the estimate of theta indicates that a change in theta would have a commensurately small impact, if any, on the MRP that is selected.

296 To demonstrate this, Figure 26 below shows the standard 95% confidence intervals for mean historical excess returns estimated over various different sample periods and for different estimates of theta. The figure shows that the change in the estimate of theta is very small, relative to the estimation uncertainty in each case. The discretion and judgment that is applied in distilling the evidence down to a single MRP allowance is orders of magnitude greater than the effect of changing theta.

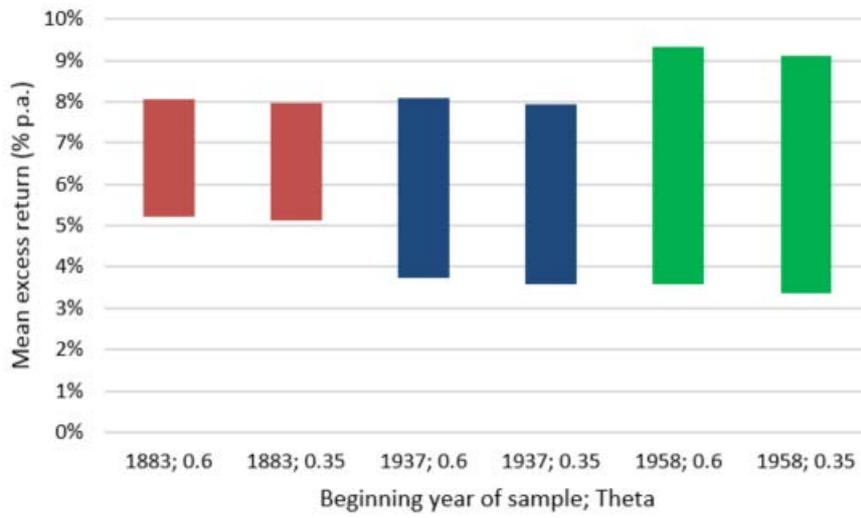
²⁴⁵ Powerlink Draft Decision, 2016, Attachment 3, pp. 104-105.

²⁴⁶ Powerlink Draft Decision, 2016, Attachment 3, p. 106.

²⁴⁷ Powerlink Draft Decision, 2016, Attachment 3, p. 106.

²⁴⁸ Powerlink Draft Decision, 2016, Attachment 3, pp. 104-105 and p. 106.

Figure 26: Historical excess return estimates for different estimates of theta



Source: Frontier calculations.

9 Declaration

297 I confirm that I have made all the inquiries that I believe are desirable and appropriate and no matters of significance that I regard as relevant have, to my knowledge, been withheld from the Court.



Professor Stephen Gray

10 Appendix: Instructions

Professor Stephen Gray
Frontier Economics
Level 1, Southbank House
Corner, Ernest and Little Stanley Street
South Bank
QLD 4101

27 January 2017

Dear Stephen

Expert Advice on Rate of Return and Value of Imputation Credits

TransGrid is preparing its revenue proposal for the 2018/19 to 2022/23 regulatory period. To assist TransGrid in the preparation of the proposal, TransGrid seeks advice on the following matters from a suitably qualified expert. The advice should be in the form of an expert report that complies with the Federal Court's Expert Evidence Practice Note GPN-EXPT.

In relation to the estimation of the **market risk premium**, the expert is asked to:

- a. Explain where the estimation of the MRP fits within the AER's regulatory framework;
- b. Explain the approach to estimating the MRP that the AER set out in its 2013 Rate of Return Guideline;
- c. Summarise the evolution of the relevant evidence and empirical estimates since 2013;
- d. Explain the implications of applying a constant, or substantially constant, MRP to contemporaneous estimates of the MRP; and
- e. Provide a current estimate of the MRP by applying the approach set out in the AER's 2013 Rate of Return Guideline to the updated evidence.

