The market risk premium

A REPORT PREPARED FOR ACTEWAGL DISTRIBUTION

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Contents

1 Introduction

1.1 Instructions

1 Frontier Economics has been retained by ActewAGL Distribution 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 (Guideline) and contrast that approach in the Explanatory Statement with the AER's approach to the MRP in recent decisions;

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 risk-free rate; and

e. provide a reasonable, current estimate of the MRP.

1.2 Author of report

3 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.

4 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, and agree to be bound by them.

2 Primary conclusions

2.1 Application of the 2013 Guideline to the prevailing evidence

5 In this report, we draw three main conclusions:

a. The preponderance of evidence indicates that the MRP has increased since the AER's Guideline; and

b. In our view, the prevailing market evidence indicates that a reasonable estimate of the MRP is at least 7%.

6 We note that this recommendation of an MRP of at least 7% is lower than the recommendation of at least 7.5% in a report on the MRP that we prepared in January 2017.[1] This reflects the evolution of the evidence since that time. Our estimation approach assigns most weight to the historical returns estimate (which remains effectively constant over time) and to the DGM estimate (which has declined to partially offset the increase in government bond yields that has occurred over the course of this year).

2.2 Change in MRP estimates since the 2013 Guideline

7 The changes in the AER's estimates of the MRP since the Guideline are summarised in Table 1 below. The preponderance of recent evidence indicates an increase in the MRP since the Guideline.

[1] Frontier Economics, January 2017, The market risk premium, Report for TransGrid.

Table 1: Change in MRP estimates since Guideline

Estimation method	AER 2013 Guideline estimate (%)	Current estimate (%)	Source for current evidence
Historical excess returns	Point estimate: 6.0	6.0 to 6.5	Range from five historical periods used by AER, updated to end 2016.
Dividend growth model	6.1 to 7.5	7.1 to 8.2	Updated estimates using AER DGM approach.
Surveys	Supportive of 6.0	7.3 to 7.6 7.8	Fernandez (2017) mean and median estimates. MRP consistent with KPMG survey and use of prevailing risk-free rate.
Conditioning variables	Qualitative consideration	Qualitative consideration	AER concludes all approaches currently near mean levels whereas one approach suggested a lower MRP at time of Guideline.
Regulatory determinations	Supportive of 6.5	7.2 to 7.7	Decsions made by other Australian regulators within the last six months. Over last year, no estimates below 6.5%, nearly all estimates above 7%.
Independent expert valuation reports (directional evidence on return on equity)	Not inconsistent with estimate of 6.5	6.9 to 8.7	Recent independent expert reports.
Wright approach ("cross-check" only)	5.8 to 8.7	7.3 to 9.9	Range from five historical periods used by AER, updated to end 2016.

Source: AER 2013 Rate of Return Guideline Materials, AER TransGrid Draft Decision

2.3 Comparison of current AER approach with the 2013 Guideline approach

2.3.1 The regulatory task when estimating the MRP

8 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.

9 The AER's Guideline materials[2] explain that "the MRP likely varies over time."[3] The AER has stated in recent Decisions that it seeks to estimate the "prevailing market risk premium",[4] which is a "forward-looking estimate of the market risk premium."[5]

10 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.

2.3.2 2013 Guideline approach

11 The approach to MRP that was set out in the Guideline materials was as follows:

a. Determine a range from the historical excess returns evidence;

b. Determine a range from the DGM evidence;

c. Form a combined range from (a) and (b);

d. Select a point estimate from within the combined range by weighting the relevant evidence as follows:

i. "greatest" consideration to historical excess returns;

ii. "significant" consideration to DGM estimates;

iii. "some" consideration to survey evidence; and

iv. "limited" consideration to other evidence (including conditioning variables and other regulators' estimates of the MRP).

12 In the Guideline materials:

a. The historical excess returns range was set to 5.0% to 6.5%;

b. The DGM range was set to 6.1% to 7.5%;

c. The combined range was set to 5.0% to 7.5%; and

d. A point estimate of 6.5% was adopted from within the combined range.

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[2] By "Guideline materials", we mean the Rate of Return Guideline, the Rate of Return Guideline Explanatory Statement (Explanatory Statement), and the associated Appendices. As we explain below, the description of the Guideline approach to the MRP was very brief, comprising three short paragraphs. The Explanatory Statement and Appendices are relevant as they explain how the AER intended, at the time it was developing the Guideline, to implement in practice the Guideline approach to the MRP.

[3] AER, 2013, Rate of Return Guideline: Explanatory Statement, p. 91.

[4] TransGrid Draft Decision, 2017, Attachment 3, p. 74.

[5] TransGrid Draft Decision, 2017, Attachment 3, p. 74.

13 The AER stated that its selection of a 6.5% estimate, from within the area of overlap between the historical and DGM estimates, reflected its consideration of the strengths and limitations of each source of evidence:

> 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.[6]

14 The AER also stated that:

> …we give greatest consideration to historical averages followed by estimates of the MRP from DGMs and then surveys.[7]

15 In relation to the other evidence, including conditioning variables which received "limited" weight, the AER stated:

> 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.[8]

and:

> We also give limited consideration to conditioning variables which give mixed results at the time of this decision. Credit spreads and dividend yields are stable, while implied volatility suggests the MRP may be below the historical average.[9]

2.3.3 The AER's approach in recent Decisions

16 The approach to MRP that is adopted in the AER's latest Decisions, such as the September 2017 Draft Decision for TransGrid, is the following:

a. The AER first determines a "baseline estimate" of the MRP using historical excess returns.[10] We note that the concept of a "baseline" MRP is not mentioned anywhere in the Guideline materials.

b. The AER then uses its DGM estimates as *directional* evidence only to decide whether it should select a point estimate above the baseline estimate.[11] Whereas the Guideline affords "significant" weight to the DGM estimates, and uses them to create the range whereby the final point estimate is selected from the region of overlap between the historical and DGM estimates, the AER's most recent Decisions apply "less reliance" on the DGM

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

[7] AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 95.

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

[9] AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 97.

[10] TransGrid Draft Decision, Attachment 3, p. 76.

[11] TransGrid Draft Decision, Attachment 3, p. 76.

estimates.[12] The DGM evidence now seems to be applied in a binary manner – having no role other than to indicate whether the final point estimate should be *directionally* above or below the "baseline" of 6%. The DGM evidence appears to have no role in determining the *amount* by which the prevailing MRP exceeds the baseline.

c. The AER then uses conditioning variables to support the contention that the MRP has been relatively stable:

> the conditioning variables indicate there has not been a material change in market conditions to warrant adjusting the market risk premium. [13]

and:

> Overall, the conditioning variables appear fairly stable and close to their long term averages.[14]

This contrasts with the Guideline approach in which conditioning variables receive "limited" weight because they are "subject to various limitations and should be used with caution."

This conclusion is also inconsistent with the fact that, at the time of the Guideline, the AER concluded that the evidence from conditioning variables was mixed, with some supporting an average and some supporting a low MRP, whereas none of the current evidence supports a low MRP.[15]

d. The AER then considers surveys and other regulatory determinations and concludes that evidence is not inconsistent with a MRP estimate of 6.5%.[16]

2.4 Derivation of a reasonable, current estimate of the MRP

17 We have been asked to provide a reasonable, current estimate of the MRP. In order to do this, we have used our best endeavours to apply the approach to estimating the MRP described in the Guideline materials to the latest data available.

18 Specifically, our approach is to:

a. Update the historical excess returns range;

[12] TransGrid Draft Decision, Attachment 3, p. 76.

[13] TransGrid Draft Decision, Attachment 3, p. 76.

[14] TransGrid Draft Decision, Attachment 3, p. 90.

[15] TransGrid Draft Decision, Attachment 3, p. 90.

[16] TransGrid Draft Decision, Attachment 3, p. 76.

b. Update the DGM range based on the AER's specification and parameter estimates;

c. Construct the combined range using the historical excess returns and DGM evidence; and

d. Select a point estimate that we consider to be reasonable from within the combined range.

2.4.1 Historical excess returns approach

19 We begin by updating the AER's historical excess returns estimates to the end of 2016. In computing these estimates, we adopt a theta of 0.6, which is consistent with a gamma of 0.4. We do not make the NERA correction for dividend yields – again to maintain consistency with the approach set out in the AER's Guideline.

20 We form the MRP range derived using historical excess returns by considering arithmetic averages only. The relevant estimates are set out in Table 2 below.

Table 2: Updated estimates of the MRP from the historical excess returns approach

Sampling period	Average (% p.a.)
1883 - 2016	6.3
1937 – 2016	6.0
1958 – 2016	6.5
1980 – 2016	6.5
1988 - 2016	6.0

Source: AER Historical excess returns estimates, updated to end 2016 by Frontier Economics.

21 In our view, these estimates support a range of 6.0% to 6.5%.[17] The lower bound of this range is derived using the lowest estimate in Table 2, and the upper bound is derived using the highest estimate in Table 2.

22 We note that, by definition, this approach produces an estimate of the MRP that is commensurate with the average market conditions that existed over the historical sampling period. By contrast, the DGM approach (below) is designed to produce

[17] This range differs from the range published by the AER in its latest Decisions (e.g., the TransGrid Draft Decision) of 5.1% to 6.4%. One reason our estimated range differs from the AER's is because our estimates are based on arithmetic averages only, whereas the AER appears to have formed the lower bound of its range (5.1%) by adding 20 basis points to the highest geometric average (4.9%, for the averaging period 1883-2016). The reasons for any remaining differences between our estimates and the AER's are unclear. The historical data we use in our estimation covers the period 1883-2016. Table 3-19 in the TransGrid Draft Decision suggests that the AER also uses data over the same period. However, the text immediately preceding the AER's Table 3-19 (section C.1, p. 202) suggests that the AER has used data "up until the 2015 calendar year end." As noted above, like the AER, we assume a theta estimate of 0.6 and we make no NERA adjustments to the historical data.

an estimate of the MRP that is commensurate with the prevailing conditions in the market.

2.4.2 DGM approach

23 We have applied the DGM approach, as set out in the Guideline, using data from June and July 2017.[18] The relevant estimates are set out in Table 3 below.

Table 3: Contemporaneous estimates of the MRP from the AER's DGM approach

Growth rate (% p.a.)	Two-stage DGM (% p.a.)	Three-stage DGM (% p.a.)
4.0	7.14	7.25
4.6	7.70	7.72
5.1	8.18	8.11

Source: AER dividend growth model, estimates over June-July 2017 computed by Frontier Economics.

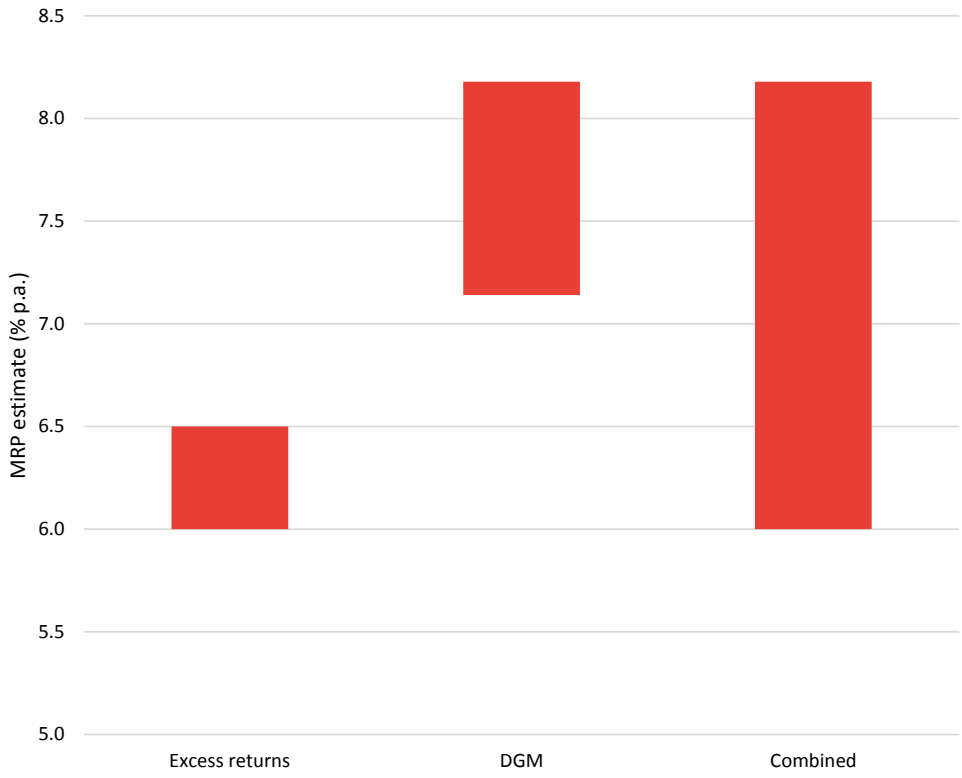
24 This supports a DGM MRP range of 7.14% (the lowest estimate in Table 3) to 8.18% (the highest estimate in Table 3).

2.4.3 The combined range

25 The combined range, based on updated data as at July 2017, is presented in Figure 1s below. The lower bound of the combined range is the 6.0% lower bound of the historical excess returns range and the upper bound of the combined range is the 8.2% upper bound from the AER's DGM approach.

[18] This is consistent with the AER's approach of using two months of data when applying the DGM.

Figure 1: Current MRP range – AER Guideline approach



Source: Frontier Economics calculations based on estimates set out in Table 2 and Table 3 above.

2.4.4 Selection of a point estimate from within the range

26 Next we select a point estimate from within the combined range. In this regard, we note that the Guideline approach is to select a point estimate that "lies between the historical average range and the range of estimates produced by the DGM."[19]

27 In the Guideline materials, the AER adopted a point estimate MRP of 6.5%. The Guideline materials do not say precisely how this point estimate was chosen from within the combined range. However, 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%[20] and its mid-point three-stage DGM estimate is 7.1%.[21] 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-

[19] AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 97.

[20] AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 93.

[21] 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.

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%[22] to 7.5%, with a mid-point of 6.6%.

28 In summary, the approach to the MRP that is set out in the Guideline is to rely primarily on the historical excess returns method and the DGM 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"[23] and is given only "some"[24] or "limited"[25] consideration.

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

a. The mid-point of the combined range is 7.1%; and

b. The upper bound of the AER's historical excess returns approach is 6.5% and the lower bound from the AER's DGM approach is 7.2%. The mid-point of this gap between the two ranges is 6.9%.

30 We also note that, since the Guideline, the AER's excess returns estimates have increased somewhat and its DGM estimates have increased substantially. Figure 4 below shows the increase in the estimates from each of the two main approaches set out in the Guideline. Clearly, the mid-points of the ranges for both methods have increased since the Guideline and the same applies to the combined range. All of this evidence is consistent with an increase in the MRP since the Guideline.

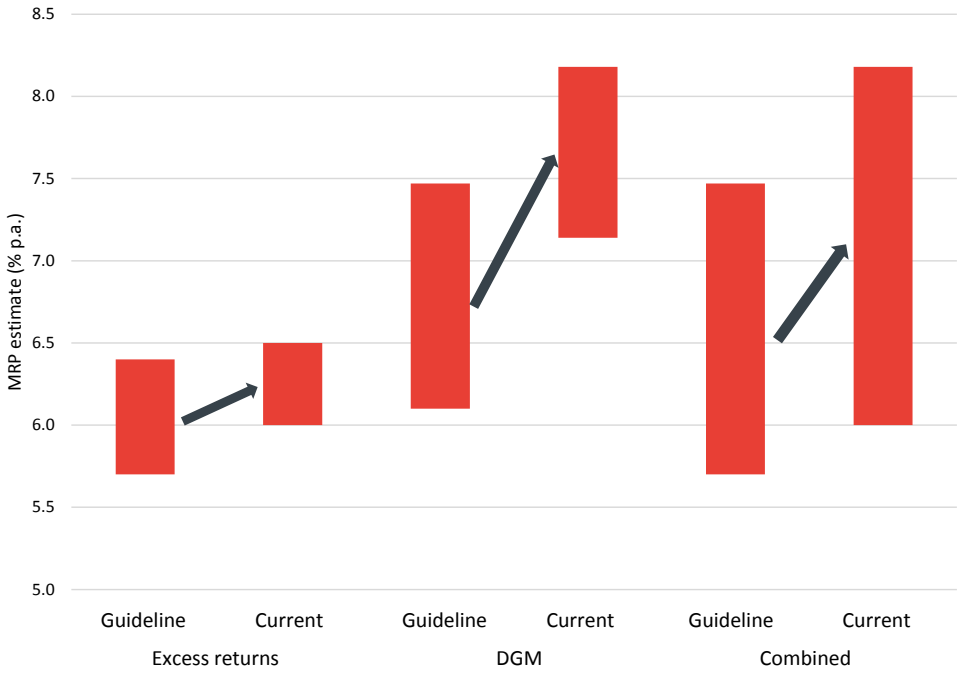
[22] AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 93.

[23] AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 96.

[24] AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 97.

[25] AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 97.

Figure 2: Comparison of AER estimates: 2013 Guideline vs. current



Source: AER 2013 Rate of Return Guideline, Explanatory Statement, Appendix D; Frontier Economics calculations based on estimates set out in Table 2 and Table 3 above.

31 In our view, the latest evidence no longer supports an estimate of 6.5%. Rather, the evidence above suggests that a reasonable, current estimate of the MRP is at least 7.0%.

2.4.5 Other relevant evidence

32 In the Guideline materials, the AER indicated that it considered other evidence to be "less informative"[26] and that it would be given only "some"[27] or "limited"[28] consideration. In this section, we consider how that other evidence has moved since the Guideline.

33 We find that the evidence from other relevant regulators in Australia and recent surveys support a MRP estimate well above 7.0%.

34 Further, we also investigate cross-check evidence in the form of recent reports from valuation experts, and estimates derived using the Wright approach, and find that these also provide strong directional evidence that the MRP in prevailing market conditions is materially higher than 7.0%.

[26] AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 96.

[27] AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 97.

[28] AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 97.

Relevant estimates from other Australian regulators

35 The AER has stated recently that it gives no weight to MRP estimates used in overseas regulatory decisions.[29] Therefore, we restrict our focus to MRP decisions by regulators in Australia.

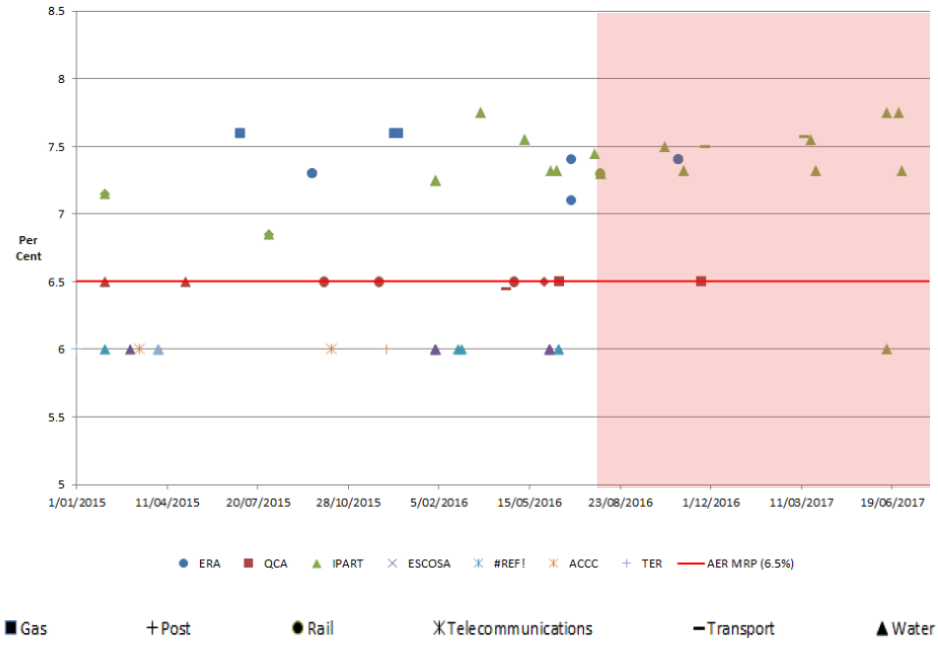
36 The AER also notes that:

> …other regulators adopt different approaches, have different regulatory tasks (and regimes) and regulate different businesses.[30]

37 We agree with this observation. In our view, to the extent the AER gives any weight to the MRP decisions of other Australian regulators — even as cross-checks — it should give most weight to the estimates derived by regulators with similar regulatory objectives and tasks.

38 We note that those regulators who seek to obtain an estimate of the MRP that is commensurate with the prevailing conditions in the market, as the AER must do under the Rules, have over the past 12 months adopted estimates above 7.0%. This is borne out by the AER's own evidence, as summarised in Figure 3 below, and discussed in some detail in Appendix C of this report.

Figure 3: Market risk premium estimates from other Australian regulators' decisions



Source: TransGrid Draft Decision, 2017, Attachment 3, Figure 3-15, p. 236.