In relation to the estimation of the **equity beta** for the benchmark efficient entity, the expert is asked to:

- a. Provide an updated set of estimates of equity beta using the current set of listed comparators that the AER uses to set its primary range for beta;
- b. Provide a current set of beta estimates for other listed infrastructure firms that operate in workably competitive markets; and
- c. Consider the implications of the updated estimates in (a) and (b) above for the AER's current equity beta allowance of 0.7.

In relation to **low-beta bias**, the expert is asked to:

- a. Explain the concept of low-beta bias in the context of the SL-CAPM;
- b. Examine the approaches for correcting for low-beta bias;
- c. Summarise the evidence about the quantum of low-beta bias; and
- d. Provide your opinion about the reasonableness of the AER's approach to correcting for low-beta bias.

In relation to the estimation of **gamma**, the expert is asked to:

- a. State their views about whether gamma should be interpreted in terms of the market value of imputation credits or in terms of the proportion of credits that are available to be redeemed;
- b. Having regard to the answer to (a) above, provide their opinion about what is the best currently available empirical estimate of gamma and of each component of gamma, the distribution rate and the value of distributed credits, theta;
- c. State their views about the econometric issues that the AER has raised and maintained in relation to dividend drop-off analysis; and
- d. State their views of the issues raised in the Lally (2016) report commissioned by the AER (Lally, M., 2016, "Gamma and the ACT decision," 23 May).

In relation to **dividend drop-off estimation of gamma**, the expert is asked to:

- a. Update the SFG (2013) dividend drop-off analysis to incorporate more recent data. (SFG, 2013, "Updated Dividend drop-off estimate of theta," report for the Energy Networks Association, 7 June).

In relation to **transition arrangements for the allowed return on debt**, the expert is asked to provide a short note in letter form that:

- a. Sets out the appropriate economic framework for considering whether a transition period should be used when moving to the trailing average approach to the allowed return on debt; and
- b. Apply that framework to the benchmark efficient entity and draw conclusions about the economic rationale for the AER's proposed 10-year transition.

Yours sincerely



Nicola Tully
Manager / Prescribed Revenue and Pricing

11 Appendix: Curriculum Vitae of Professor Stephen Gray

Stephen F. Gray

Professor of Finance
University of Queensland
Business School
Brisbane 4072
AUSTRALIA
Office: +61-7-3346 8032
Email: s.gray@business.uq.edu.au

Director
Frontier Economics
Email: Stephen.Gray@frontier-economics.com.au

Academic Qualifications

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

Employment History

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

Academic Awards

- 2014 E Yetton Prize for best paper in the Australian Journal of Management, Brailsford, T., S. Gray and S. Trepongkaruna, (2013), "Explaining the bid-ask spread in the foreign exchange market: A test of alternate models."
- 2006 Outstanding Professor Award, Global Executive MBA, Fuqua School of Business, Duke University.
- 2002 Journal of Financial Economics, All-Star Paper Award, for Modeling the Conditional Distribution of Interest Rates as a Regime-Switching Process, JFE, 1996, 42, 27-62.
- 2002 Australian University Teaching Award – Business (a national award for all university instructors in all disciplines).
- 2000 University of Queensland Award for Excellence in Teaching (a University-wide award).
- 1999 Outstanding Professor Award, Global Executive MBA, Fuqua School of Business, Duke University.
- 1999 KPMG Teaching Prize, Department of Commerce, University of Queensland.
- 1998 Faculty Teaching Prize (Business, Economics, and Law), University of Queensland.
- 1991 Jaedicke Fellow in Finance, Doctoral Program, Graduate School of Business, Stanford University.
- 1989 Touche Ross Teaching Prize, Department of Commerce, University of Queensland.
- 1986 University Medal in Commerce, University of Queensland.

Large Grants (over \$100, 000)

- Institute of Teaching and Learning Innovation Grant 2016-17, Technology-enhanced Learning Grant (\$200,000), with K. Benson, B. Oliver and J. Birt.