39 As we note in Appendix C, in addition to the regulatory decisions reflected in Figure 3, IPART, the ERA and QCA have each published further estimates of the MRP:

[29] TransGrid Draft Decision, 2017, Attachment 3, p. 291.

[30] TransGrid Draft Decision, 2017, Attachment 3, p. 291.

a. IPART's August 2017 Biannual WACC update determined a MRP estimate of 7.7%;[31]

b. The ERA's October 2017 WACC Final Decision for WA rail networks determined a MRP estimate of 7.2%;[32] and

c. The QCA's November 2017 Draft Decision on bulk water charges for Seqwater concluded that the best empirical estimate of the MRP at the present time is 7.0%.[33]

40 This evidence indicates that other regulators in Australia are currently estimating the MRP, reflecting prevailing market conditions, to be at least 7.0%, with nearly all decisions within the last 12 months adopting estimates materially above 7.0%.

41 The AER notes that the ERA has stated in its 2016 Goldfields Gas Pipeline Decision[34] that its estimate of the MRP (7.4%) is comparable to the AER's estimate of 6.5% "once differences in parameter estimates and judgment are accounted for."[35] The ERA explains in its Goldfields Gas Decision that it uses a risk-free rate with a 5-year term, whereas the AER uses a risk-free rate with a 10-year term. At the time of that decision, the 5-year risk-free rate was approximately 40 basis points below the 10-year rate. Thus, the ERA's MRP was 7% relative to the 10-year government bond yield, which is materially different from the AER's 6.5% allowance.

42 Moreover, we note that in the ERA's latest Decisions, in relation to WA rail networks, the ERA adopted a 10-year risk-free rate, and still arrived at a MRP estimate of 7.2%.[36]

43 Further, the ERA is subject to the same Rules as the AER and therefore must, like the AER, ensure its estimate of the MRP satisfies the ARORO.

44 Hence, it is incorrect that the ERA's most recent estimates of the MRP are consistent with the AER's estimate of 6.5%.

Survey evidence

45 In its Guideline materials, the AER noted that:

> McKenzie and Partington place significant weight on survey evidence[37]

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[31] IPART, WACC Biannual update, August 2017, p. 2.

[32] ERA, Determination on the 2017 Weighted Average Cost of Capital for the Freight and Urban Railway Networks, and for Pilbara railways, 6 October 2017, p. 4.

[33] QCA, Seqwater Bulk Water Price Review 2018–21, November 2017, p. 54.

[34] ERA, Final Decision on Proposed Revisions to the Access Arrangement for the Goldfields Gas Pipeline, June 2016, p. 240.

[35] TransGrid Draft Decision, 2017, Attachment 3, p. 291.

[36] ERA, Determination on the 2017 Weighted Average Cost of Capital for the Freight and Urban Railway Networks, and for Pilbara railways, 6 October 2017, p. 4.

[37] AER, 2013, Rate of Return Guideline, Explanatory Statement, Appendix D, p. 89.

and that:

> Lally also supported the use of survey evidence and suggested the recent Fernandez survey is the most relevant survey evidence. [38]

46 The AER then cited five versions of the Fernandez surveys in its Table D.5.[39]

47 An updated Fernandez survey was released in April 2017.[40] This new survey is clearly the most timely of the available surveys.

48 The Fernandez (2017) survey reports that:

a. **The median MRP for Australia has increased to 7.6%** and the mean is 7.3%;[41]

b. **The mean reported MRP increased between 2015 and 2017 for the vast majority of countries represented in the survey.** Out of the 41 countries in Table 6, the mean MRP estimate increased for 31 and decreased for 10.[42] Of the 10 countries for which the MRP estimate decreased, 9 are developing markets. This indicates that an increase in the reported MRP for Australia is in line with the results for other markets and particularly other developed markets;

c. **The standard approach of survey respondents is to pair the MRP estimate with a risk-free rate above the prevailing government bond yield.** The authors take the 10-year government bond yield as a standard benchmark and show that respondents are pairing their MRP estimates with a risk-free rate above the benchmark rate.[43] Since the AER's approach is to estimate the risk-free rate as the 10-year government bond yield without adjustment, the implied MRP is even higher than the raw figures set out above.

d. **As with prior surveys, the estimates would have to be adjusted to reflect the value of dividend imputation tax credits that is assumed by the AER.** It is, in our view, unreasonable to suggest (as the AER does) that survey respondents had already adjusted their MRP estimates to reflect a gamma of precisely 0.4 so as to be consistent with the AER's other MRP estimates. However, even if

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[38] AER, 2013, Rate of Return Guideline, Explanatory Statement, Appendix D, p. 89.

[39] AER, 2013, Rate of Return Guideline, Explanatory Statement, Appendix D, p. 92.

[40] Fernandez, P., V. Pershin and I.F. Acin, Discount rate (risk-free rate and market risk premium) used for 41 countries in 2017: A survey, April 17, ssrn.com/abstract=2954142.

[41] Fernandez et al (2017), Table 2, p. 3.

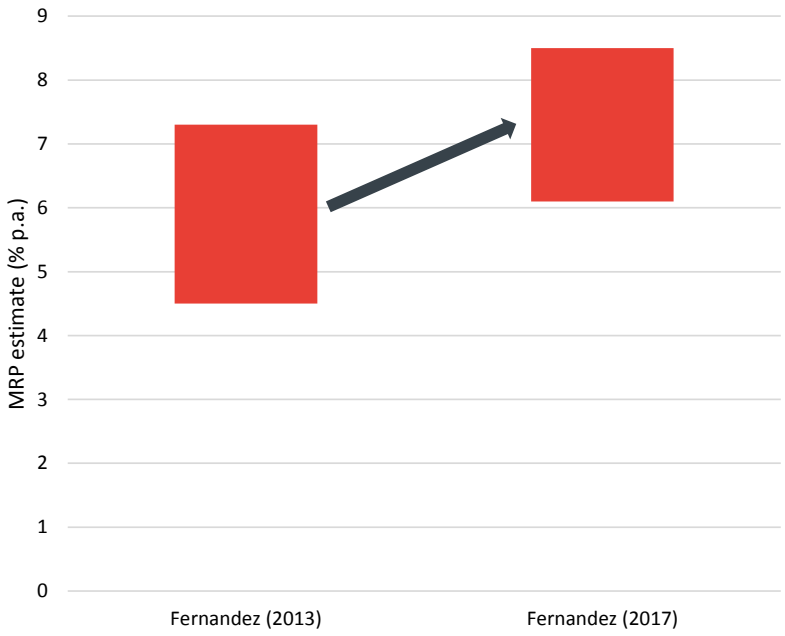
[42] Fernandez et al (2017), Table 6, p. 7.

[43] Fernandez et al (2017), Table 8, p. 9. The median return on the market is not reported.

no such adjustment were made, the 'raw' survey evidence would still support a MRP estimate well in excess of 7.0%.

49 We note that the Fernandez survey on which the AER placed primary regard in the Guideline, produced materially lower estimates of the MRP than does the current Fernandez survey. That is, this survey evidence supports the notion that the MRP has risen materially since the Guideline, as shown in Figure 4 below.

Figure 4: Comparison of survey estimates of the MRP: 2013 Guideline vs. current



Source: Fernandez, P., J. Aguirreamalloa and L. Corres, 2013, Market risk premium used in 82 countries in 2012: a suvey with 7,192 answers, May 15; Fernandez, P., V. Pershin and I.F. Acin, 2017, Discount rate (risk-free rate and market risk premium) used for 41 countries in 2017, April 17. For each survey, we have set out a range that consists of the mean estimate plus and minus one standard deviation.

50 In its most recent Decisions, the AER presents results from a number of other surveys, but nearly all of these are more than 12 months out of date and so have little relevance to estimation of the current MRP reflecting prevailing market conditions.

Cross-checks: Wright estimates

51 The AER states in recent Decisions that it uses the Wright evidence as a cross-check on its overall return on equity, but does not use the Wright approach to estimate the MRP because the Wright approach:[44]

a. is "not theoretically justified";

b. does "not take into account changing market conditions";

[44] TransGrid Draft Decision, 2017, Attachment 3, p. 199.

c. assumes a clear inverse relationship between the risk-free rate and the MRP, and there is "no compelling empirical evidence" for such a relationship; and

d. is not generally accepted by market practitioners, academics or regulators.

52 Whilst we disagree with a number of the AER's reasons cited above,[45] we make a more fundamental observation. The AER uses the Wright approach as a cross-check of the overall return on equity estimate and, in doing so it presents its estimates of:[46]

a. What it refers to as the "Wright CAPM return on equity";

b. the prevailing risk-free rate; and

c. equity beta.

53 Using these inputs, the Wright estimate of the MRP can be calculated mechanistically using the following formula:

$$MRP_W = \frac{r_W - r_f}{\beta}$$

where MRP_W denotes the Wright estimate of the MRP, r_W denotes the AER's Wright CAPM return on equity, r_f denotes the AER's estimate of the prevailing risk-free rate and β denotes the AER's estimate of the equity beta.

54 Note that all of the estimates on the right-hand-side of this relationship are the AER's own estimates. Further, the Wright CAPM return on equity is accepted by the AER as a cross-check on the overall return on equity estimate. Given these facts, it would seem logical for the AER to use its Wright estimate of the MRP as a cross-check on its other estimates of the MRP. The AER's Wright estimate of the MRP is implicit within its own estimate of the Wright CAPM return on equity. It can be computed mechanistically using two other parameter estimates (the risk-free rate and equity beta) which the AER presumably regards as uncontroversial as they are its own estimates.

55 That is the approach that we have followed in this report: The AER's own estimates of the risk-free rate, equity beta, and the Wright CAPM return on equity

[45] For example, it is incorrect to say that the Wright approach does not take into account changing market conditions. The AER seems to argue that because the Wright approach uses long-run averages of the overall return on the market, it is incapable of reflecting changing market conditions. We note that the Wright estimates of the MRP move in a very similar manner to the AER's DGM estimates, which the AER acknowledges reflects prevailing market conditions well. Further, we note that whilst direct empirical evidence of an inverse relationship between the risk-free rate and MRP is impossible to adduce (since the MRP cannot be observed directly; it can only be estimated), there is ample indirect evidence (which we cite below in this report) that the returns required by equity investors have remained fairly stable over time as the risk-free rate has fluctuated significantly. This is entirely consistent with the Wright approach.

[46] For example: TransGrid Draft Decision, 2017, Attachment 3, Table 3-21, p. 199.

imply a unique estimate of the MRP. We use this unique estimate of the MRP as a cross-check of the AER's allowed MRP.

56 Table 4 below presents estimates of the MRP derived using the Wright CAPM.

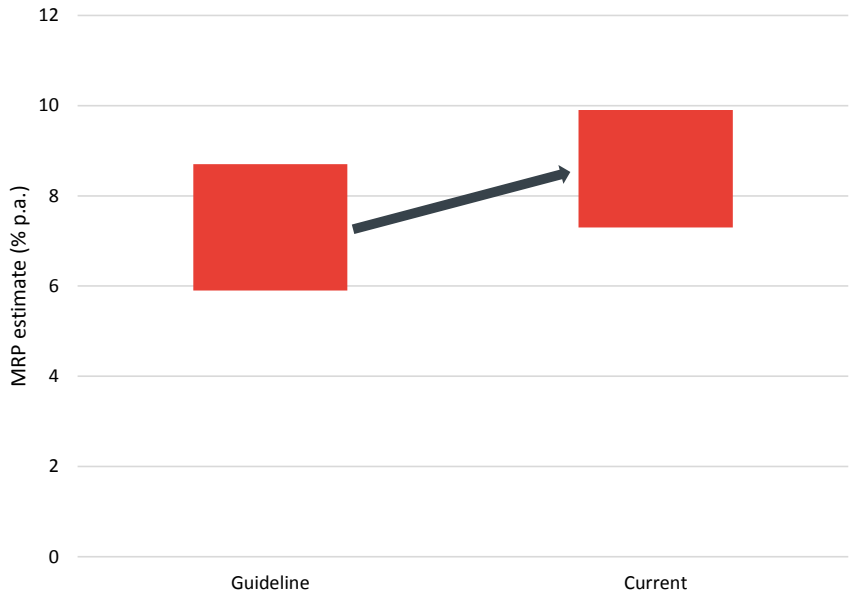
Table 4: Contemporaneous estimates of the MRP from the Wright approach

Sampling period	Average (% p.a.)
1883 - 2016	8.6
1937 – 2016	7.3
1958 – 2016	8.9
1980 – 2016	9.9
1988 - 2016	9.3

Source: AER Wright approach estimates, updated to end 2016 by Frontier Economics.

57 Figure 5 below shows that the Wright estimates of the MRP have also materially increased since the AER's 2013 Guideline.

Figure 5: Comparison of Wright estimates of the MRP: 2013 Guideline vs. current



Source: AER Wright estimates, updated to end 2016 by Frontier Economics.

Cross-checks: Updated independent expert report evidence

58 The AER also stated in its Guideline materials that independent expert valuation reports "should play a role in our estimation of the expected return on equity," [47] cautioning that they must be contemporaneous:

> 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.[48]

59 The Guideline materials acknowledge that independent valuation experts have regard to changing market conditions and new information, when estimating the return on equity:

> Expert reports have regard to changing market conditions and new information. Firms undertaking valuations will generally have an agreed policy or framework that is applied consistently at a point in time. Within this they may adjust their assumptions and point estimates having regard to current market conditions.[49]

60 The AER went on to explain in the Guideline materials that different valuation experts take account of changing market conditions and new information in different ways: some adjust the risk-free rate, some the MRP and others still the overall return on equity; therefore, in order to make fair comparisons across different valuation experts' reports, it is necessary to examine the valuation experts' estimates of the overall return on equity:

> However, the adjustments can be arbitrary and may be made to the risk free rate, the market risk premium and/or the expected return on equity. Hence, the results are most comparable at the overall return on equity level.[50]

61 We agree entirely with the AER on this point. It would be quite misleading to examine only the MRP estimates presented by valuation experts, ignoring any adjustments to account for changing market conditions that these experts may have applied to their estimates of the risk-free rate or the overall return on equity.

62 However, in recent Decisions the AER makes precisely the error that is warned against in the Guideline materials, when assessing some valuation experts' reports that we had brought to the AER's attention in previous submissions. Specifically, the AER has stated that:[51]

a. Three of the four valuation reports we cited "specify a market risk premium of 6 per cent";

b. These same three valuation reports apply an uplift to the prevailing risk-free rate. "This does not change the market risk premium itself

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[47] AER, 2013, Rate of Return Guideline, Explanatory Statement, Appendices, p. 28.

[48] AER, 2013, Rate of Return Guideline, Explanatory Statement, Appendices, p. 28.

[49] AER, 2013, Rate of Return Guideline, Explanatory Statement, Appendices, p. 28.

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

[51] TransGrid Draft Decision, 2017, Attachment 3, p. 294.

> and so should not be compared as such. The AER does not apply any uplift to its risk-free rate."

63 Our point in drawing the AER's attention to these valuation reports (and the AER's point in the Guideline materials) is that whilst these valuation experts were using a MRP estimate of 6%, they had made upward adjustments to the risk-free rate (or elsewhere) to account for prevailing market conditions, so as to obtain a more realistic estimate of the overall return on equity.

64 Independent valuation experts use a range of approaches to estimate the required return on equity that they consider to be commensurate with the prevailing market conditions. However, the AER has adopted an approach where the only parameter that can be varied is the MRP. Consequently, the relevant task is to determine what MRP would have to be inserted into the AER's valuation formula to obtain an estimate of the required return on equity that is consistent with that adopted by the independent expert. This is the *effective* MRP that is implicit in the independent expert reports.

65 For example, suppose the prevailing risk-free rate is 3% and an independent expert report adopts an adjusted risk-free rate of 5% and a MRP of 6%. In this case, the expert has determined that the required return on market equity is 11% (5%+6%). This implies an effective MRP of 8% (11%-3%). Thus, if the effective MRP of 8% is used in the AER's valuation formula, where the risk-free rate is set to 3%, the resulting estimate of the required return on market equity is 11% (3%+8%), which is consistent with the expert's view.

66 It would, in our view, be unreasonable to conclude that the expert report supported the approach of inserting a 6% MRP into a valuation formula with a risk-free rate of 3%, as that would produce a return on equity estimate of only 9%, which is clearly inconsistent with the expert's view. We note that, for each independent expert report, there is a unique MRP that, when inserted into the AER's valuation formula, produces a return on equity estimate that is consistent with the expert's return on equity estimate.

67 The AER gives the following reasons in recent Decisions for rejecting the use of valuation expert reports to cross-check its estimates of the MRP:

a. The AER argues that the uplifts applied by valuation experts to initial estimates (i.e., of the risk-free rate, MRP or the overall required return on equity) may be inconsistent with the ARORO. As a result the AER prefers to have regard to unadjusted estimates.[52] Further, the adjustments made by valuation experts "seem too ad hoc to be a regulatory tool."[53] We note that the adjustments applied by valuation experts affect the overall estimate of the required return on equity *and* the effective MRP implicit within those estimates. It is inconsistent for the AER to reject

[52] TransGrid Draft Decision, 2017, Attachment 3, Table 3-6, pp. 93-4.

[53] TransGrid Draft Decision, 2017, p. 293.

estimates of the effective MRP in valuation experts' reports as a cross-check, due to concerns over the adjustments applied, but then accept the same valuation experts' overall return on equity estimates (affected by the same adjustments) as a cross-check on its overall return on equity estimate – as per the Guideline. Further, the AER provides no evidence that the adjustments being made by valuation experts *actually* reflect any of these factors; it merely speculates that the adjustments *may* reflect some of these factors and, based on this speculation alone, rejects valuation expert reports as evidence relevant to the MRP.

b. The AER notes that the ARORO states that data must be "informed by sound empirical analysis and robust data", and argues that many valuation reports do not state the source of their information or decisions.[54] This reasoning appears to be an unexplained departure from the Guideline, which concludes that "Expert reports are credible, verifiable, and clearly sourced."

68 Given that the AER accepts valuation expert reports as a cross-check on the overall return on equity, we consider it reasonable to use this same evidence (accounting for the various ways in which different experts may make adjustments for changing market conditions and new information) as a cross-check on MRP estimates.

69 In our January 2017 report, we presented estimates of the effective MRP contained in valuation reports by Lonergan Edwards, Grant Samuel, Deloitte and KPMG.[55]

70 We calculate the effective MRP used in these valuation reports by first summing together the risk-free rate and MRP estimates reported in each of those reports. 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.[56]

[54] TransGrid Draft Decision, 2017, p. 293.

[55] Frontier Economics (2017), Section 4.5.

[56] 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.

71 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.

72 As we noted in our January 2017 report, the MRP figures set out in Table 5 are ex-imputation estimates. For example, Lonergan Edwards specifically states that its WACC parameter estimates have been derived:

> …without adjustment for imputation.[57]

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.[58]

73 Consequently, before the estimates of the effective MRP reported in Table 5 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.

74 For the avoidance of doubt, we do not argue that these valuation reports should be used as evidence on the precise point estimate of the MRP. However, this is relevant directional evidence that finance practitioners are *not* coupling the prevailing risk-free rate with a MRP commensurate only with the historical excess returns evidence—as the AER's Decisions in effect do.

75 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.

[57] Lonergan Edwards, 2016, p. 45.

[58] Grant Samuel, 2016, p. 11.

76 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.

2.4.6 Conclusions in relation to MRP

77 In our view, the evidence set out above supports the notion that the MRP has increased materially since the Guideline, published in December 2013. In the Guideline materials, the AER set out the sort of evidence that it would consider when estimating the MRP. As explained above, the preponderance of that evidence supports the conclusion that the MRP has risen materially since the Guideline.

78 In selecting a current, forward-looking point estimate, we have adopted an approach that we consider is reasonable and consistent with the Guideline. This involves:

a. Estimating a range of historical excess returns estimates;

b. Estimating a range of DGM estimates;

c. Constructing a combined range; and

d. Selecting a point estimate that lies between the historical average range and the range of estimates produced by the DGM.

79 As set out above, this produces a current estimate of at least 7.0%.

80 The fact that our proposed estimate of at least 7.0% is higher than the 6.5% estimate that the AER adopted when applying its approach to the evidence in 2013 is conservative in that:

a. The AER's historical excess returns estimates have increased since 2013;

b. The AER's DGM estimates have increased since 2013, and are currently above 7.0%;

c. A number of other regulators are currently adopting MRP estimates above 7.0%;

d. The most recent survey evidence suggests that the MRP has increased since 2013, and is currently above 7.0%;

e. The AER's Wright estimates have increased since 2013 and are currently above 7.0%; and

f. The effective MRP estimates being used by independent valuation experts are currently above 7.0%.

81 We note that had the AER adopted this estimate in its latest Decisions, the return on equity allowance would have still been materially lower (by about 107 basis points) than the return on equity allowance implied by the AER's parameter estimates set out in the Guideline materials—as shown in Table 6 below.

Table 6: Change in return on equity estimates over time

Parameter	December 2013	September 2017
Risk-free rate	4.10%	2.68%
Beta	0.7	0.7
MRP	6.50%	7.00%
Return on equity	8.65%	7.58%
Change in return on equity estimates	-107 basis points	

Source: Frontier calculations

82 Therefore, we do not claim that the overall return on equity has remained perfectly constant over time. We simply argue that the return on equity has not fallen as materially as claimed by the AER in its most recent Decisions.

2.5 Summary of appendices to this report

83 The remainder of this report fleshes out the above analysis and conclusions in a series of Appendices, each of which is summarised below.

2.5.1 Appendix A: The AER's Guideline approach

84 Appendix A to this report contains a summary of the approach to estimating the MRP that was set out in the Guideline materials. In this report, we have sought to apply the approach described in the Guideline materials as best we can to the prevailing evidence to obtain a reasonable, current estimate of the MRP.

2.5.2 Appendix B: The AER's recent presentation of the Guideline approach

85 Appendix B to this report contains a summary of the approach to estimating the MRP that was set out in the AER's most recent Decisions. That Appendix documents the similarities and differences between the approach described in the Guideline materials and the approach used by the AER in its most recent Decisions. We concluded that the fact that a material change in the evidence has not produced any change in the MRP allowance makes the current approach difficult to reconcile with the Guideline approach.

86 The main differences between the two approaches are:

a. The introduction of a "baseline" historical estimate that was not mentioned in the Guideline materials;

b. The downgrading of the DGM evidence from receiving "significant" weight to now being afforded "less reliance" and providing only "directional" information; and

c. The additional weight that seems to now be afforded to conditioning variables in justifying the maintenance of the same 6.5% allowance.

87 The AER does not offer any reasons for these (and other) departures from the Guideline approach in its most recent Decisions. Indeed, the AER argues that it has not departed from the Guideline approach when making its most recent Decisions.

2.5.3 Appendix C: Issues relating to the AER's interpretation of the prevailing evidence

88 Appendix C to this report raises a number of issues in relation to the AER's current interpretation of the prevailing evidence.

The interpretation of the historical excess returns evidence

89 The AER concludes in its most recent Decisions that the historical excess returns data supports an MRP range between 5.1% and 6.4%.[59]

90 The lower bound of 5.1% comes from the geometric mean of historical excess returns. The AER concludes that "there may be a bias in the geometric averages."[60]

91 The upper bound of 6.4% comes from the arithmetic mean of historical excess returns, which is the correct method for taking the average in this setting. The AER's latest Decisions report arithmetic mean estimates between 5.8% and 6.4% for the five historical periods that are examined.[61]

92 The latest Decisions then adopt an historical excess returns estimate of 5.5% to 6.0%.[62] That range does not even include the majority of the arithmetic estimates, even though the AER has acknowledged that the arithmetic mean is the appropriate method for taking the average in this setting. Moreover, the mid-point of the final range is below *all* of the AER's arithmetic mean estimates. The range adopted by the AER in its latest Decisions does not seem to reconcile with the evidence presented.

93 Moreover, our estimates of the arithmetic mean for the same five historical periods range between 6.0% and 6.5%. We have been unable to reconcile the AER's slightly lower estimates.

[59] TransGrid Draft Decision, Attachment 3, p. 76.

[60] TransGrid Draft Decision, Attachment 3, p. 76.

[61] TransGrid Draft Decision, Attachment 3, p. 202.

[62] TransGrid Draft Decision, Attachment 3, p. 76.

Conclusions about whether current government bond yields are "low"

94 One important point made in submissions to the AER was that the historical data can, by definition, only provide an estimate of the MRP for the average market conditions over the historical period that was used. It then follows that, if the prevailing market conditions differ in some respect relative to the historical average conditions, the historical average MRP may not reflect the prevailing conditions as it is required to do. The AER received submissions to the effect that one important difference is that the prevailing government bond yields are lower than at any time in history. The AER's most recent Decisions reject that submission[63] on the basis that "the low rates we are currently experiencing are not so unusual."[64]

95 In Figure 6 below, we plot the 10-year government bond yields that form the basis of the AER's historical estimate of the MRP. Taking data back to 1883, the three lowest yields are those that have occurred since the Guideline. This would appear to settle the issue of whether the prevailing government bond yields are low.

96 The fact that the three years since the Guideline have produced the three lowest government bond yields in history:

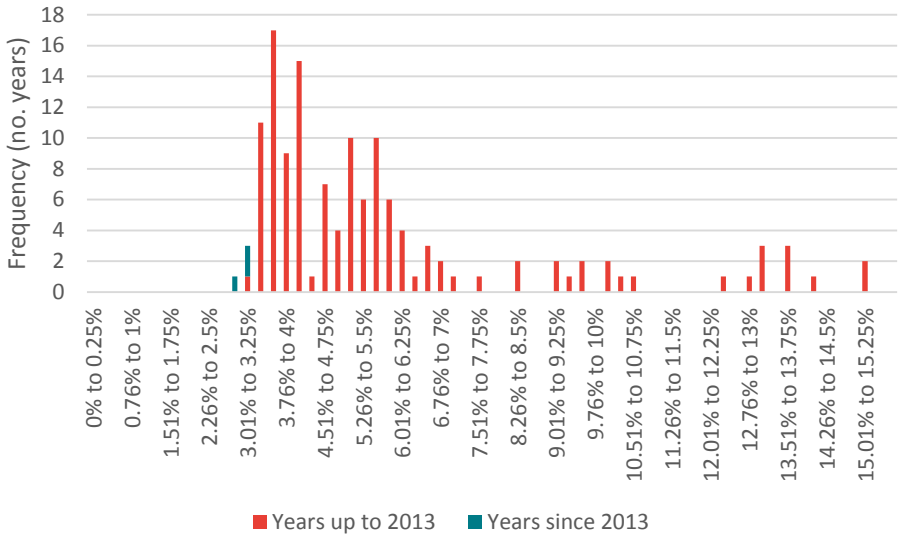
a. raises questions about the weight that should be applied to an historical MRP that is computed using data from a period of uniformly higher yields; and

b. makes it imperative that material weight be given to DGM estimates, since the DGM reflects prevailing market conditions more than other estimation approaches considered by the AER. In our view, the DGM should not be relegated to providing only directional evidence.

[63] TransGrid Draft Decision, 2017, Attachment 3, p. 285.

[64] Partington and Satchell (2016), p. 23.

Figure 6: Frequency distribution of government bond yields from 1883 to 2016



Source: Frontier Economics analysis.

Conclusions about survey evidence

97 The AER's recent Decisions conclude that:

> Survey evidence generally supported a market risk premium around 6.0 per cent or less.[65]

98 However, the evidence does not support that conclusion. The AER considers two surveys from 2017, which should receive predominant weight given that the Guideline materials identify "timeliness" as a potential weakness of survey evidence.[66]

99 Fernandez et al (2017) report mean and median MRP estimates of 7.3% and 7.6% respectively.

100 KPMG (2017) report a median MRP of 6.0% but specifically note that:

a. Australia's current low-interest environment has resulted in some valuers adjusting the market risk premium upwards by either 0.5% or 1.0%;[67] and

b. The vast majority of respondents are currently using risk-free rates that are well above the prevailing 10-year government bond yield.[68]

[65] TransGrid Draft Decision, 2017, Attachment 3, p. 76.

[66] AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 90.

[67] KPMG, 2017 Valuation Practices Survey, p. 11.

[68] KPMG, 2017 Valuation Practices Survey, p. 10.

> In fact, KPMG indicate that the most commonly used risk-free rate was 4.5%.[69]

101 If the most commonly used risk-free rate is 4.5%, and the most commonly used MRP is 6.0%, the total required return on equity for an average firm is 10.5%. If that expected market return is paired with a prevailing risk-free rate of 2.7% (as is the case in the AER's latest Decisions) the implied MRP is 7.8%.

102 It would be unreasonable to interpret this evidence as supporting the approach of inserting a 6.0% MRP into the CAPM formula with the prevailing risk-free rate of 2.7%, as that would produce a return on equity figure that is materially lower than that actually adopted by the respondents. Such an approach would imply that respondents considered the required return on equity to be 8.7%, which is materially different from the 10.5% that they are actually using.

Conclusions about the practice of other regulators

103 The AER's latest Decisions conclude that:

> Regulatory decisions over the past 12 months indicate a market risk premium of 6.5 is reasonable.[70]

104 The latest Decisions contain a Figure that summarises regulatory MRP estimates since the beginning of 2015.[71] This Figure shows that:

a. The majority of regulatory estimates are materially higher than 6.5% (mostly above 7%);

b. Some regulatory estimates are equal to 6.5%; and

c. Some regulatory estimates are equal to 6.0%.

105 The AER's latest Decisions note that the AER's focus is on regulatory decisions over the 12 month period between August 2016 and July 2017.[72] The MRP estimates determined by other Australian regulators during this period were almost exclusively above 7.0%. Only two data points lie on or below the AER's preferred MRP estimate of 6.5%:

a. One was a decision by the QCA in relation to DBCT's draft access undertaking in October 2016, which used a MRP estimate of 6.5%; and

b. The other is a June 2016 determination by IPART for WaterNSW in relation to bulk water services supplied in the Murray-Darling Basin (MDB) valleys, which used a MRP estimate of 6.0%.

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[69] https://home.kpmg.com/au/en/home/insights/2017/07/valuation-practices-survey-2017.html (accessed 15 December 2017).

[70] TransGrid Draft Decision, 2017, Attachment 3, p. 76.

[71] TransGrid Draft Decision, 2017, Attachment 3, Figure 3-15, p. 236.

[72] TransGrid Draft Decision, 2017, Attachment 3, Figure 3-15, p. 235.

106 However, we note that:

a. the October 2016 QCA decision has been superseded by a November 2017 QCA decision in relation to Seqwater's bulk water charges. In its more recent decision, the QCA concluded that the best empirical estimate of the MRP at the present time is 7.0%.[73]

b. the June 2016 estimate of 6.0% should be disregarded because IPART was constrained by legislation to use a 6.0% MRP for WaterNSW's charges in relation to the MDB valleys.[74] Indeed, in the same determination, IPART adopted a 7.75% MRP for charges that were not subject to that legislative constraint.[75]

107 The suggestion that 12 estimates above 7% and one legislatively mandated figure below 6.5% supports an MRP of 6.5% is a clear misinterpretation of the evidence.

108 Moreover, we note that the two additional recent decisions from other Australian regulators, which were not considered in the AER's most recent Decisions, are:

a. IPART's August 2017 Biannual WACC update determined a MRP estimate of 7.7%;[76] and

b. The ERA's October 2017 WACC Final Decision for WA rail networks determined a MRP estimate of 7.2%.[77]

109 These estimates also point to a current MRP estimate of at least 7.0%.

2.5.4 Appendix D: The implications of a "nearly constant" approach to the MRP

110 Whilst the AER acknowledges that "the MRP likely varies over time,"[78] the AER has allowed an MRP of 6.5% in every one of its Draft and Final Decisions since the Guideline was published in December 2013, irrespective of how the market evidence has changed. The AER also adopted an MRP of 6.5% in its previous review of WACC parameters in 2009.

111 Appendix D to this report explains that the consequence of applying a fixed MRP to the prevailing risk-free rate (as in the AER's approach) is that the return on equity allowance varies one-for-one with changes in government bond yields.

112 This can lead to implausible outcomes. For example, during the global financial crisis (GFC) in late 2008, government bond yields fell sharply as demand for safe

[73] QCA, Seqwater Bulk Water Price Review 2018–21, November 2017, p. 54.

[74] IPART, Review of prices for rural bulk water services from 1 July 2017 to 30 June 2021, June 2017, p. 72.

[75] IPART, Review of prices for rural bulk water services from 1 July 2017 to 30 June 2021, June 2017, p. 75.

[76] IPART, WACC Biannual update, August 2017, p. 2.

[77] ERA, Determination on the 2017 Weighted Average Cost of Capital for the Freight and Urban Railway Networks, and for Pilbara railways, 6 October 2017, p. 4.

[78] AER, 2013, Rate of Return Guideline: Explanatory Statement, p. 91.

government bonds increased dramatically. The AER's approach of applying a fixed MRP to the prevailing risk-free rate would have implied that the return required by investors fell in line with government bond yields during the GFC. An approach that leads to such implausible outcomes is an unreasonable one.

2.5.5 Appendix E: Evidence on the total required return on equity

113 Appendix E to this report addresses a number of points the AER has raised in relation to evidence of stability in the required return on equity. In a number of previous submissions (including our January 2017 report for TransGrid), we presented evidence indicating that the overall required return on equity had remained relatively stable since the Guideline. This implies that the MRP has increased to largely offset the material decline in government bond yields that has occurred since 2013. The AER's most recent Decisions argue that we have not engaged sufficiently with some of its assessment of that evidence.

114 Appendix D presents a response to the AER's analysis and concludes that there is material evidence from central banks, other regulators, corporate advisory firms and independent experts that the required return on equity has remained relatively stable over recent years and has *not* declined one-for-one with the dramatic fall in government bond yields, as the AER's regulatory allowances would suggest.

2.5.6 Appendix F: Issues relating to DGM estimates of the MRP

115 Appendix F to this report documents the change in the way the AER uses its DGM estimates when estimating the MRP. Although the AER's most recent Decisions state that the AER has not changed the weight it applies to its DGM evidence,[79] that statement is difficult to reconcile with the fact that the MRP allowance has remained fixed even as the AER's DGM estimates have increased materially.

116 The AER's most recent Decisions set out a number of issues that *may* affect DGM estimates, without providing any evidence that these issues *have* in fact affected the AER's estimates. We address each of those issues in Appendix F to this report. We note that all of these potential issues were known at the time the Guideline was written, so could not be the basis for reducing the weight applied to the (now materially higher) DGM estimates. Moreover, some of the issues were specifically considered by the AER when it was developing the Guideline and were set aside as being unimportant. For example, the possibility of a term structure of equity returns was specifically rejected in the Guideline[80] and the possibility that the long-run growth rate may be affected by the issuance of new shares is already

[79] TransGrid Draft Decision, Attachment 3, p. 215.

[80] AER, 2013, Rate of Return Guideline, Explanatory Statement, Appendices, p. 115.

accommodated by a specific downward adjustment within the AER's approach to implementing the DGM.

117 Also, as noted above, recent Decisions state clearly that the AER has *not* reduced the weight that it applies to its DGM estimates, which is difficult to reconcile with the fixed 6.5% MRP allowance that has been maintained even as the AER's DGM estimates have increased materially.

118 In recent Decisions, the AER appears to have accepted advice from Partington and Satchell (2017) to the effect that a study by Duarte and Rosa (2015) of the New York Federal Reserve concludes that historical excess returns are more closely related to the MRP than are DGM estimates.[81] However, we show that Partington and Satchell appear to have misinterpreted that study, drawing precisely the wrong conclusion from it. Indeed, Duarte and Rosa (2015) conclude that the DGM produces high estimates when the true MRP is high and low estimates when the true MRP is low and that the reverse holds for the historical mean estimate.[82]

119 Also relevant is the fact that the study in question concludes that the required return on equity has remained stable even as government bond yields have fallen, leading to an increase in the MRP.[83] This finding lends support to the AER's own DGM evidence.

[81] Partington and Satchell (2017), April, p. 25.

[82] Duarte and Rosa (2015), p. 46.

[83] Duarte and Rosa (2015), p. 54.

3 Declaration

120 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

4 Appendix A: The AER's Guideline approach

4.1 Recap on the regulatory task

121 In a January 2017 report to TransGrid,[84] which TransGrid submitted along with its 2017 Initial Proposal to the AER, we explained that:

a. The AER's Guideline materials explain that "the MRP likely varies over time";[85] and, as a consequence

b. The AER has stated in recent Decisions that it seeks to estimate the "prevailing market risk premium",[86] which is a "forward-looking estimate of the market risk premium."[87]

4.2 Methods considered by the AER when estimating the MRP

122 In its 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.

4.2.1 Historical excess returns

123 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.

124 The mean historical excess return ranges between approximately 6.0% and 6.5% depending on which historical period is considered.

4.2.2 Dividend growth model (DGM)

125 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

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[84] Frontier Economics, *The market risk premium*, January 2017 ('Frontier Economics (2017)').

[85] AER, 2013, Rate of Return Guideline: Explanatory Statement, p. 91.

[86] TransGrid Draft Decision, 2017, Attachment 3, p. 74.

[87] TransGrid Draft Decision, 2017, Attachment 3, p. 74.

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.

126 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: [88]

a. DGM estimates "may reflect current market conditions more closely";

b. "DGMs are recognised financial models that are commonly used in practice;" and

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."

127 In the Guideline materials, 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. [89]

4.2.3 Surveys

128 The AER indicates that it has some limited regard to surveys, although the AER states that it considers this evidence to be "less informative than historical averages and DGM estimates."[90]

4.2.4 Other evidence

129 The AER also states that it gives "limited consideration" to conditioning variables and other regulators' estimates.[91]

4.3 Distilling the evidence into a single MRP allowance

130 At the time the AER was developing the Guideline, many stakeholders requested that the AER provide clear guidance on the approach it intended to apply when deriving a point estimate of the MRP using the various methodologies and sources of evidence identified in the Guideline. The AER responded by setting out in its final Guideline materials a worked example to show how it would apply the

[88] AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 96.

[89] AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 96.

[90] AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 96.

[91] AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 97.

evidence available in December 2013 to derive a point estimate for the MRP.[92] The AER concluded that the evidence available in December 2013 supported a MRP estimate of 6.5%.

Weight given by the AER to different sources of evidence

131 In the worked example in its Guideline materials, the AER stated that, when setting the allowed MRP, it will rely 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. [93]

132 The AER further stated that it gives:

> …significant consideration to DGM estimates of the MRP,[94]

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

> …the most significant development in this area.[95]

133 The AER also notes that it gives "some"[96] consideration to surveys and "limited"[97] 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,[98]

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. At the same time, we consider them relevant and worthy of limited consideration.[99]

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

The worked example in the Guideline

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

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[92] AER, 2103, Rate of Return Guideline, Explanatory Statement, p. 89.

[93] AER, 2103, Rate of Return Guideline, Explanatory Statement, p. 95.

[94] AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 97.

[95] AER, 2013, Rate of Return Guideline, Explanatory Statement, Appendices, p. 89.

[96] AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 97.

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

[98] AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 96.

[99] AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 97.

> The AER proposes to estimate a range for the MRP, and then select a point estimate from within that range.[100]

136 The AER's Guideline materials make clear that its range for the MRP would be derived by the aggregation of ranges from the historical excess returns and DGM methods. Specifically, the AER explained in its worked example that, given the evidence available in December 2013:

> We consider a range for the MRP of 5.0 to 7.5 per cent is reasonable based on the evidence before us. The range we determine in this decision reflects the span of the evidence before us.[101]

137 In its Guideline materials, the AER concluded that, based on information available in December 2013:

a. The historical excess returns method supported a range of 5.0% to 6.5%;[102] and

b. The DGM method supported a range of 6.1% to 7.5%.[103]

138 The AER then combines these two ranges into a single combined range of 5.0% to 7.5%, whereby:[104]

a. the lower bound was derived from the lower bound of the historical excess returns range; and

b. the upper bound was derived using the highest available estimate from the AER's specification of the DGM.

139 The AER noted that this estimated range would not be fixed in stone, but rather, the range may change over time as the available evidence changes:

> The upper and lower bound estimates reflect the evidence before us. These estimates may change over time and likewise the upper and lower bounds may change.[105]

140 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 DGM[106]

and that:

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[100] AER, 2013, Rate of Return Guideline, p. 16.

[101] AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 93.

[102] AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 95.

[103] AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 97.

[104] AER, 2103, Rate of Return Guideline, Explanatory Statement, p. 93.

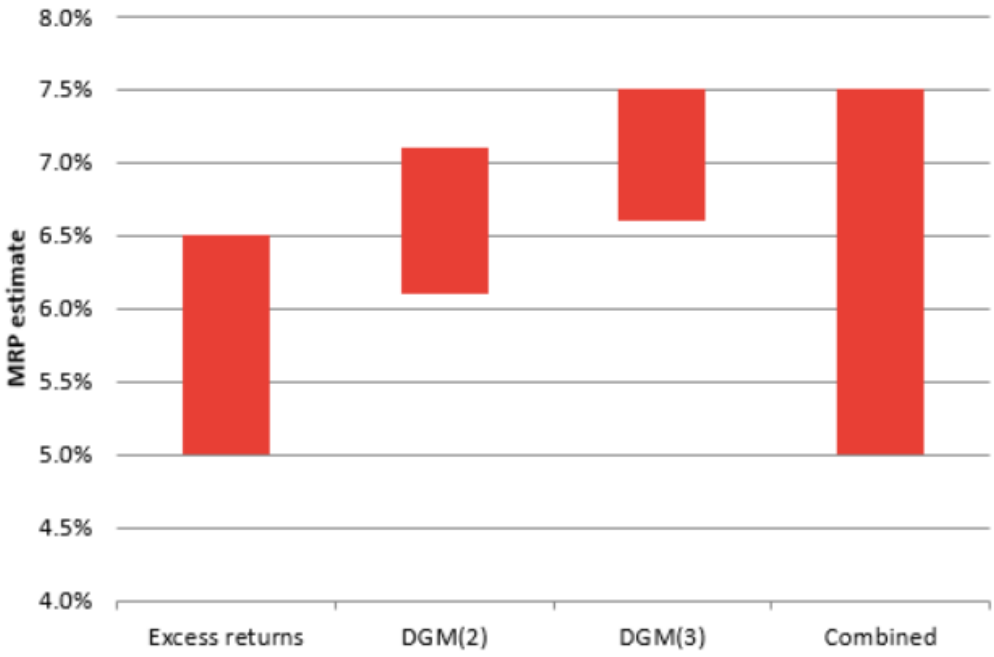
[105] AER, 2103, Rate of Return Guideline, Explanatory Statement, p. 93.