- Australian Research Council Linkage Grant, 2008—2010, Managing Asymmetry Risk (\$320,000), with T. Brailsford, J. Alcock, and Tactical Global Management.
- Intelligent Grid Cluster, Distributed Energy – CSIRO Energy Transformed Flagship Collaboration Cluster Grant, 2008-2010 (\$552,000)
- Australian Research Council Research Infrastructure Block Grant, 2007—2008, Australian Financial Information Database (\$279,754).
- Australian Research Council Discovery Grant, 2006—2008, Capital Management in a Stochastic Earnings Environment (\$270,000).
- Australian Research Council Discovery Grant, 2005—2007, Australian Cost of Equity.
- Australian Research Council Discovery Grant, 2002—2004, Quantification Issues in Corporate Valuation, the Cost of Capital, and Optimal Capital Structure.
- Australian Research Council Strategic Partnership Grant, 1997—2000, Electricity Contracts and Securities in a Deregulated Market: Valuation and Risk Management for Market Participants.

Current Research Interests

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

Publications

- Gray, S. and D. Morrison, (2017), ‘Phoenixing at the fulcrum: Less fuff, faster forward formulation,’ *Insolvency Law Journal*, forthcoming.
- Gray, S. and J. Nowland, (2016), Director workloads, attendance and firm performance, *Accounting Research Journal*, forthcoming.
- Gray, S., (2016), “Dividend imputation and the corporate cost of capital,” *JASSA*, <http://finsia.com/news/news-article/2016/04/18/dividend-imputation-and-the-corporate-cost-of-capital>
- Faff, R., S. Gray, and K. Tan, (2016), “A contemporary view of corporate finance theory, empirical evidence and practice,” *Australian Journal of Management*, forthcoming.
- Faff, R., S. Gray, and H. Norton, (2015), “Yes, one-day international cricket ‘in-play’ strategies can be profitable!” *Journal of Banking and Finance*, 61, S164-S176.
- Gray, S. and J. Nowland, (2015), “The Diversity of Expertise on Corporate Boards in Australia,” *Accounting and Finance*, forthcoming. <http://onlinelibrary.wiley.com/doi/10.1111/acfi.12146/full>
- Darat, A., S. Gray, J. C. Park and S. Wu, (2016), “Corporate governance and bankruptcy risk” *Journal of Accounting, Auditing and Finance*, 31, 2, 163-202.
- Gray, S., I. Harymawan and J. Nowland, (2016), “Political and government connections on corporate boards in Australia: Good for business?” *Australian Journal of Management*, 41, 1, 3-26.
- Brailsford, T., S. Gray and S. Treepongkaruna, (2014), “Explaining the bid-ask spread in the foreign exchange market: A test of alternate models,” *Australian Journal of Management*, 39, 4, 573-591.
- Faff, R., S. Gray and M. Poulsen, (2014), “Financial inflexibility and the value premium,” *International Review of Finance*, 13, 3, 327-344.
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- Parmenter, B, A. Breckenridge, and S. Gray, (2010), 'Economic Analysis of the Government's Recent Mining Tax Proposals', *Economic Papers: A Journal of Economics and Policy*, 29(3), September, 279-91.
- Gray, S., C. Gaunt and Y. Wu, (2010), "A comparison of alternative bankruptcy prediction models," *Journal of Contemporary Accounting and Economics*, 6, 1, 34-45.
- Feuerherdt, C., S. Gray and J. Hall, (2010), "The Value of Imputation Tax Credits on Australian Hybrid Securities," *International Review of Finance*, 10, 3, 365-401.
- Gray, S., J. Hall, D. Klease and A. McCrystal, (2009), "Bias, stability and predictive ability in the measurement of systematic risk," *Accounting Research Journal*, 22, 3, 220-236.
- Treepongkaruna, S. and S. Gray, (2009), "Information volatility links in the foreign exchange market," *Accounting and Finance*, 49, 2, 385-405.
- Costello, D., S. Gray, and A. McCrystal, (2008), "The diversification benefits of Australian equities," *JASSA*, 2008, 4, 31-35.
- Gray, S. and J. Hall, (2008), "The Relationship Between Franking Credits and the Market Risk Premium: A Reply," *Accounting and Finance*, 48, 1, 133-142.
- Gray, S., A. Mirkovic and V. Rangunathan, (2006), "The Determinants of Credit Ratings: Australian Evidence," *Australian Journal of Management*, 31(2), 333-354.
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- Gray, S. and J. Hall, (2006), "The Relationship Between Franking Credits and the Market Risk Premium," *Accounting and Finance*, 46(3), 405-428.
- Gray, S. and S. Treepongkaruna, (2006), "Are there non-linearities in short-term interest rates?" *Accounting and Finance*, 46(1), 149-167.
- Gray, P., S. Gray and T. Roche, (2005), "A Note on the Efficiency in Football Betting Markets: The Economic Significance of Trading Strategies," *Accounting and Finance*, 45(2) 269-281.
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- Cannavan, D., F. Finn and S. Gray, (2004), "The Value of Dividend Imputation Tax Credits in Australia," *Journal of Financial Economics*, 73, 167-197.
- Gray, S. and S. Treepongkaruna, (2003), "Valuing Interest Rate Derivatives Using a Monte-Carlo Approach," *Accounting and Finance*, 43(2), 231-259.
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- Gray, S. (1988), "The Straddle and the Efficiency of the Australian Exchange Traded Options Market," *Accounting Research Journal*, 1(2), 15-27.