[106] JGN Draft Decision, 2014, Attachment 3, Appendix C, p. 222.

> 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.[107]

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

Figure 7: AER Guideline MRP ranges



Source: AER Rate of Return Guideline Explanatory Statement – Appendices, December 2013, Table E.1.

142 In its Guideline materials, the AER set the allowed MRP to 6.5%. In selecting this estimate, 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.[108]

143 Moreover, the AER stated that its preferred historical excess returns estimate is 6.0%[109] and has since stated that its preferred approach to the DGM is the three-

[107] JGN Draft Decision, 2014, Attachment 3, Appendix C, p. 222.

[108] AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 97.

[109] AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 97.

Appendix A: The AER's Guideline approach

stage specification,[110] 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.

144 In summary, the approach to the MRP that is set out in the Guideline materials 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"[111] and is given "some"[112] or "limited"[113] consideration.

145 In the worked example that the AER provides in the Guidelines materials, to demonstrate how it will apply the MRP methodology, the range from within which the AER selected its MRP point estimate was constructed by aggregating together the ranges derived using historical excess returns and DGM evidence. Specifically:

a. the lower bound of the range from within which the AER selected the Guideline point estimate of 6.5% was derived using the lower bound of the excess returns range; and

b. the upper bound was derived using the upper bound of the DGM evidence.

146 The AER then selected a point estimate of 6.5%, which was approximately the mid-point between the point estimate implied by excess returns evidence (6.0%) and the mid-point of the DGM evidence (7.1%).

[110] JGN Draft Decision, 2014, Attachment 3, Appendix C, p. 222.

[111] AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 96.

[112] AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 97.

[113] AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 97.

5 Appendix B: The AER's recent presentation of the Guideline approach

147 In its 2017 TransGrid Draft Decision, the AER has criticised us and a number of network service providers for having "mischaracterised the Guideline approach for estimating the market risk premium."[114]

148 Specifically, the AER argues that:

> We did not and do not average estimates across historical excess returns and dividend growth model estimates. We have regard to a range of relevant evidence.[115]

149 In its latest Decisions, the AER describes the Guideline approach to the MRP as follows:

> We place most reliance on historical excess returns. Therefore, we use this information to determine a baseline estimate of the market risk premium. We consider 6.0 per cent (from a range of 5.1–6.4 per cent) is, at this time, a reasonable point estimate based on this source of evidence.
>
> We place less reliance on our dividend growth model estimates of the market risk premium. This information indicates whether we should select a market risk premium point estimate above or below the baseline estimate.
>
> We place some reliance on the other information (survey evidence and conditioning variables). This information, in conjunction with dividend growth model evidence, helps to indicate how far above or below the baseline estimate the market risk premium point estimate should be. We use other Australian regulators' market risk premium estimates as a cross check on how we consider information.[116]

150 To summarise, the AER now says that, under the Guideline approach:

a. The first step to estimating the MRP is to determine a "baseline estimate" of the MRP using historical excess returns, and that it considers that a reasonable baseline estimate (from a range of 5.1% to 6.4%) is 6.0%.

b. The second step is to use DGM evidence to decide whether it should select a point estimate above the baseline estimate. However, this evidence is to provide directional assistance only, and must not be used to determine the level of the final point estimate.

[114] TransGrid Draft Decision, 2017, Attachment 3, p. 82.

[115] TransGrid Draft Decision, 2017, Attachment 3, p. 82.

[116] TransGrid Draft Decision, 2017, Attachment 3, p. 78.

c. Other information (surveys and conditioning variables) are to be used to decide how far above or below the baseline the final MRP point estimate should be.

151 This represents a material reinterpretation of the original Guideline. Nowhere in the Guideline materials is the process outlined above described. Indeed, the Guideline materials contain no reference to a "baseline" estimate of the MRP. Rather, the AER's new approach to the MRP appears to be departure (without reasons) from the original Guideline approach.

152 In summary, the Guideline states that:

> The AER proposes to estimate a range for the MRP, and then select a point estimate from within that range.[117]

153 In the TransGrid Draft Decision, the AER says that the relevant material available to it suggests a range for the MRP with a lower bound of 5.1% (which is derived from what the AER considers to be the lower bound of historical excess returns MRP range) and an upper bound of 8.17% (which is derived from the upper bound of the DGM evidence).[118] The AER then says it has selected a point estimate of 6.5% from within this range.[119]

154 However, in arriving at this point estimate, the AER applies a number of steps and considerations, which are not set out in the Guideline materials. For example, the AER presents in the TransGrid Draft Decision a "baseline estimate" of the MRP derived from the historical excess returns evidence.[120] However, there is no reference to any "baseline estimate" of the MRP anywhere in the Guideline, Explanatory Statement or Appendices.

155 The AER now suggests that the *only* role of the DGM evidence within the Guideline approach is to identify "directionally" whether the final point estimate of the MRP should be above or below the AER's baseline estimate of the MRP. For instance, the AER states in the TransGrid Draft Decision that:

> The guideline designated the dividend growth model to inform on whether the market risk premium may be above or below the historical estimates.[121]

and:

> We assessed the dividend growth model in detail in section B.4 and consider that there are a range of limitations with the dividend growth model which makes its results unreliable and unsuitable for directly estimating the market risk premium. We still believe it is useful for indicating, directionally, where the

[117] AER, 2013, Rate of Return Guideline, p. 16.

[118] TransGrid Draft Decision, 2017, Attachment 3, pp. 74-5.

[119] TransGrid Draft Decision, 2017, Attachment 3, pp. 74-5.

[120] TransGrid Draft Decision, 2017, Attachment 3, p. 76 and p. 78.

[121] TransGrid Draft Decision, 2017, Attachment 3, p. 76.

> market risk premium should lie in relation to the historical excess returns as indicated in the Guideline.[122]

156 In support of its claim that the only role of the DGM is to provide directional evidence, the AER cites the following paragraph in the Guideline materials:

> In estimating the MRP, we place most emphasis on historical estimates (which gives an MRP estimate of approximately 6 per cent) and dividend growth model estimates (which give changing MRP estimates over time, particularly in response to changing interest rates). Our approach to the MRP is symmetrical. This means we may adopt a value above 6 per cent when dividend growth model estimates are above the historical estimates (as they are at December 2013), and a value lower than 6 per cent when dividend growth model estimates are below the historical estimates. At December 2013, our MRP point estimate is 6.5 per cent, chosen from within a range of 5 to 7.5 per cent.[123]

157 The passage above does indicate that if the DGM estimates are above the historical excess returns estimate, the AER would select a MRP point estimate above the historical excess returns estimate, and vice versa.

158 However, under the Guideline approach where the AER constructs a combined range using historical excess returns and DGM evidence, and then selects a point estimate close to the mid-point of that range (as the worked example in the Guideline materials did) this result would follow because:

a. If the estimated DGM range were *above* the historical excess returns range, the mid-point of the combined range would naturally lie above the historical excess returns evidence; and

b. If the estimated DGM range were *below* the historical excess returns range, the mid-point of the combined range would also lie *below* the historical excess returns evidence.

159 In other words, the only excerpt from the Guideline materials that the AER has adduced in support of its current description of the Guideline approach is entirely consistent with our interpretation of the Guideline approach. However, nothing in the passage that the AER cites from the Guideline materials designates the DGM as mere directional evidence. That is a new interpretation of the Guideline, which is inconsistent with the worked example in the Guideline materials designed to help stakeholders understand how the AER intends to apply the Guideline MRP approach.

160 Additionally, we note that the AER now says that the role of survey and conditioning variable evidence is to determine how far above or below its baseline estimate the final point estimate should be set. However, there is nothing in the Guideline materials that attributes that role to the survey and conditioning variable evidence.

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[122] TransGrid Draft Decision, 2017, Attachment 3, pp. 97-8.

[123] AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 11.

Appendix B: The AER's recent presentation of the Guideline approach

161 For example, in the worked example provided by the AER in the Guideline, the AER concluded that, as at December 2013:

a. The survey evidence supported a MRP estimate of 6.0%; and

b. The conditioning variables produced mixed results, but some variables indicated an estimate close to 5.6%.

162 All of these pieces of evidence indicated, at the time of the Guideline, an estimate at or below 6.0% (the estimate implied by the historical excess returns evidence). It is therefore unclear how this additional evidence "helps to indicate how far above or below the baseline estimate the market risk premium point estimate should be."

163 Finally, we note that the AER now seems to be giving more weight to conditioning variables than that set out in the Guideline materials. In the TransGrid Draft Decision, the AER states that the conditioning variables indicate that market conditions have not changed materially and, therefore a change in its estimate of the MRP from 6.5%, the estimate adopted in every decision since the Guideline, would not be warranted:

> …the conditioning variables indicate there has not been a material change in market conditions to warrant adjusting the market risk premium.[124]

164 As noted above, the Guideline indicated that the AER would give only "limited consideration" to conditioning variables (which the AER concludes have not changed materially) but "significant consideration" to DGM evidence (where the AER's estimates have increased materially).

165 Further, the Guideline materials made explicit that the AER would give greater consideration to DGM estimates than conditioning variables:

> …in this decision, we give DGM estimates greater consideration than other forward looking estimates of the MRP, such as dividend yields, implied volatility and credit spreads. This reflects our assessment of the relative strengths and limitations of these sources of evidence.[125]

166 However, contrary to those statements, the AER now explains that it is conditioning variables (and not the DGM evidence) that will determine "how far above or below the baseline estimate the market risk premium point estimate should be."

167 Since the Guideline, the DGM evidence has changed materially (as shown in Figure 12). However, the AER argues that because the conditioning variables do not indicate a material change in market conditions, an increase in the MRP estimate (to reflect the changing DGM evidence) is not warranted. In other words, the AER appears to be saying that the conditioning variables evidence now trumps the DGM evidence. In allowing the conditioning variables evidence to effectively

[124] TransGrid Draft Decision, 2017, Attachment 3, p. 74.

[125] AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 97.

overrule the DGM evidence, the AER appears to be giving greater weight to the former than the latter. This would seem to be another unexplained departure by the AER from the original Guideline.

Appendix B: The AER's recent presentation of the Guideline approach

6 Appendix C: The AER's interpretation of the MRP evidence

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

168 As explained in Section 4.1 above, 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 historical excess returns and DGM methods are able to contribute to this regulatory task.

169 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.[126]

and:

> …we consider DGM estimates have strong theoretical grounding and are more likely to reflect prevailing market conditions than other approaches.[127]

170 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.

171 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.[128]

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[126] AER, 2013, Rate of Return Guideline: Explanatory Statement, Appendices, p. 84.

[127] AER, 2013, Rate of Return Guideline: Explanatory Statement, Appendices, p. 85.

[128] AER, 2013, Rate of Return Guideline: Explanatory Statement, Appendices, p. 78.

172 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 time[129] 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.[130]

173 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 2.68%[131] whereas the average yields over the various historical periods that the AER considers are several times greater than this, as set out in Table 7 below.

Table 7: Mean historical excess return estimates

Historical period	Mean excess return	Mean government bond yield
1883-2016	6.3%	5.5%
1937-2016	6.0%	6.5%
1958-2016	6.5%	7.4%
1980-2016	6.5%	8.0%
1988-2016	6.0%	4.8%

Source: Frontier calculations.

174 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.

175 Thus, the approach of adding the (effectively constant) mean historical excess return estimate to the prevailing government bond yield currently produces an

[129] AER, 2013, Rate of Return Guideline: Explanatory Statement, p. 91.

[130] Lally, M., 2013, Review of the AER's Methodology, March, p. 6.

[131] TransGrid Draft Decision, 2017, Attachment 3, p. 12.

Appendix C: The AER's interpretation of the MRP evidence

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 the remainder of this report, 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.

176 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,

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.

177 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.[132]

178 The AER went on to conclude in the Guideline 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.[133]

179 In recent Decisions, however, the AER has argued that the present market conditions are not uncommon for Australia, and that current level interest rates are not so dissimilar to levels that have prevailed in the past as to invalidated mean historical excess returns from informing an estimate of the current MRP:

> …it is important to note the current market situation is not uncommon for Australia. We note the magnitude of current interest rates is not so dissimilar to the past as to invalidate the historic market risk premium informing an estimate of the current market risk premium.[134]

180 In support of these contentions, the AER refers to Partington and Satchell (2016), who argue that:

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[132] AER, 2013, Rate of Return Guideline, Explanatory Statement, Appendices, p. 103.

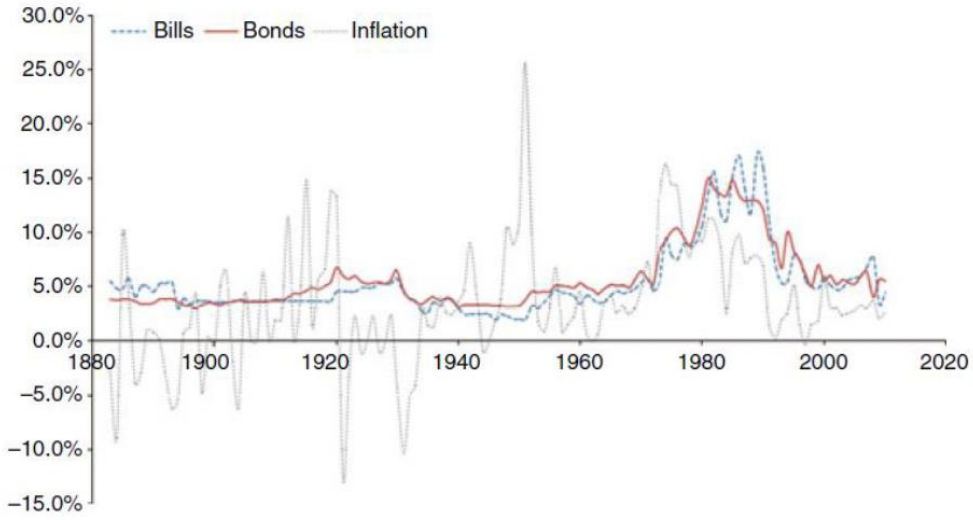
[133] AER, 2013, Rate of Return Guideline, Explanatory Statement, Appendices, p. 110.

[134] TransGrid Draft Decision, 2017, Attachment 3, p. 285.

> We begin by making a comment about the supposed abnormality of the current conditions. We agree that interest rates in the USA and UK are abnormally low. However, in Australia, while current interest rates may seem very low to those whose memory of interest rates only extends back for forty-five years, the low interest rates we are currently experiencing are not so unusual. Indeed over the majority of the history for which the MRP has been calculated relatively low interest rates have prevailed.[135]

181 In order to justify this claim, Partington and Satchell (2016) refer to data on historical bond yields represented in a chart in Brailsford et al (2012),[136] which we reproduce below in Figure 8.

Figure 8: Historical bill and bond returns



Source: Brailsford et al (2012) reproduced in Partington and Satchell (2016), p. 24

182 Based on data in this chart, Partington and Satchell argue that:

> Clearly high yields were only a feature of the post 1970 era and thus it is lower interest rates that have been most common in computing the long run market risk premium. It is also clear that there have been extended periods of low interest rates. For 30 years prior to 1913 interest rates were below 4% and reached a low point of 3%. While for 18 of the 19 years from1933 to 1951 interest rates were again below 4% and for 11 years of that period stayed in the range 3.1% to 3.3%.[137]

183 Partington and Satchell repeat similar claims in their April 2017 report to the AER.[138]

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[135] Partington and Satchell (2016), p. 23.

[136] Brailsford, T., J. C. Handley and K. Maheswaran, 2012, The historical equity risk premium in Australia: Post-GFC and 128 years of data, Accounting and Finance, 52 (1), 237-247

[137] Partington and Satchell, 2016, p. 23.

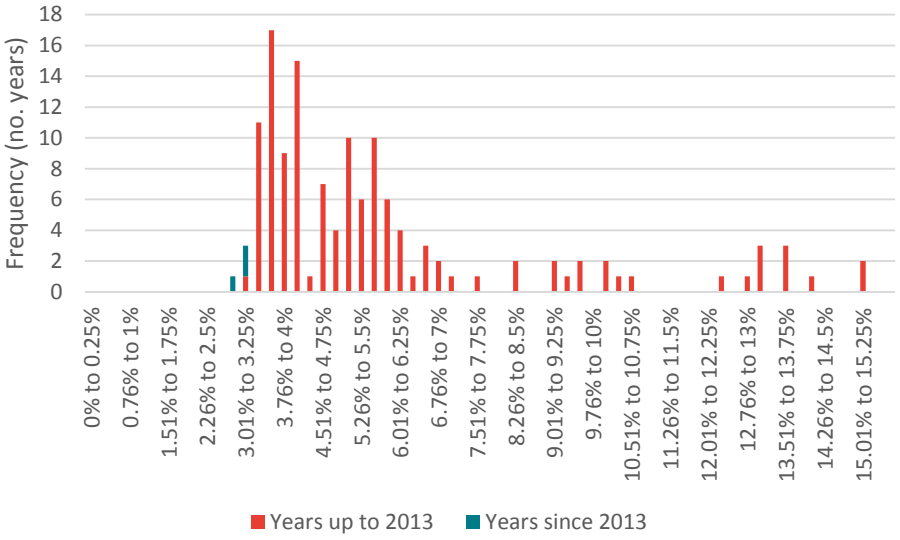
[138] Partington and Satchell, 2017, April, pp. 23-4.

Appendix C: The AER's interpretation of the MRP evidence

184 Unfortunately, the chart from Brailsford et al (2012), which Partington and Satchell rely upon, presents data only to 2010 (which Partington and Satchell themselves recognise). Therefore, it does not show how government bond yields have changed since the publication of the Guideline in December 2013, or how post-2013 government bond yields in Australia compare to historical levels. Furthermore, simple visual inspection of the chart above is insufficient to draw meaningful conclusions about how similar or dissimilar prevailing bond yields are to historical levels.

185 Figure 9 below presents a frequency distribution of the 10-year government bond yields that the AER uses in its calculation of mean historical excess returns. This distribution covers bond yields from 1883 to 2016, and therefore extends the Brailsford et al (2012) data series by six years. Importantly, it *includes* years since the publication of the 2013 Guideline.

Figure 9: Frequency distribution of government bond yields from 1883 to 2016



Source: Frontier analysis.

186 Figure 9 shows that:

a. There have been only four years in this series spanning 134 years during which the average government bond yield was 3.0% or lower: 1897 and every year since the publication of the Guideline – 2014, 2015 and 2016.

b. Every year since the publication of the Guideline (denoted by the blue bars) lies in the extreme left tail of the distribution.

c. The average yield in the very latest year in the dataset, 2016, was 2.74%. This is happens to be minimum yield in the entire dataset. The average yield in 2016 is also 280 basis points lower than the

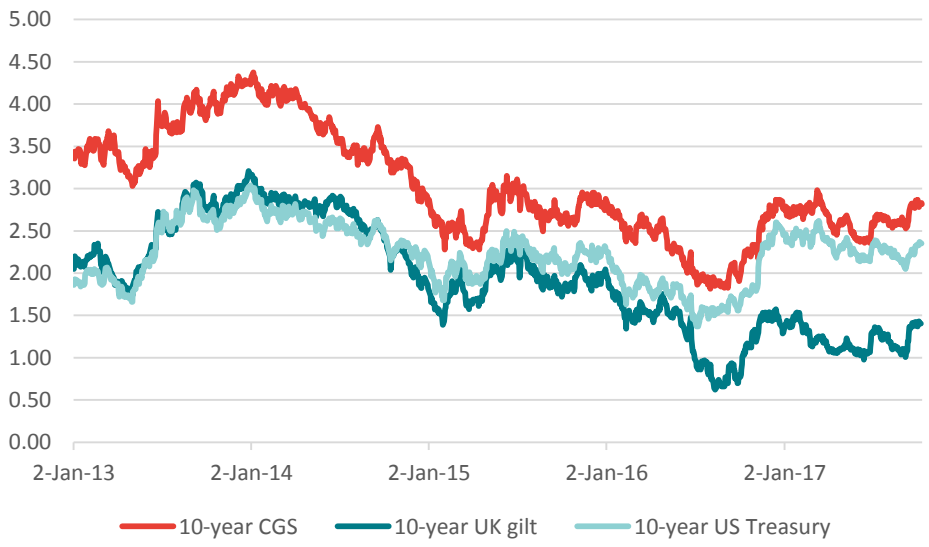
mean of the distribution (i.e., 5.55%) and 196 basis points lower than the median of the distribution (i.e., 4.70%).