Teaching

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

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

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

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

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

2002 Australian University Teaching Award – Business (a national award for all university instructors in all disciplines).

2000 University of Queensland Award for Excellence in Teaching.

1999 Department of Commerce KPMG Teaching Prize, University of Queensland.

1998 Faculty Teaching Prize, Faculty of Business Economics and Law, University of Queensland.

1998 Commendation for Excellence in Teaching, University-wide Teaching Awards, University of Queensland.

1989 Touche Ross Teaching Prize, Department of Commerce, University of Queensland.

Board Positions

2012 - Present: Director, Children's Hospital Foundation, Queensland.

2002 - Present: Director, Financial Management Association of Australia Ltd.
2003 - 2012: Director, Moreton Bay Boys College Ltd. (Chairman from 2007).
2002 - 2007: External Risk Advisor to Board of Enertrade (Queensland Power Trading Corporation Ltd.)

Consulting

SFG Consulting: 1997-2014.
Frontier Economics: 2014-Present.

Twenty years' experience in consulting to companies, government-owned corporations, government and regulatory agencies. Examples include:

- *Regulatory cost of capital:* Preparation of submissions in regulatory determinations. Clients include all Australian energy transmission and distribution businesses, FOXTEL, Telstra, BBI, ACCC, IPART, ERA.
- *Corporate cost of capital reviews:* Review of cost of capital estimates for project evaluation and impairment testing purposes. Clients include QANTAS, Stanwell Corporation, Ecowise.
- *Executive stock option valuation:* Clients include Collins Foods Group, Ground Probe, Crater Gold Mining, Beach Petroleum.
- *New Project Evaluation:* Assisting companies and GOCs to evaluate proposed new projects. Particular focus is on quantifying risk and uncertainty and presenting possible outcomes in a probabilistic framework. Clients include Queensland Treasury Corporation, Queensland Accommodation Group, Stanwell, EnerTrade.
- *Financial modelling and forecasting:* Clients include ATO (forecasting delinquent payments), ASX (forecasting trading volumes), Compass Resources (integrated mine valuation model).

Retained as a valuation expert in many litigation cases; produced many expert witness reports; appeared in Court for cross examination many times including:

- *Macquarie Generation:* Witness for AGL in competition case.
- *Telstra v. ACCC:* Witness for Telstra in rate of return regulation case.
- *C7 Case:* Witness for PBL, NewsCorp, Telstra re valuation of Seven's failed cable TV network.
- *Alcan v. NT Commissioner of Revenue:* Witness for Alcan re valuation of combined bauxite mine and alumina refinery for stamp duty purposes.