187 It is evident from these data that prevailing government bond yields *are* abnormally low by historical standards, and have been so since 2013. In our view, this demonstrates conclusively that Partington's and Satchell's claim that government bond yields are "not so dramatically dissimilar to the past," apparently based on casual empiricism, simply does not withstand objective scrutiny.

188 Another claim that Partington and Satchell (2016) make is that government bond yields in other countries, such as the US and the UK, are currently abnormally low, whereas government bond yields in Australia are not.[139] Partington and Satchell (2017) attribute this to the fact that the US, UK and a few other jurisdictions pursued quantitative easing (QE), whereas Australia has not to date pursued QE.[140] These are very misleading claims.

189 Figure 10 plots the yields on 10-year Australian Commonwealth Government Securities, UK Gilts and US Treasury bonds from 2 January 2013 to 2 October 2017.

Figure 10: Yields on 10-year government bonds in Australia, UK and US since 2012



Source: RBA, Bank of England, US Federal Reserve.

190 The Figure shows that whilst government bond yields in the US and the UK have since 2013 been lower than government bond yields in Australia, since late 2016, the gap between yields in the US and Australia has closed considerably. Over the 12 months to 2 October 2017, the average difference between the yields on 10-

[139] Partington and Satchell (2016), p. 23.

[140] Partington and Satchell (2017), April, p. 23.

Appendix C: The AER's interpretation of the MRP evidence

year CGS and 10-year US Treasury yields was just 34 basis points. Hence, if Partington and Satchell regard government bond yields in the US to be abnormally low (which they do), the same should be said of government bond yields in Australia.

191 Table 8 computes the percentage change in government bond yields between 2 January 2013 and 2 October 2017 in Australia, the UK and the US. The Table shows that whilst bond yields in the UK have fallen by approximately 33%, Australian government bond yields have also declined very materially, by over 15%. By contrast, over the same period, US government bond yields have increased by nearly 26%.

Table 8: Change in Australian, US and UK government bond yields since 2012

	10-year CGS	10-year UK Gilt	10-year US Treasury
2-Jan-13	3.40%	2.05%	1.86%
2-Oct-17	2.87%	1.37%	2.34%
% change	-15.6%	-33.2%	25.8%

Source: RBA, Bank of England, US Federal Reserve, Frontier analysis

192 Table 9 below computes the ratio between the prevailing nominal bond yield (computed as the 20-day average to 2 October 2017) and the historical average nominal bond yield (over the period 1900-2016).[141] The Table shows that CGS yields in Australia are presently as low by historical standards as are US Treasury yields. Hence, if government bond yields in the US are currently abnormally low, it must be the case that the same is true for Australia.

Table 9: Comparison of prevailing and historical average bond yields

	Historical mean real bond yield	Historical mean inflation rate	Historical mean nominal bond yield	Prevailing bond yield	Ratio between current and historical yield
Australia	2.50%	3.90%	6.5%	2.7%	0.42
UK	2.70%	3.90%	6.7%	1.3%	0.19
US	2.50%	3.00%	5.6%	2.2%	0.40

[141] We calculate the mean nominal bond yields in this Table using data on historical average real bond yields and historical average rates of inflation (over the period 1900-2016) reported in the 2017 Credit Suisse Investment Returns Yearbook.

Source: 2017 Credit Suisse Investment Returns Yearbook, RBA, Bank of England, US Federal Reserve, Frontier analysis

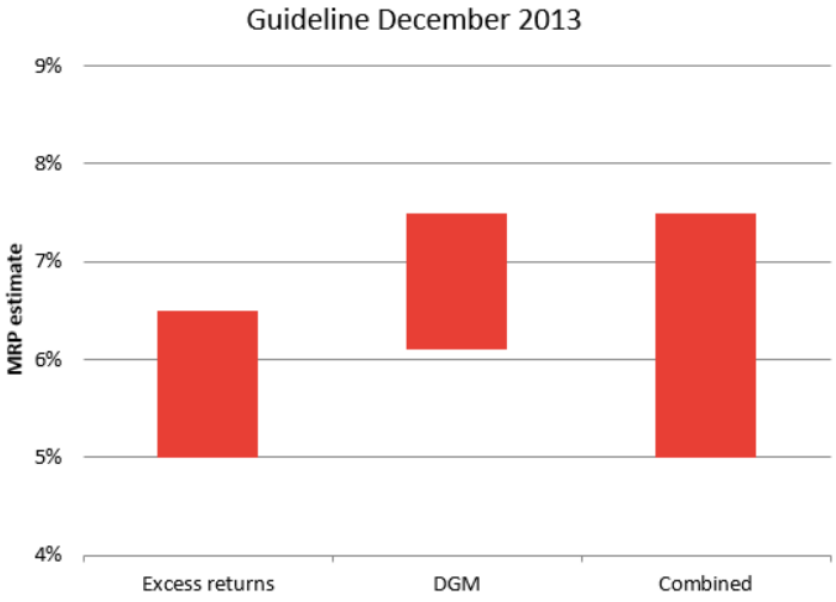
193 In our view, market conditions today *are* very different from those that prevailed at the time the Guideline was published, and the AER's MRP estimates ought to reflect this.

6.2 The evolution of the AER's range of estimates

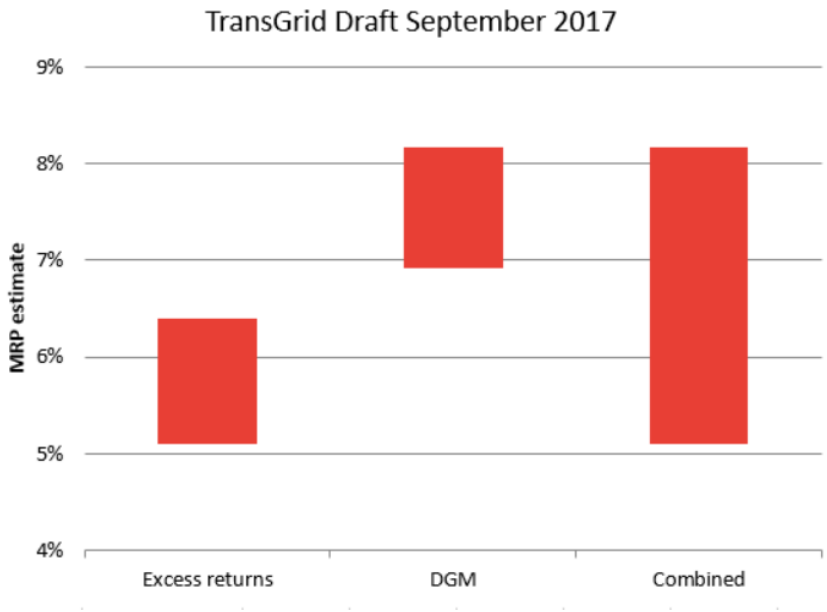
194 In this section, we show that the evidence on which the AER relies has changed materially since the publication of the Guideline in 2013. However, the AER has maintained the same MRP allowance of 6.5% in every decision since the Guideline.

195 As set out in Section 4 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 11 below.

Figure 11: AER MRP ranges



Appendix C: The AER's interpretation of the MRP evidence



Source: AER Rate of Return Guideline, December 2013; TransGrid Draft Decision, September 2017.

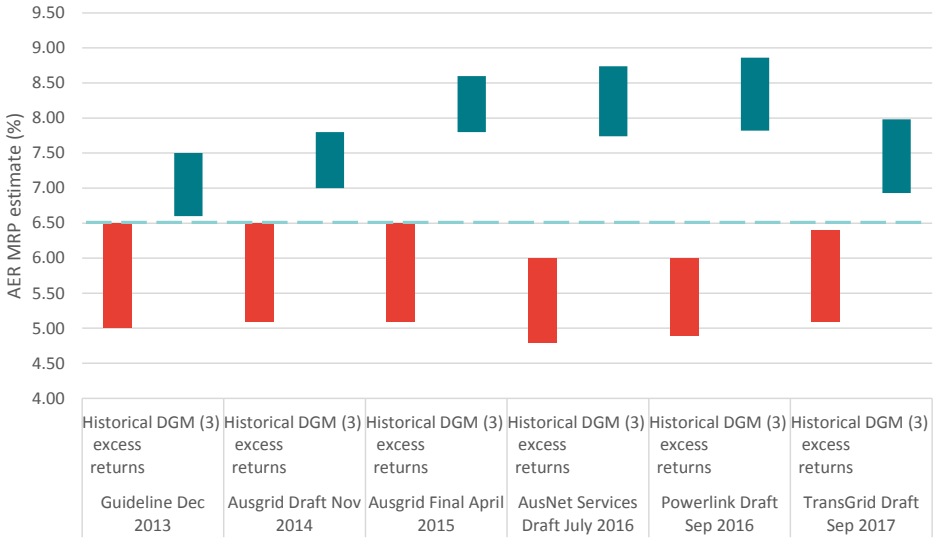
196 The historical average excess returns evidence has not changed materially – as one would expect. In the Guideline, the AER specified a range of 5.0% to 6.5% for the historical excess returns estimates. In its most recent Decisions, the AER determined a range between 5.1% and 6.4%, depending on which historical period is considered.[142] This is the range that we have displayed in Figure 11.

197 By contrast, the MRP 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.

198 We summarise the evolution of the AER's MRP estimates derived using historical excess returns and the AER's preferred three-stage DGM specification, and the AER's MRP allowance in Figure 12 below.

[142] TransGrid Draft Decision, 2017, Attachment 3, Table 3-19, p. 202.

Figure 12: The AER's primary MRP estimates



Source: Rate of Return Guideline December 2013; Ausgrid Draft Decision November 2014; Ausgrid Final Decision April 2015; AusNet Services Draft Decision July 2016; Powerlink Draft Decision September 2016; TransGrid Draft Decision September 2017.

199 Figure 12 shows that:

a. The AER's historical excess returns estimate range (denoted by the red bars in the Figure) has narrowed slightly since the Guideline, but the upper bound of this range has not changed materially. The AER has consistently interpreted the appropriate point estimate of this evidence to be 6.0% since the publication of the Guideline in 2013;[143]

b. The AER's DGM estimates of the MRP (denoted by the dark blue bars in the Figure) have increased materially since the Guideline; and

c. The AER's allowed MRP (the light blue line in the Figure) has remained constant at 6.5% since the Guideline, despite the changing DGM evidence.

200 That is, Figure 12 shows that even though the AER's DGM estimates have increased materially since the Guideline, this has had no impact on the AER's MRP allowance.

201 We note that, in its recent final decisions, the AER has stated that it has applied the Guideline approach to the MRP since the publication of the Guideline in 2013,[144] and that:

[143] We consider this source of evidence in more detail in Section 6.3 below.

[144] TransGrid Draft Decision, 2017, Attachment 3, p. 73.

Appendix C: The AER's interpretation of the MRP evidence

We have not changed the weight we apply to the dividend growth model.[145]

202 That is, the AER contends that its 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 12 above if the DGM evidence plays only a very minor role in determining the allowed MRP, with the vast majority of weight being applied to historical excess returns.[146] Although the AER's own DGM estimates have diverged materially since the Guideline, its MRP allowance remains anchored to the historical excess returns estimate.

203 However, this would be at odds with the Guidelines materials, which states that the AER gives "significant consideration to DGM estimates of the MRP."[147]

204 In summary, in the face of the material change in the AER's own DGM evidence since the Guideline, there appears to be no way of reconciling the AER's contentions that it:

a. has applied the Guideline approach to the MRP consistently since December 2013;

b. has not changed the weight it applies to the DGM evidence; and

c. gives "significant" consideration to the DGM evidence.

205 It appears that 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.

206 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.

207 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. We report that:

a. The AER's estimate of average historical excess returns has remained stable (in part because these averages are computed over long historical periods, and in part because of the AER has varied

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[145] TransGrid Draft Decision, 2017, Attachment 3, p. 215.

[146] 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, 2015, Attachment 3, pp. 368-369.

[147] AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 97.

the way in which it has interpreted the historical excess returns evidence); 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.

6.3 The AER's historical excess returns estimates

208 In the Guideline, the AER set out estimates of the arithmetic and geometric mean of excess returns over various historical periods.[148] The AER concluded that the mean historical excess returns supported an MRP range of 5.0% to 6.5%.[149]

209 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.[150]

210 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 mean estimates. Therefore, we consider a lower bound estimate of 5.0 per cent appropriate. [151]

211 Figure 13 plots how the AER's estimates of MRP using the geometric (red bars) and arithmetic (dark blue bars) mean of excess returns has evolved in a series of Decisions since the publication of the Guideline, and the AER's conclusions on the final range (light blue bars) for the MRP derived using historical returns, based on that evidence.

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

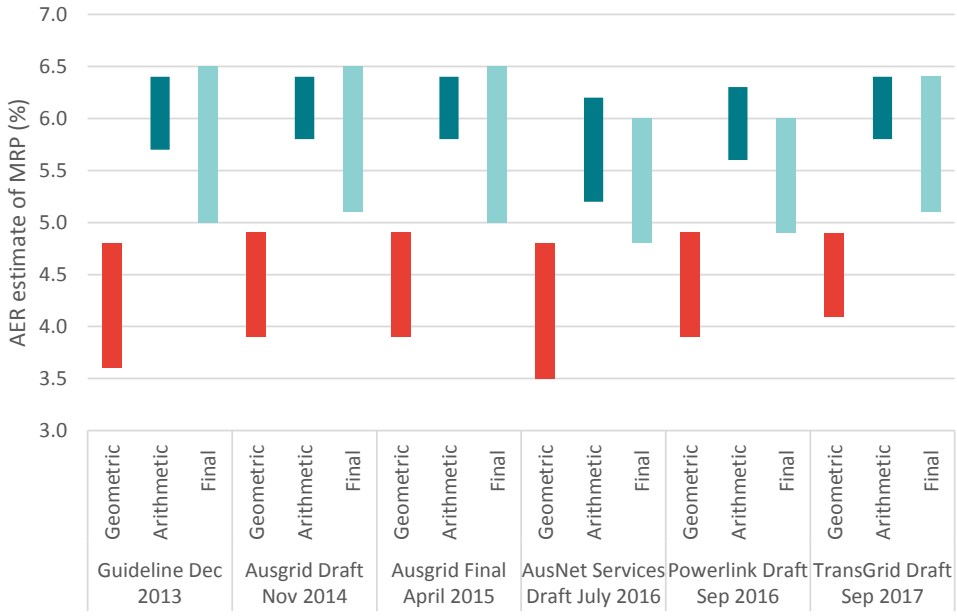
[149] AER, 2013, Rate of Return Guideline, Explanatory Statement, Appendices, Table D.2, p. 97.

[150] 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.

[151] AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 93.

Appendix C: The AER's interpretation of the MRP evidence

Figure 13: Evolution of the AER's historical excess returns MRP estimates



Source: Rate of Return Guideline December 2013; Ausgrid Final Decision April 2015; SA Power Networks Final Decision April 2015; AusNet Distribution Final Decision May 2016; Powerlink Draft Decision September 2016; TransGrid Draft Decision September 2017.

212 A striking feature of these plots is that there seems to be no consistency over time in the way the AER interprets the available evidence when determining its final historical excess returns MRP range.

213 For example, in 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.[152]

214 However, in the October 2015 Decisions, the AER set the lower bound of the range (5.0%) only 10 basis points above the highest geometric mean (4.9%).[153] No explanation was given by the AER for this change. The upper bound of the range remained at 6.5% in those Decisions.

215 Then, in the May 2016 and September 2016 Decisions, the AER set the lower bound of the range *equal* to the highest geometric mean estimate, and the upper bound of the range (6.0%) materially lower than the highest arithmetic mean estimate (6.2% and 6.3%, respectively). Once again, no explanation was provided in the AER's Decisions for these changes of approach.

[152] Ausgrid Draft Decision, 2014, Attachment 3, p. 193; Ausgrid Final Decision, 2015, Attachment 3, p. 115.

[153] SA Power Networks Final Decision, 2015, Attachment 3, p. 36.

216 Rather confusingly, in its May 2016 Final Decisions, the AER claimed that it had based its historical returns MRP range on arithmetic averages because it had concerns that the geometric averages suffered from bias:

> 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.[154]

217 But this was manifestly not so. The bottom of the range was influenced by the geometric mean estimates, and the upper bound was significantly lower than indicated by the upper end of the arithmetic mean range.

218 In the AER's most recent Decisions, it appears to have reverted back to setting the lower bound of the range 20 basis points above the highest geometric mean estimate (consistent with the Guideline), but the upper bound of the range was set equal to, rather than slightly above, the upper end of the arithmetic mean range. Once again, no explanation was provided for this particular approach.

219 In all of its Decisions since the Guideline, the AER has concluded that a reasonable point estimate for the MRP based on historical excess returns is 6.0% – despite the underlying arithmetic and geometric mean estimates varying over time, and despite the AER's interpretation of the historical evidence changing in an unexplained way from one decision to another. The AER offers no explanation for why 6.0% was a reasonable estimate in all past instances in which the underlying evidence differed.

6.4 The AER's DGM estimates

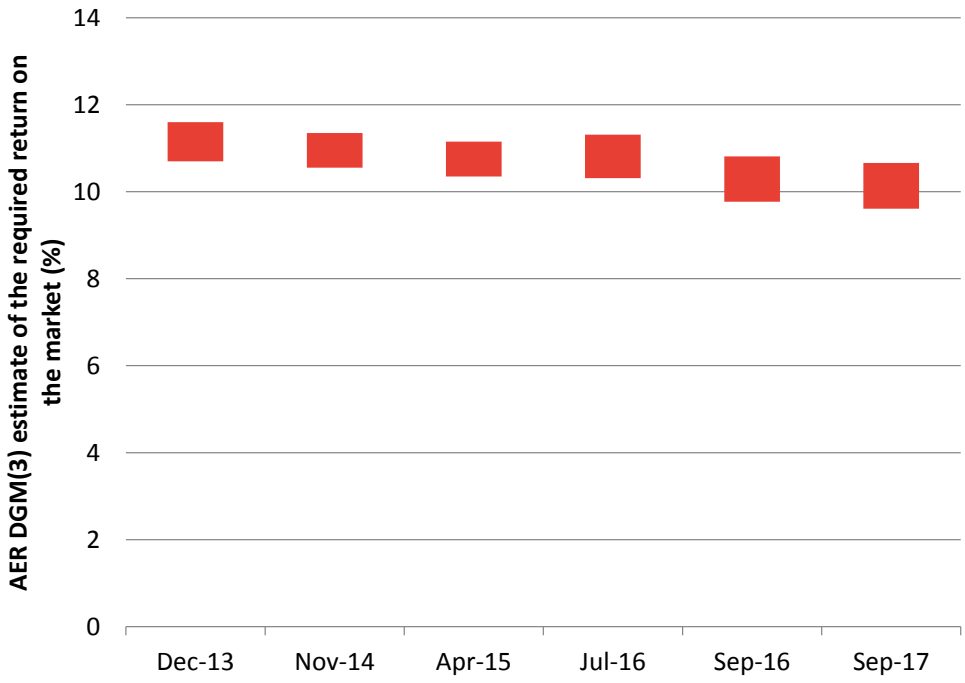
220 The evolution of the AER's DGM estimates of the MRP is summarised in Figure 14 above. It is clear that these estimates have increased materially since the Guideline.

221 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 14 below shows that the AER's own DGM estimates of the required return on equity have remained fairly constant since the publication of the Guideline – they have certainly not fallen in line with the marked decline in government bond yields.

[154] AusNet Draft Decision, 2016, Attachment 3, p. 59.

Appendix C: The AER's interpretation of the MRP evidence

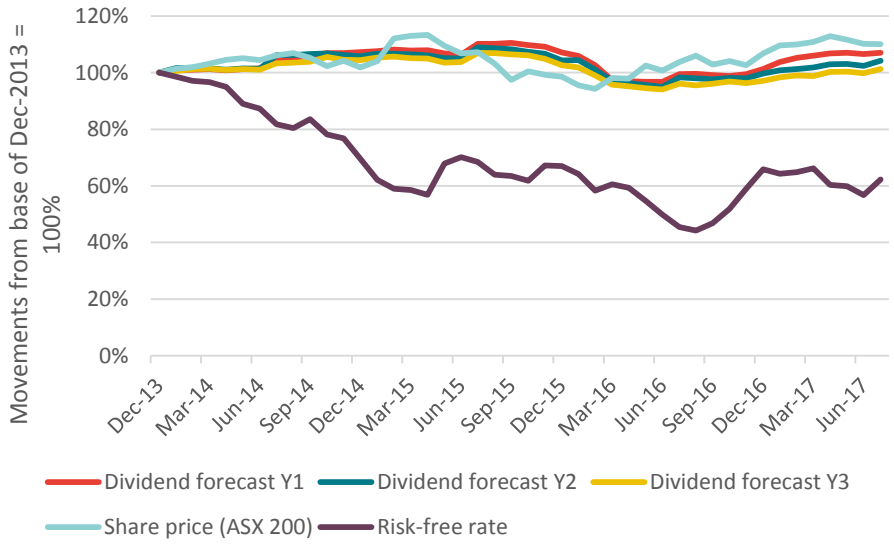
Figure 14: AER three-stage DGM estimates of the required return on the market



Source: AER Rate of Return Guideline December 2013; AER Ausgrid Draft Decision November 2014; AER Ausgrid Final Decision April 2015; AER AusNet Services Draft Decision July 2016; Powerlink Draft Decision September 2016; AER TransGrid Draft Decision September 2017.

222 The reasons for the stable return on equity estimates obtained from the AER's three-stage DGM are apparent from examination of the inputs to the model, which are presented graphically in Figure 15 below.

Figure 15: Evolution of inputs to AER's three-stage DGM



Source: Bloomberg and RBA data, Frontier analysis.

Appendix C: The AER's interpretation of the MRP evidence

223 Figure 15 shows that nothing has changed materially other than the fall in the risk-free rate. The forecast dividends have remained fairly stable, share prices have remained fairly 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.

224 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.

6.5 Other considerations

225 The AER has regard to a number of other considerations—surveys, conditioning variables and the recent decisions of other Australian regulators—when setting its MRP allowance. Notwithstanding that much of this evidence indicates an increase in the MRP, the AER has chosen to make no adjustment to its preliminary estimate that is based primarily on historical excess returns.

226 In this section, we show that the AER has in recent Decisions interpreted the evidence on surveys, conditioning variables and other regulatory decisions selectively, to argue in favour of no departure from its favoured estimate of 6.5%. This interpretation of the recent evidence has resulted in a constant MRP allowance.

6.5.1 Surveys

227 The AER's most recent Decisions present the survey evidence summarised in Table 10 below.

228 The AER concludes from this evidence that:

> Survey evidence generally supported a market risk premium around 6.0 per cent or less.[155]

229 In our view, the only way the AER could arrive at this conclusion is if it were to continue to give surveys that are several years out of date material weight, and to give the most recent surveys little weight.

[155] TransGrid Draft Decision, 2017, Attachment 3, p. 76.

Appendix C: The AER's interpretation of the MRP evidence

Table 10: Survey evidence considered by the AER in its most recent Decisions

Survey	Numbers of responses	Mean (%)	Median (%)	Mode (%)
Fernandez et al (2013)	73	5.9	6.0	N/A
KPMG (2013)[a]	19	N/A	6.0	6.0
Fernandez et al (2013)	17	6.8	5.8	N/A
Asher and Hickling (2013)	46	4.8	5.0	6.0
Fernandez et al (2014)[b]	93	5.9	6.0	N/A
Asher and Hickling (2014)[c]	27	4.4	4.6	6.0
Fernandez et al (2015)	40	6.0	5.1	N/A
KPMG (2015)[d]	~27	N/A	6.0	6.0
Asher and Carruther (2015)	29	4.9	N/A	N/A
Fernandez et al (2016)	87	6.0	6.0	N/A
Carruther (2016)	24	5.3	N/A	N/A
Fernandez et al (2017)	26	7.3	7.6	N/A
KPMG (2017)	45	N/A	6.0	6.0

Source: TransGrid Draft Decision, 2017, Attachment 3, Table 3-24, p. 228.

230 Table 10 presents survey evidence as old as 2013 (four years out of date) alongside the two most recent surveys, by Fernandez and KPMG, published in 2017. The AER acknowledges that surveys measure investors' expectations about the MRP:

> Survey estimates explore investor expectations about the market risk premium. They achieve this by directly asking investors and market practitioners what their expectations are and/or what they apply in practice.[156]

231 In the Guideline materials, the AER stated that it considered that the strength of survey evidence is the:

> …direct theoretical link between expected excess returns and stated expectations[157]

232 Since survey evidence aims to capture market participants' expectations of the MRP, if survey evidence is to be relied upon the most recent surveys should be used as they are most likely to provide the best indication of the *prevailing* MRP. For instance, Table 10 above presents six survey studies by Fernandez, and each of these asks respondents to report the MRP they are using *in that year*. For example, the 2017 Fernandez survey asks respondents to report the "Market Risk Premium that I am using in 2017".[158] This suggests that older surveys reflect out-

[156] TransGrid Draft Decision, 2017, Attachment 3, p. 228.

[157] AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 90.

[158] Fernandez, Linares, Acín, 2017, Discount Rate (Risk-Free Rate and Market Risk Premium) used for 41 Countries in 2017: a survey, April, p.13.

of-date expectations of the MRP, and are therefore less relevant to estimating a return on equity that reflects the prevailing conditions in the market for equity funds. Conversely, more recent surveys are more likely to provide useful evidence on the prevailing MRP, and therefore should supersede older surveys.

233 We note that in the Guideline materials, the AER itself noted "timeliness" as a potential weakness of survey evidence.[159] Further, in recent Decisions, the AER acknowledges that it must have regard to the timing of surveys when evaluating the usefulness of survey evidence, but then proceeds to consider survey evidence as old as 2013 without providing any explanation as to why the use of such old surveys is appropriate.

234 We have expressed many reservations about the reliability of survey evidence in the past.[160] However, our view is that if the AER is minded to give some consideration to survey evidence, it should give most weight to the most recent and timely survey evidence, and least weight to older less timely evidence.

235 Therefore, of the survey evidence cited by the AER, we consider that the most useful evidence are those surveys that pertain to 2017:

a. The 2017 Fernandez survey; and

b. The 2017 KPMG Valuation Practices Survey.

236 The first of these surveys, the Fernandez survey, suggests that prevailing MRP in Australia is now materially higher than 6.0%. That survey finds that the median estimate of the MRP is 7.6%.

237 The 2017 KPMG Valuation Practices Survey does indeed find that the median estimate of the MRP used by valuation experts is 6.0%. However, KPMG notes that:

a. Australia's current low-interest environment has resulted in some valuers adjusting the market risk premium upwards by either 0.5% or 1.0%;[161] and

b. The vast majority of respondents are currently using risk-free rates that are well above the prevailing 10-year government bond yield.[162] In fact, the KPMG website indicates that, in relation to the 2017 Valuation Practices Survey, the most commonly used risk-free rate was 4.5%.[163]

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[159] AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 90.

[160] See, for example: Frontier Economics, The market risk premium: A report prepared for TransGrid, September 2016.

[161] KPMG, 2017 Valuation Practices Survey, p. 11.

[162] KPMG, 2017 Valuation Practices Survey, p. 10.

[163] https://home.kpmg.com/au/en/home/insights/2017/07/valuation-practices-survey-2017.html (accessed 15 December 2017).

Appendix C: The AER's interpretation of the MRP evidence

238 If the most commonly used risk-free rate is 4.5%, and the most commonly used MRP is 6.0%, the total required return on equity, assuming the AER's equity beta of 0.7, would be 8.7%.[164] This implies that had most valuers used the risk-free rate adopted by the AER its latest Decisions, 2.68%, and adjusted the MRP rather than the risk-free rate, those valuers would have had to use a MRP estimate of approximately 8.6% to arrive at the same total required return on equity estimate of 8.7%.[165] In other words, implicit within the 2017 KPMG Valuation Practices Survey is a MRP of 8.6% rather than 6.0%. It would, in our view, be unreasonable to interpret this evidence as supporting the approach of inserting a 6% MRP into the CAPM formula with the prevailing risk-free rate, as that would produce a return on equity figure that is materially lower than that actually adopted by the respondents.

239 The Guideline materials themselves note that survey respondents may make adjustments either the risk-free rate or to the overall return on equity, rather than the MRP reported, in order to reflect prevailing market conditions:

> Furthermore practitioners may make adjustments to other parameters (for example, the risk free-rate) or to the return on equity or overall returns to reflect prevailing market conditions and this may not be picked up in the survey.[166]

240 To the extent that evidence of this is available in the results of the survey (as it is in the 2017 KPMG Valuation Practices Survey), then this should be accounted for. However, the AER has not done so in its latest Decisions.

241 In summary, we consider that that:

a. Of the survey evidence presented by the AER in its latest Decisions, the most timely evidence – i.e., surveys pertaining to 2017 – should be given most weight because these are most likely to reflect market participants' prevailing expectations of the MRP and, therefore, are most suitable for the purposes of estimating a return on equity that that reflects the prevailing conditions in the market for equity funds.

b. The two surveys cited by the AER that relate to 2017, by Fernandez and KPMG, both indicate that the prevailing MRP is considerably higher than the estimate of 6.5% adopted by the AER in its most recent Decisions.

242 In sharp contrast, the AER maintains that the survey evidence supports a MRP estimate of 6.0%. This estimate can only be supported by the evidence if material consideration is given to out-of-date evidence and/or the AER is exercising its

[164] 4.5% + 0.7 × 6.0% = 8.70%.

[165] (8.70% – 2.68%) ÷ 0.7 = 8.60%.

[166] AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 97.

judgment in a way that is not explained in its decisions, and therefore cannot be replicated by any stakeholder.

6.5.2 Conditioning variables

243 In its most recent Decisions, the AER has regard to a number of conditioning variables and concludes, based on the most recent values for those conditioning variables, that there is no satisfactory evidence for a departure from the AER's standard MRP estimate of 6.5%:

> Having considered all the relevant material before us we do not consider there is satisfactory evidence to warrant departure from the Guideline approach and our 6.5 per cent point estimate. For example, the conditioning variables indicate there has not been a material change in market conditions to warrant adjusting the market risk premium.[167]

244 The view that we have expressed in previous submissions to the AER is that in the absence of a formal econometric mapping of these conditioning variables to a point estimate of the MRP, it is difficult to know how this evidence should be interpreted.[168] We note that the AER's advisers, Partington and Satchell, agree with us in this regard:

> We agree with the former statement that it is difficult to draw conclusions from conditioning variables in the absence of formal econometric mapping to a point estimate of the MRP. This the substance of a well-regarded paper by Goyal and Welch(2008) who demonstrate that over a long period of time there seems to be no stable relationship between forecasts of MRP and actual market excess returns in the US. We would expect similar results elsewhere.[169]

245 Notwithstanding agreement between us and the AER's advisers, the AER continues to use evidence on various conditioning variables to reach conclusions about the *level* of the prevailing MRP.

246 Having reiterated this overarching concern, we raise three further concerns about the way in which the AER has used conditioning variables.

247 First, the AER has used conditioning variables to assess whether "there is satisfactory evidence to warrant departure from" the AER's Guideline estimate of 6.5%. In other words, the AER has introduced into its decision-making process for determining a MRP allowance a persuasive evidence test. Such a test was expressly rejected by the AEMC in 2012 when it developed the Rule Change that led to the requirement for the AER to prepare the Guideline.

248 In its Final Rule Determination, the AEMC noted that some stakeholders had submitted that some form of persuasive evidence test, or 'inertia principle' should

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[167] TransGrid Draft Decision, 2017, Attachment 3, p. 74.

[168] See, for example: Frontier Economics, The market risk premium: A report prepared for TransGrid, September 2016.

[169] Partington and Satchell (2017), April, p. 28.

Appendix C: The AER's interpretation of the MRP evidence

be included in the Rules, such that when making a rate of return determination, the AER would by default estimates for certain parameters that applied in previous determinations unless there was persuasive evidence that warranted the application of different estimates:

> The Commission also gave consideration to a suggestion from NSPs that if a rate of return framework based on the NGR determination by determination approach were to be adopted, then there should be an "inertia principle" included in the rules. This would require the parameter values of previous regulatory determinations to be binding until variation is sought that passes some form of persuasive evidence test. It was suggested that some parameters by their nature are subject to significant ongoing discussion and that two experts could look at the same material and come up with multiple answers. It was suggested that use of this type of "evidence" would reduce certainty, stability and transparency in the regulatory framework.[170]

249 Having considered these representations, the AEMC rejected resoundingly the proposal that a persuasive evidence test, or inertia principle, be included within the Rules. The AEMC stated the following:

> The rate of return guidelines are not intended to explicitly lock-in any parameters or methodologies from which departure would not be permitted. In order for the guidelines to have some purpose and value at the time of the regulatory determination or access arrangement process, they must have some weight to narrow the debate. However, there should not be any "inertia principle" or "persuasive evidence test" applying to the application of the guidelines. Requirements on the regulator (and service providers) of this nature to justify departures from the guidelines would undermine the purpose of them.[171]

250 In this statement, the AEMC is explicit that in the application of the Guideline in the context of making a particular Decision:

a. there should be no presumption that a parameter estimate from a previous Decision should apply unless satisfactory or persuasive evidence is adduced that justifies the use of a different estimate; and

b. network service providers and the AER are free from the burden of a persuasive evidence test.

251 By using the conditioning variables to assess whether there is satisfactory evidence to depart from a previous estimate of the MRP, the AER appears to have applied a persuasive evidence test.

252 In our view, a correct application of the conditioning variables evidence would involve the AER using that evidence to estimate the MRP in prevailing market conditions. However, as we have explained previously, it is very difficult to use the

[170] AEMC, Rule Change Final Determination, 2012, pp. 45-6.

[171] AEMC, Rule Change Final Determination, 2012, p. 58.

conditioning variables in that way in the absence of a formal econometric mapping of these conditioning variables to a point estimate of the MRP.

253 Our second concern in respect of the AER's application of conditioning variables is that it argues that these variables indicate that market conditions have not changed materially since the Guideline. However, the AER's allowed return on equity has declined by over 16% between the publication of its December 2013 Guideline (8.7%) and its September 2017 Decisions (7.2%). If market conditions have not changed materially since the Guideline (when the AER derived its MRP estimate of 6.5%), why has the AER's estimate of the return required by equity investors fallen so materially?

254 Finally, we note that the AER appears to be giving conditioning variables greater weight than indicated in the Guideline. As explained in section 0, in the Guideline the AER:

a. said that it would give only "limited consideration" to conditioning variables but "significant consideration" to DGM evidence; and

b. made explicit that it would give more weight to DGM evidence than it would to conditioning variables.

255 According to the AER's own analysis, the DGM evidence suggests that the MRP has increased materially since the publication of the Guideline. However, in recent Decisions the AER has used conditioning variables (which the AER has said should be given less weight than DGM evidence) to overrule the DGM evidence and argue for no change to its Guideline estimate of the MRP, 6.5%. This appears to be a material and unexplained departure from the Guideline.

6.5.3 Regulatory determinations

256 The Guideline approach is for the AER to give some limited consideration to MRP estimates by other Australian regulators.[172] In its most recent Decisions, the AER contends that:

> Regulatory decisions over the past 12 months indicate a market risk premium of 6.5 is reasonable. The most recent regulatory decisions in 2017 have largely used an MRP value from 2016.[173]

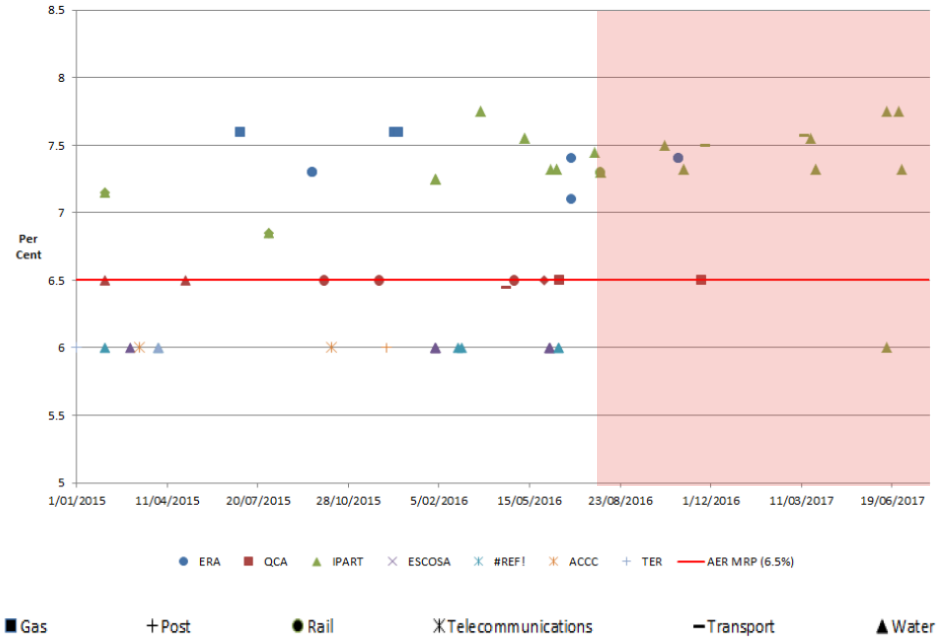
257 However, the empirical evidence actually presented by the AER does not support this contention. Most recent decisions by other Australian regulators are well above 6.5%, as indicated by the AER's own chart, which is reproduced below in Figure 16.

[172] AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 97.

[173] TransGrid Draft Decision, 2017, Attachment 3, p. 76.

Appendix C: The AER's interpretation of the MRP evidence

Figure 16: Market risk premium estimates from other Australian regulators' decisions



Source: TransGrid Draft Decision, 2017, Attachment 3, Figure 3-15, p. 236.

258 The AER makes clear that its focus is on regulatory decisions over the 12 month period between August 2016 and July 2017 (which we have shaded in the Figure above).[174] The AER's own data show that the MRP estimates determined by other Australian regulators during this period were almost exclusively above 7.0%. Only two data points lie on or below the AER's preferred MRP estimate of 6.5%:

a. One was a decision by the QCA in relation to DBCT's draft access undertaking in October 2016, which used a MRP estimate of 6.5%; and

b. The other is a June 2016 determination by IPART for WaterNSW in relation to bulk water services supplied in the Murray-Darling Basin (MDB) valleys, which used a MRP estimate of 6.0%.

259 It is important to recognise that the MRP estimate used in the June 2016 IPART determination does not represent IPART's view of the MRP prevailing at that time. This is evident for two reasons:

a. First, IPART states explicitly in that determination that it is required to use the ACCC Water Charge Infrastructure Rules (WCIR) when setting WaterNSW's charges in relation to the MDB valleys, and the WCIR methodology stipulates the use of a MRP of

[174] TransGrid Draft Decision, 2017, Attachment 3, Figure 3-15, p. 235.

6.0%.[175] Hence, IPART is compelled to use the ACCC-mandated MRP estimate of 6.0%; and

b. Second, in the same determination, IPART also set WaterNSW's charges in relation to bulk water services provided to the Coastal valleys. When setting those charges, IPART used a MRP estimate (derived using its standard methodology) of 7.75%.[176] This estimate, which may be interpreted as IPART's view of the prevailing MRP since it is based on its own methodology and not the requirements of the WCIR, is shown in Figure 16.

260 If the IPART bulk water determination in relation to the MDB valleys is discarded, as it does not represent IPART's view of the prevailing MRP, then in the 12 month period that the AER considers relevant, only a single determination by another Australian regulator, the QCA, sits below 7.0%.

261 Based on this evidence, we see no reasonable way in which the AER could conclude that "Regulatory decisions over the past 12 months indicate a market risk premium of 6.5 is reasonable." Such a conclusion is a misinterpretation of the evidence.

262 In addition, we note that since the AER released its 2017 TransGrid Draft Decision, from which Figure 16 is an excerpt, IPART, the ERA and the QCA have each published further estimates of the MRP:

a. IPART's August 2017 Biannual WACC update determined a MRP estimate of 7.7%;[177]

b. The ERA's October 2017 WACC Final Decision for WA rail networks determined a MRP estimate of 7.2%;[178] and

c. The QCA's November 2017 Draft Decision on bulk water charges for Seqwater concluded that the best empirical estimate of the MRP at the present time is 7.0%.[179]

263 All three of these recent MRP decisions are materially greater than the AER's estimate of 6.5%. It is particularly noteworthy that the QCA (who was the only regulator in the AER's chart to have determined the same MRP of 6.5% as the AER within the past 12 months) now considers that "the best empirical estimate

[175] IPART, Review of prices for rural bulk water services from 1 July 2017 to 30 June 2021, June 2017, p. 72.

[176] IPART, Review of prices for rural bulk water services from 1 July 2017 to 30 June 2021, June 2017, p. 75.

[177] IPART, WACC Biannual update, August 2017, p. 2.

[178] ERA, Determination on the 2017 Weighted Average Cost of Capital for the Freight and Urban Railway Networks, and for Pilbara railways, 6 October 2017, p. 4.

[179] QCA, Seqwater Bulk Water Price Review 2018–21, November 2017, p. 54.

Appendix C: The AER's interpretation of the MRP evidence

of the MRP is 7.0 per cent at this time."

Appendix C: The AER's interpretation of the MRP evidence

7 Appendix D: The implications of a "nearly constant" approach to the MRP

7.1 The AER's approach is to set a nearly constant MRP allowance

264 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%.

265 Although the AER's position is that "the MRP likely varies over time,"[180] 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.[181]

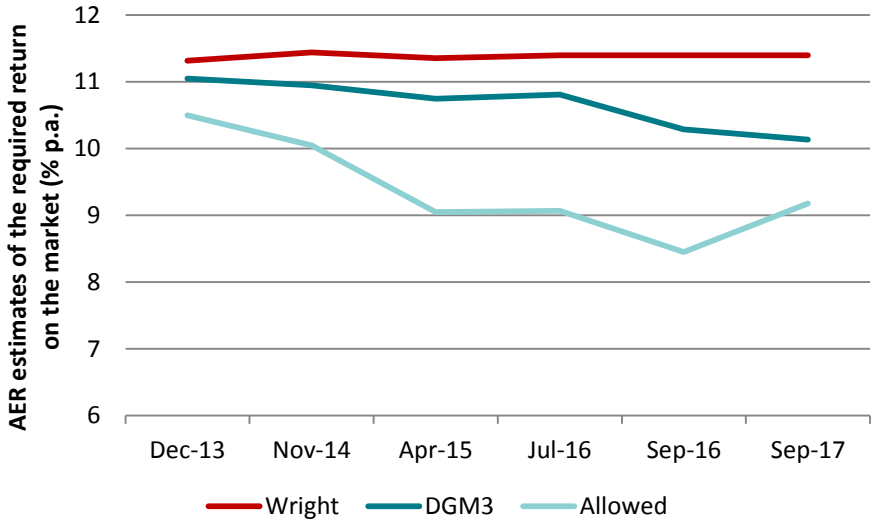
7.2 The allowed return on equity falls one-for one with falls in government bond yields

266 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 17 below.

[180] AER, 2013, Rate of Return Guideline: Explanatory Statement, p. 91.

[181] Partington and Satchell (2016), p. 17.

Figure 17: 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; TransGrid Draft Decision September 2017.

267 Since its Guideline in December 2013, the yield on 10-year government bonds has fallen from 4.1% to 2.68%.[182] 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 firm[183] has fallen from 10.6%[184] in December 2013 to 9.2%[185] now. This represents a decline of more than 13% since 2013, as illustrated in Figure 18 below.

[182] TransGrid Draft Decision, September 2017.

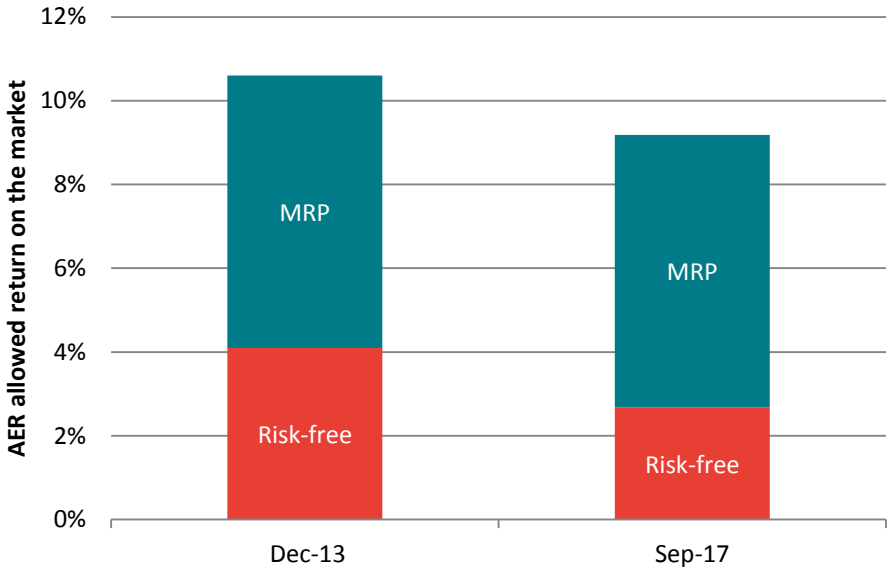
[183] Which, under the CAPM, is equal to the sum of the risk-free rate and the MRP.

[184] 4.1% + 6.5%.

[185] 2.68% + 6.5%.

Appendix D: The implications of a "nearly constant" approach to the MRP

Figure 18: AER estimate of the required return on equity for an average firm



Source: AER Rate of Return Guideline, December 2013; TransGrid Draft Decision, September 2017.

268 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 13% since the end of 2013.

269 The broader effect of the AER's approach to distilling the MRP evidence into a single regulatory allowance is illustrated in Figure 19. 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.[186]

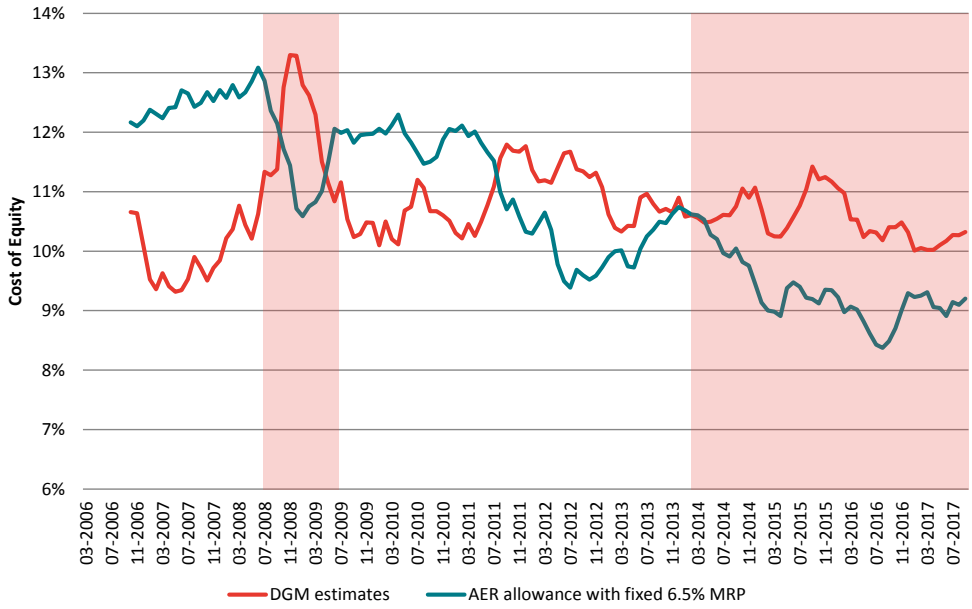
270 The most obvious point of departure is during the global financial crisis (GFC) in late 2008.[187] The approach of applying a fixed premium to the contemporaneous government bond yield implies that the required return on equity *fell* dramatically during the peak of the GFC – as investors moved funds 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.

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

[187] The first shaded region in the figure below.

Appendix D: The implications of a "nearly constant" approach to the MRP

Figure 19: The required return on the market – AER mid-point DGM estimates and regulatory allowances



Source: AER, RBA, Frontier Economics calculations.

271 Figure 19 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.

272 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 to 2005.

273 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[188] (hovering between 10% and 11%), the AER allowance suggests a material decline in the cost of equity.

7.3 The source of the problem

274 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. 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.

[188] The second shaded region in the figure above.

275 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.

276 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.

277 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.[189]

278 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 MRP.

279 This is the crux of the problem with the AER's nearly constant MRP. Even though government bond yields have fallen markedly 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.

280 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.

281 In their most recent report, Partington and Satchell (2017) state that they agree in principle with the contentions we make above:

> There is a high level of agreement here, as we agree with everything that Frontier have said in the above paragraph. Thus both we and Frontier agree that just

[189] Partington and Satchell (2016), p. 17.

Appendix D: The implications of a "nearly constant" approach to the MRP

> because there has been a large fall in government bond yields does not necessarily mean that an increase in the MRP will offset reduced required returns to stocks. Nor is there anything necessarily unnatural about the required stock return falling one for one with falls in the government interest rate. Ceteris paribus that is to be expected. Nonetheless, we agree with Frontier and accept that on occasion it is entirely possible that the MRP may increase as interest rates fall. However, we remain unconvinced by the evidence that Frontier subsequently present for a current increase in the market risk premium.[190]

282 Hence, it appears that the only difference between our views and that of the AER's advisers is that Partington and Satchell are unconvinced by our arguments that the MRP has increased recently. In Appendix F, we address a number of their key objections to the evidence that we present, particularly in relation to the DGM.

[190] Partington and Satchell (2017), April, p. 15.

8 Appendix E: Evidence on the total required return on equity

8.1 Overview of evidence

283 In a number of recent reports,[191] we have set out evidence from a range of respected market participants that 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:

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 Lonergan Edwards.

284 This evidence indicates that the required return on equity has remained relatively stable even as government bond yields have fallen – which implies an increase in the MRP to partially offset the fall in government bond yields. All of this is consistent with the AER's own DGM evidence set out above.

285 While we remain of the view that this represents relevant evidence that should inform the estimation of the MRP, we do not restate that evidence here. Rather, we respond to a small number of specific points that the AER and its advisers have raised in relation to it.

8.2 Purpose of evidence of stability in required returns

286 The AER's own DGM evidence indicates that the required return on equity has remained quite stable since the Guideline even though government bond yields have fallen materially. This indicates that an increase in the MRP has at least partially offset the fall in government bond yields.

287 The purpose of our summary of the analyses performed by central banks, other regulators, corporate advisory firms and independent expert firms is to show that there is a weight of opinion and analysis that is entirely consistent with the evidence of relative stability in the required return on equity. We do not suggest that any single piece of evidence or analysis is individually compelling or should be used to

[191] See, for example, Frontier Economics, 2017, The market risk premium, Report prepared for TransGrid, January, Section 5.

supplant other evidence as a point estimate of the MRP. Rather, we simply note that there is a preponderance of evidence from a range of credible market participants (central banks, other regulators, advisory firms and independent valuation experts) that also conclude that the required return on equity has remained stable in recent years – consistent with the AER's own DGM estimates.

288 The AER's analysis of this evidence in its recent decisions focuses on a small number of specific issues relating to some individual pieces of evidence, which we address below. The AER does not suggest that *all* of the evidence from central banks, other regulators, advisory firms and independent valuation experts is flawed or unreliable, so we maintain the point that there is a preponderance of evidence from credible market participants supporting the conclusion that the required return on equity has remained relatively stable in recent years.

8.3 Evidence from FERC

289 We have previously noted that FERC has recently concluded that:

> 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.[192]

and 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. [193]

and further that:

> 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.[194]

290 FERC then allowed a return on equity of 12.5%[195]

291 We submitted this as evidence that is inconsistent with the AER's practice of adding the same fixed risk premium even as government bond yields have varied materially – as that approach produces a 1:1 correspondence between the return on equity and the change in government bond yields.

292 In its TransGrid Draft Decision, the AER dismisses this evidence on the basis that FERC's:

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[192] FERC Opinion 531, Docket EL11-66-001, June 2014, Paragraph 159.

[193] FERC Opinion 531, Docket EL11-66-001, June 2014, Paragraph 158.

[194] FERC Docket ER14-500-000, January 2014, pp. 35-36.

[195] FERC Docket ER14-500-000, January 2014, pp. 35-36.

> …concern seems to be in using solely historic excess returns with a simple CAPM. However, we use information from a range of relevant material, including forward looking material, to determine the forward looking return on equity.[196]

293 That is, the AER appears to accept that it would be wrong to use only historic excess returns to estimate the MRP in a "simple" CAPM; that approach leading to the return on equity varying 1:1 with changes in the government bond yield. The AER then suggests that it is immune from such criticism since it does not use only historical excess returns, but also uses "forward-looking material." However, whatever the AER says about its approach, the fact is that in every decision since the Guideline it *has* set the MRP to the same fixed 6.5% such that the allowed return on equity *has* varied 1:1 with changes in government bond yields. Thus, the AER's practice is certainly *not* immune from the FERC criticism and conclusion.

8.4 Evidence from the Federal Reserve Bank

294 In a recent paper for the Federal Reserve Bank of New York, Duarte and Rosa (2015)[197] 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.[198]

295 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.[199]

296 We have drawn the evidence presented in the Federal Reserve Paper by Rosa and Duarte to the AER's attention in previous reports.[200] In its 2017 TransGrid Draft Decision, the AER addresses this study and concludes that the Duarte and Rosa

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[196] TransGrid Draft Decision, Attachment 3, p. 3-97.

[197] Duarte, F. and C. Rosa, 2015, "The Equity Risk Premium: A Review of Models," Federal Reserve Bank of New York Economic Policy Review, December.

[198] Duarte and Rosa (2015), p. 39-40.

[199] Duarte and Rosa (2015), p. 54.

[200] Frontier Economics, The market risk premium, January 2017.

Appendix E: Evidence on the total required return on equity

paper uses US data and it is not clear that the Australian market would follow a similar experience.[201]

297 We consider this paper to be relevant because of its focus on precisely the issue that arises in the AER's own estimates of the MRP – the required return on equity appears to have remained stable over recent years even as government bond yields have fallen to historical lows:

> …unlike the ERP, expected stock returns are close to their long-run mean and nowhere near their highest levels, achieved in 1980. The discrepancies between the two lines [depicting the estimated ERP and expected stock returns] are the result of exceptionally low bond yields since the end of the financial crisis.[202]

298 We also note that the AER's advisers, Partington and Satchell, have placed weight on this paper in another context, as we discuss in Section 9 below.

8.5 Evidence from McKinsey Inc.

299 In a recent McKinsey publication, Dobbs, Koller, Lund, Ramaswamy, Harris, Krishnan and Kauffman (2016)[203] examine the practice of investors, companies, bankers and management teams and 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. 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.[204]

300 Dobbs, Koller and Lund (2014)[205] seek to explain the stability of the required return on equity with reference to price earnings ratios. For example, if dividends

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[201] TransGrid Draft Decision, Attachment 3, p. 3-98.

[202] Duarte and Rosa, 2015, p. 53.

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

[204] Dobbs, Koller, Lund, Ramaswamy, Harris, Krishnan and Kauffman, 2016, p. 12.

[205] Dobbs, R., T. Coller and S. Lund, 2014, "What effect has quantitative easing had on your share price?" McKinsey on Finance, 49, Winter 2014.

are generally expected to grow at a constant rate, the price earnings ratio will be a function of dividend payout (D/E), the return on equity and expected growth:

$$P/E = \frac{D/E}{r_e - g}.$$

Dobbs, Koller and Lund make the point that a reduction in the required return on equity would, other things being equal, lead to an increase in the price/earnings ratio. Partington and Satchell (2017) make the point that other things may not be equal – dividend payout ratios and/or the expected growth rate may also change. We agree that this is possible, although no evidence is presented that those things *have* changed. However, Dobbs, Koller and Lund are simply seeking to reconcile the broader evidence of recent stability in the required return on equity by considering the relationship with price/earnings ratios. Even if that reconciliation is rejected, there remains a preponderance of evidence, using a whole range of different approaches, indicating recent stability in the required return on equity.

8.6 IPART

301 IPART applies a default 50% weight to forward-looking estimates of the MRP – primarily a number of DGM specifications.[206] In its most recent update, IPART adopts a contemporaneous MRP of 7.8%.[207]

302 IPART is presently consulting on various aspects of its rate of return methodology. In a recent consultation paper, which discussed proposals for possible improvement to its methodology, IPART stated clearly its view that there exists an inverse relationship between the risk-free rate and the MRP:

> ...there is a negative correlation between the risk-free rate and the MRP - when one of these parameters changes, the other changes in the opposite direction. This is because in times of economic uncertainty, investors would move away from riskier assets in preference for safer assets like government bonds. This would push up the price of these bonds and decrease the yield – a phenomenon known as a 'flight to quality'.[208]

303 IPART went on to present evidence that supported its view on the inverse relationship between the risk-free rate and the MRP:

> Figure 3.1 shows this inverse relationship between the risk-free rate and the MRP estimated using the Damodaran model. Very similar correlations are also found for the other MRP methods, including the two Bank of England models and the SFG analyst implied method. In particular, the figure shows if the risk-free rate increases by 1%, the MRP decreases by approximately 1% -

[206] IPART, Review of WACC Methodology, December 2013.

[207] IPART, WACC Biannual update, August 2017.

[208] IPART, Review of our WACC method, Issues Paper, July 2017, p. 16.

Appendix E: Evidence on the total required return on equity

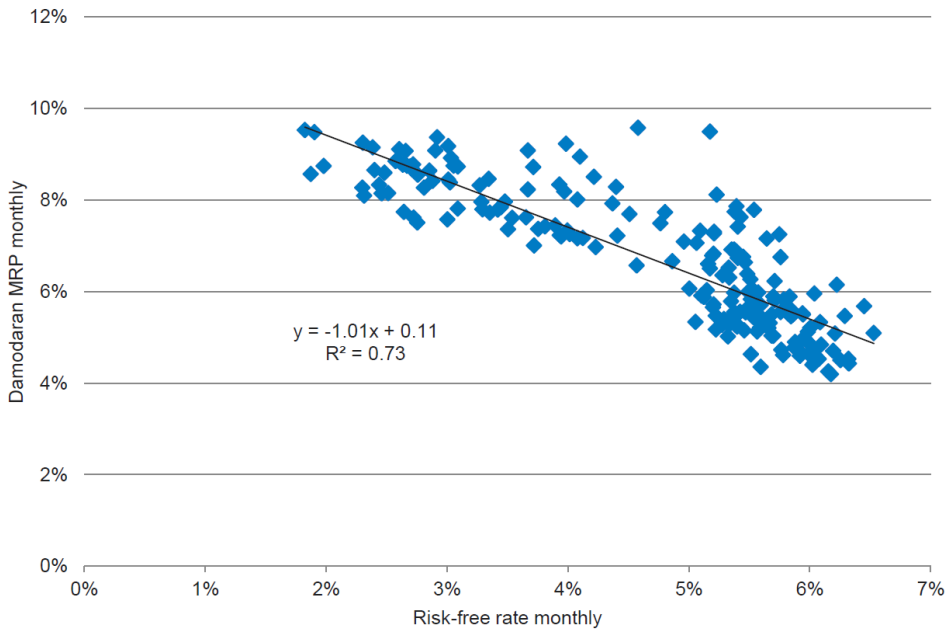
substantially offsetting the effect on the WACC of the increase in the risk-free rate.[209]

304 We reproduce below in Figure 20 the chart that IPART referred to in the excerpt above.

305 The corollary of IPART's analysis is that the overall return on equity is fairly stable over time, such that a reduction in the risk-free rate is accompanied by an increase in the MRP, and vice versa. IPART's view about the stability of the overall return on equity is borne out by the stability of the WACC estimates produced by its current rate of return methodology – as shown in Figure 21 below.

306 This contrasts with the AER's WACC allowances, which have declined materially since 2013 as government bond yields have fallen.

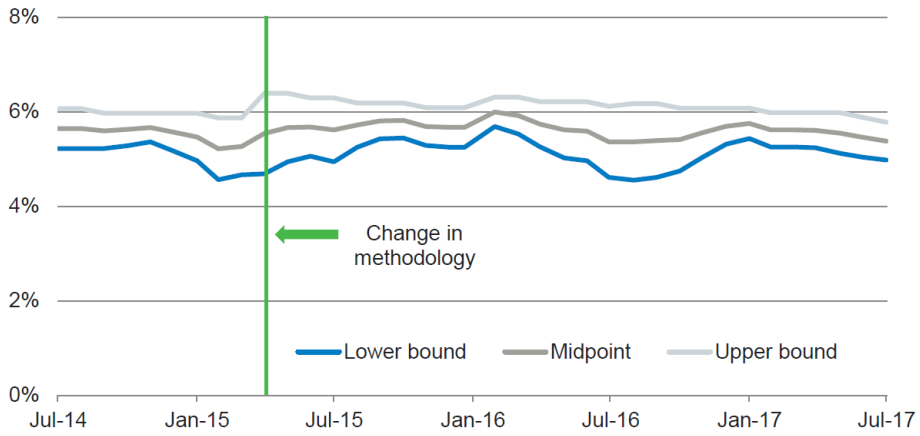
Figure 20: Correlation between IPART's DGM estimate of the MRP and the prevailing risk-free rate



Source: IPART, Review of our WACC method, Issues Paper, July 2017, Figure 3.1, p. 17.

[209] IPART, Review of our WACC method, Issues Paper, July 2017, pp. 16-7.

Figure 21: IPART WACC estimate of real vanilla WACC (equity beta = 1, gearing = 60%)



Source: IPART, WACC Biannual update, August 2017, p.1.

Appendix E: Evidence on the total required return on equity

9 Appendix F: The reliability of DGM estimates of the MRP

9.1 The AER's views on the DGM in the Guideline

307 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.

308 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.

309 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.[210]

310 The AER did, in the Guideline materials, express some reservations about the DGM. The AER's primary concern was the sensitivity of the DGM estimates of the MRP to estimates of the long-run growth rate, and the time assumed to transition to the long-run growth rate:

> Our primary concern with using DGM estimates is the sensitivity of the estimates to assumptions about the long term growth rate and the time it takes to reach the long run growth rate…[211]

311 The AER went on to say that despite those concerns, it considered that theoretical basis for the DGM was sound, and that estimates from the DGM are more likely to reflect prevailing market conditions than other approaches:

> 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.[212]

312 In the Guideline, the AER was concerned that because DGM estimates can be sensitive to model specification, inconsistent application of models through time could result in cherry-picking of estimates. Therefore, the AER considered that in order for the DGM to be useful in a regulatory context, it would be necessary to settle on a formulation of the DGM that could be applied consistently over time:

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[210] AER, 2013, Rate of Return Guideline: Explanatory Statement, Appendices, p. 110.

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

[212] AER, 2013, Rate of Return Guideline: Explanatory Statement, Appendices, p. 85.

> There are many possible formulations of DGMs and the results from the different variants tend fluctuate through time. For DGMs to be given greater consideration in the regulatory process, we consider that it is necessary to settle on a variant that can be consistently applied through time. A consistent approach through time will moderate some of the causes of variation.[213]

313 Through the Guideline process, a number of stakeholders proposed various formulations of the DGM. The AER rejected all of these and settled on two specifications of its own design—a two-stage model and a three-stage model—drawing on advice received from its own experts.[214]

314 After investigating different DGM specifications and settling on a preferred construction, the AER stated in the Guideline materials that:

> We consider our preferred construction provides a reasonable indication of the range of MRP estimates implied by the DGM.[215]

315 The AER describes its proposal of a preferred construction of the DGM as:

> …the most significant development in this area[216]

316 The AER stated that its preferred formulation would allow a symmetric and consistent assessment of MRP evidence over time. This, said the AER, gave it more confidence in this evidence, which meant that it would give DGM evidence more consideration than it had done in the past:

> We have considered the available evidence on the DGM and proposed our preferred construction of the model. We have consulted with stakeholders on our preferred construction and engaged consultants to review our proposal. As a result, in this explanatory statement we propose our preferred DGM estimates. Consequently, we have greater confidence in the symmetry of this information through time and give these estimates greater consideration than we have in the past.[217]

317 The AER also noted that consistent construction and application of the DGM helps address its primary concern about sensitivity of DGM estimates to the assumed long-term growth rate assumption, and transition to the long-term growth rate:

> … the outcomes [of DGMs] are sensitive to the model assumptions, especially the assumed long term growth in dividends and the transition from current dividends to the long term growth path. There are a range of plausible assumptions that one could make on these parameters. We note, however,

[213] AER, 2013, Rate of Return Guideline: Explanatory Statement, Appendices, p. 85.

[214] AER, 2013, Rate of Return Guideline: Explanatory Statement, Appendices, pp. 85-6.

[215] AER, 2013, Rate of Return Guideline, Explanatory Statement, Appendices, p. 87.

[216] AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 89.

[217] AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 96.

Appendix F: The reliability of DGM estimates of the MRP

> consistent applications of the various models appear to show similar trends over time.[218]

318 Further, whilst the AER did express some concerns in the Guideline about the sensitivity of DGM estimates to model inputs, the AER noted that it had access to "robust data" with which to estimate the inputs to its preferred specification of the DGM, and that, consequently, it places "emphasis on DGMs for estimating the MRP":

> The determination of robust and transparent DGM estimates, however, is predicated on the reliability and breadth of the available input data. As outlined previously, the estimation of DGMs requires assumptions about dividend yields, as well as the expected growth rate of dividends. For estimates of dividend yields in the Australian market, a sufficiently robust data series exists. Additionally, methods for estimating the growth rate of dividends in the Australian market have been developed. This is why we place emphasis on DGMs for estimating the MRP. [219]

319 The AER gave the strong impression throughout the Guideline materials that whilst it did have some reservations about the DGM, these would be ameliorated by consistent application of its preferred formulation of the DGM, and that it had data and means to derive reliable inputs to its specification of the DGM.

320 The AER concluded in the Guideline materials that when estimating the MRP, it would give:

> …significant consideration to DGM estimates of the MRP.[220]

321 In summary, when developing the Guideline, the AER:

a. 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. Expressed some concerns about the reliability of input parameters—particularly the long-run growth rate—but concluded that these concerns are mitigated by a consistent implementation of its preferred DGM, and that it had "robust data" with which it could derive those inputs; and

c. Stated that it would give "significant" consideration to its DGM evidence when determining the MRP allowance, and that it placed "emphasis on DGMs for estimating the MRP."

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[218] AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 96.

[219] AER, 2013, Rate of Return Guideline, Explanatory Statement, Appendices, p. 15.

[220] AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 97.

9.2 Recent AER views on the DGM

322 The AER has stated in its most recent Decisions that it has not changed its views about the DGM since the Guideline:

> The AER has not changed its view on the DGM and how useful the information it provides is in forming a point estimate of the MRP.[221]

323 The AER has also said that it has not altered the weight that it gives to the DGM:

> We have not changed the weight we apply to the dividend growth model.[222]

324 As we set out in Section 6, since the publication of the Guideline, the AER's DGMs, implemented consistently, have indicated that the MRP has increased materially. As this has occurred, the AER appears to have placed less weight on its DGM estimates. For example, unlike the "significant consideration" that was given to the DGM in the Guideline materials, the AER now says that "limited reliance" should be placed on DGM estimates:

> Consistent with the rate of return guideline (Guideline), we use dividend growth models to inform our estimate of the market risk premium. However, we consider that limited reliance should be placed on estimates from dividend growth models.[223]

325 The AER says in its latest decisions that the DGM now fails to provide a "true" estimate of the MRP:

> We consider our dividend growth model is theoretically sound but that there are many limitations in practically implementing the model. As previously stated in our assessment of the dividend growth model, it may capture current conditions to a certain extent but fails to adequately provide a 'true' estimate of the forward looking MRP.[224]

326 This recent statement by the AER, that the DGM captures current market conditions only "to a certain extent" seems to retreat from the Guideline, which stated that DGM estimates are more likely to reflect prevailing market conditions than other approaches:

> DGM estimates have strong theoretical grounding and are more likely to reflect prevailing market conditions than other approaches.[225]

and 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

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[221] TransGrid Draft Decision, 2017, Attachment 3, p. 81.

[222] TransGrid Draft Decision, 2017, Attachment 3, p. 215.

[223] TransGrid Draft Decision, 2017, Attachment 3, p. 209.

[224] TransGrid Draft Decision, 2017, Attachment 3, p. 76.

[225] AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 85.

Appendix F: The reliability of DGM estimates of the MRP

> looking as they estimate expectations of future cash flows and equate them with current market prices through the discount rate.[226]

327 The AER also now says that the DGM is likely to produce "upward biased estimates in the current market" and "may not accurately track changes in the return on equity for the market."[227] The reasons for this conclusion are discussed below. As we explain, none of these reasons are new – they were all considered when the AER developed its Guideline. The only thing that has changed since the Guideline is that the AER's DGM estimates are now higher.

328 The AER has also stated in recent Decisions that:

> The guideline designated the dividend growth model to inform on whether the market risk premium may be above or below the historical estimates.[228]

329 As we have explained in section 0, nowhere in the Guideline is the DGM designated merely as a method to determine whether the final point estimate of the MRP should be set above or below the historical excess returns estimate, or as providing directional evidence only. The AER's description of the DGM as providing only directional evidence represents an after-the-event recasting of the role of the DGM in the Guideline approach to the MRP.

9.3 AER concerns

330 In this sub-section, we consider each of the concerns that the AER has documented in relation to the DGM estimates of the MRP since the publication of the Guideline.

331 Importantly, *all* of these concerns were known at the time of the Guideline and *none* of them were raised as a reason for placing "limited reliance" on DGM estimates. Importantly, none of these concerns are based on any new evidence since the Guideline, other than the fact that the AER's DGM estimates are now higher.

9.3.1 Slow-changing dividends

332 The AER points out correctly that corporate dividends are more stable over time than corporate earnings. The AER then conjectures that if the market's expectation is that earnings are falling, stock prices would fall. However, if dividends remain sticky, then the dividend yield would remain high and the resulting estimate of the return on equity would be overstated:

> If investors revise downwards their earnings expectations for a firm, the share price may drop significantly with the 'sticky' dividend unchanging. Together, this will cause a higher dividend yield, giving an upwardly-biased estimate of the

[226] AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 84.

[227] TransGrid Draft Decision, 2017, Attachment 3, p. 76.

[228] TransGrid Draft Decision, 2017, Attachment 3, p. 76.

> return on equity. The reverse occurs if expectations are for profits and free cash flow to equity to rise.[229]

333 We note that the AER simply asserts that this *could* be a problem in present market conditions, but presents no convincing evidence that the market's expectations of earnings is in fact falling at the present time. (We explain below that the only evidence presented by the AER appears to have been misinterpreted.)

334 We acknowledge that it is possible that a firm may seek to maintain its dividend through a period of weaker earnings. However, this is only possible for a short period of time. If earnings are persistently weak, maintaining a high level of dividends becomes unsustainable. Thus, if a firm is anticipating weaker earnings for a prolonged period, it is highly unlikely that it would *increase* its dividend.

335 We have previously pointed out that the AER's concerns about sticky dividends leading to upward-biased DGM estimates of the MRP are unlikely to be material in current market conditions because analysts are currently forecasting growing dividends and earnings.[230] Forecasts of this kind are inconsistent with the notion that dividends are currently being sustained in the face of what is expected to be weak earnings in the future.

336 The AER acknowledges our submission but states that it finds this evidence unpersuasive because the analyst forecasts we presented related only to the short-term (i.e., until 2017).[231] The AER argues that analysts' forecasts are only short term forecasts, whereas market prices are likely to reflect earnings expectations in the more distant future.[232] The AER asserts that is uncertain that investors expect positive growth in dividends per share beyond the short term (i.e., post-2017):

> It is not apparent that there is or will be strong earnings growth.[233]

337 The AER presents no actual evidence that, although the market is expecting corporate earnings growth over the next two years, it may be expecting earnings to decline thereafter.

338 The only empirical evidence that the AER cites in support of its concerns is the RBA's January 2017 Chart Pack:

> …RBA data suggests that forecast growth in earnings per share will likely slow over the 2016-17 financial year.[234]

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[229] TransGrid Draft Decision, 2017, Attachment 3, p. 214.

[230] Frontier Economics, The relationship between government bond yields and the market risk premium, January 2016, p. 39.

[231] TransGrid Draft Decision, 2017, Attachment 3, p. 215.

[232] TransGrid Draft Decision, 2017, Attachment 3, p. 214.

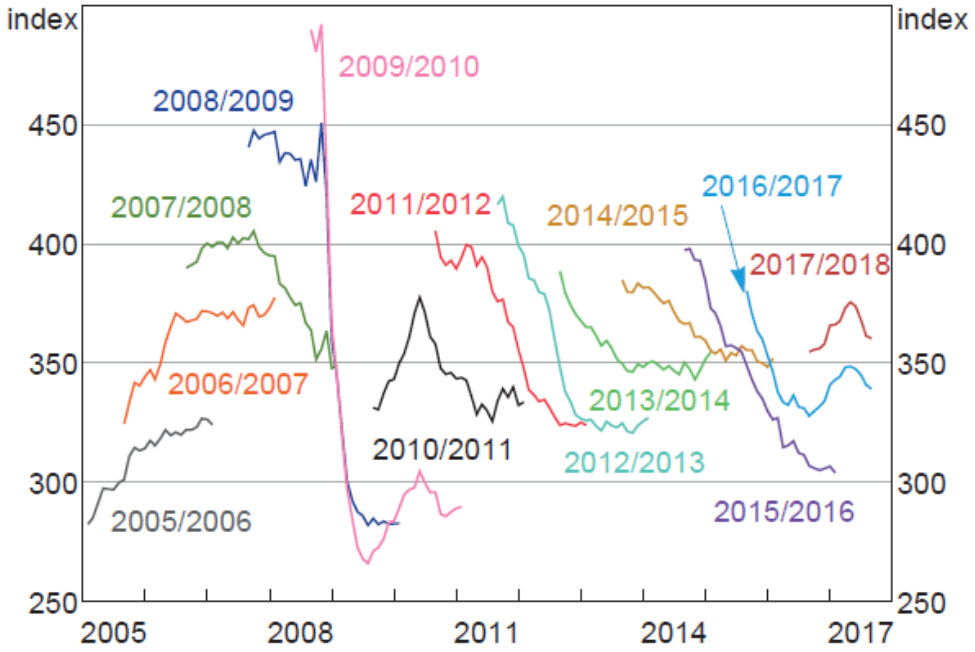
[233] TransGrid Draft Decision, 2017, Attachment 3, p. 214.

[234] TransGrid Draft Decision, 2017, Attachment 3, p. 287.

Appendix F: The reliability of DGM estimates of the MRP

339 We reproduce below in Figure 22 the earnings growth forecasts in the most recent (October 2017) version of the RBA Chart Pack.

Figure 22: Forecast earnings per share



Source: RBA, The Australian Economy and Financial Markets, Chart Pack, October 2017, p. 24

340 We make two observations about the RBA earnings forecasts:

a. First, the latest RBA Chart Pack presents earnings forecast data to 2017-18. The data clearly suggests that earnings forecasts for 2016-17 were above earnings forecasts for 2015-16 (a point that the AER has acknowledged[235]), and earnings forecasts for 2017-18 are higher again. In other words, the RBA data cited by the AER suggests that analysts are forecasting earnings to increase over the next two years.

b. Second, at the start of 2016, earnings were expected to fall over that year and then increase again over 2017. At the start of 2017, the continuing expectation was for earnings to rise over the year. However, the level of forecast earnings was revised upwards relative to the forecast from the previous year. This suggests that expected earnings growth has increased with new information.

341 In our view, nothing in the RBA data supports the AER's contention of weak future earnings growth. The 'sticky dividends' issue would only be material if future

[235] TransGrid Draft Decision, 2017, Attachment 3, p. 100.

earnings were likely to fall so materially as to make the current dividend unsustainable, and there is no evidence to support that conjecture.

342 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.

9.3.2 Bias in analyst forecasts

343 In a number of recent 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 does not present any actual evidence that the analysts' forecasts used in its DGMs are biased. This proposition is simply asserted as a general truth:

> Analyst forecasts are well understood to be upwardly biased.[236]

344 We have submitted previously 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 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.

345 The AER's response to 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.[237]

346 This response misses 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.

347 Our previous submissions have noted that the issue was known to the AER at the time of the Guideline when the AER applied "significant consideration" to its DGM estimates.

348 The AER has recently stated that:

> Frontier has not provided any evidence that bias has not increased.[238]

349 To examine the very recent extent of any analyst forecast bias in Australia, we collected data on 'earnings surprises' for the 2015-16 financial year for the stocks in the ASX 20 index.[239]

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[236] TransGrid Draft Decision, 2017, Attachment 3, p. 228.

[237] TransGrid Draft Decision, 2017, Attachment 3, p. 216..

[238] TransGrid Draft Decision, 2017, Attachment 3, p. 215..

[239] Source: CommSec.

Appendix F: The reliability of DGM estimates of the MRP

350 The earnings surprise is actual earnings per share less forecast 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.

351 In response to this evidence, the AER says that it has:

> …reservations about a survey from only 20 firms. [240]

352 The AER also notes that:

> Partington and Satchell advised that they would "place little weight on a non-random sample of twenty firms and one year's observations" when assessing the reliability of analyst's forecasts.[241]

353 We note that the ASX 20 represents roughly half of the capitalisation of the Australian share market, so whilst we have focussed on 20 firms, these firms represent a very substantial portion of the Australian stock market.[242] Further, we analysed the latest year of data available at the time of our submission since the AER's challenge to us was that we had not provided evidence of a recent increase in analyst forecast bias.

354 In response to the AER's concerns, we have provided some data and evidence relevant to the present market conditions. By contrast, the AER and its advisers offer *no data or evidence* relevant to the present market conditions, nor do they set out the standard of evidence that they *would* find persuasive.

355 A related point that Partington and Satchell make is that the supposed problems arising from bias in analysts' forecasts are exacerbated by the fact that the AER is seeking to estimate the MRP over a relatively long (i.e., 10-year) horizon:

> We certainly agree that DGM-based estimates of the MRP are forward looking and that this is an attractive property. The usefulness of this approach rather depends upon the accuracy of the forecast and the horizon that it is evaluated over. It is unfortunately the case that forecasts of future earnings and dividends tend to be fairly inaccurate over more than 2 years. Indeed, even over a one or two year horizon the evidence is that analyst's forecasts are upward biased. Thus, a 10 year horizon, which seems implicit in many of the calculations here, is probably going to lead to poor forward looking estimates of the risk premium.

356 Partington and Satchell imply that if analysts' forecasts over a relatively short, two-year horizon are biased, then forecasts over a 10-year horizon must be much worse, such that any DGM estimates that rely on such long-range forecasts should be distrusted.

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[240] TransGrid Draft Decision, 2017, Attachment 3, p. 229.

[241] TransGrid Draft Decision, 2017, Attachment 3, p. 229.

[242] https://www.asx20list.com/ (accessed 9 October 2017).

357 It is worth noting, however, that analysts' forecasts are used in the AER's two-stage and three-stage DGMs only in the first two years.[243] From year three, the growth rate either switches immediately to the AER's estimate of the long-run growth rate (in the case of the two-stage model), or transitions to the long-run growth rate by year 10 (in the case of the three-stage model). Hence, the AER's DGMs *do not* rely on analyst forecasts relating to a 10-year horizon. By implying that the AER's DGM estimates are derived using very uncertain long-range analyst forecasts, Partington and Satchell exaggerate greatly the limitations of those estimates.

358 The AER also notes that its experts, McKenzie and Partington, have advised that analysts' forecasts are slow to adjust to changing market information, which can create problems with time matching analyst dividend forecasts with prices. This, in turn, may result in DGM estimates not tracking changes in the return on equity accurately:

> McKenzie and Partington also considered that analysts' forecasts are slow to adjust to changing information. This creates problems with time matching analyst dividend forecasts with prices. It also implies that dividend growth models may not track changes in the return on equity accurately.[244]

359 We agree that this is a potential limitation of the DGM. This was also recognised by SFG during the Guideline process. During that process, SFG proposed a version of the DGM that matched the timing of price inputs and analyst forecast inputs, in order to address this limitation. The AER acknowledged this as a feature of the SFG version of the DGM in the Guideline materials.[245]

360 The AER considered this feature of the SFG model, performed its own investigation of the issue, and concluded that the problem was not of a sufficient magnitude to incorporate the feature of matching analyst forecasts inputs to price inputs:

> Given that the forecast data is somewhat 'stale', SFG suggests this stale forecast data may partly explain the volatility observed in the return on equity of the energy infrastructure businesses. However SFG does not provide evidence of the magnitude of this effect, or indeed, whether the effect on the volatility of the return on equity is material. We did some sensitivity analysis, examining the effect on our estimates of the MRP of adjusting for sluggish analyst forecasts. We decided that, given the moderate magnitude of the adjustments, and also the given uncertainties surrounding the calculation of the adjustment, that we would not incorporate the adjustment into our estimates of the MRP.[246]

361 Having concluded in the Guideline that this problem was not sufficiently material to address in its own DGMs, the AER now cites exactly the same problem as a

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[243] AER, 2013, Rate of Return Guideline, Explanatory Statement, Appendices, pp. 115-7.

[244] TransGrid Draft Decision, 2017, Attachment 3, p. 216.

[245] AER, 2013, Rate of Return Guideline, Explanatory Statement, Appendices, p. 123.

[246] AER, 2013, Rate of Return Guideline, Explanatory Statement, Appendices, pp. 124-5.

Appendix F: The reliability of DGM estimates of the MRP

reason why its DGM estimates "may not track changes in the return on equity accurately."

9.3.3 Dividends as a proxy for free cash flow on equity

362 In its Decisions, the AER cites a submission from McKenzie and Partington (2014)[247] in relation to the effect of the financing of dividends.[248] McKenzie and Partington posit that if a firm routinely issues new shares,[249] 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.

363 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.

364 We also note that there is no reason to suggest that this issue is any more or less important than at the time of the Guideline.

9.3.4 Term structure for required return on equity

365 In Decisions, the AER considers the question of a term structure in the required return on equity.[250] 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:

> 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.[251]

366 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.*

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

[248] TransGrid Draft Decision, 2017, Attachment 3, p. 216..

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

[250] TransGrid Draft Decision, 2017, Attachment 3, p. 194.

[251] TransGrid Draft Decision, 2017, Attachment 3, p. 217.

> Consequently we do not recommend that an estimation technique involving an equity term structure be adopted.[252]

367 In its Guideline materials, the AER explained that:

> …we do not incorporate a term structure into our model because it is non-standard.[253]

368 Consequently this notion of a return on equity term structure would seem to be irrelevant unless the AER intends to depart from the Guideline.

9.3.5 Evidence on the forecast accuracy of DGM estimates

369 In recent Decisions, the AER criticises a number of network service providers for giving too much weight to DGM evidence, and argues that the DGM should be used only to inform whether the final MRP point estimate should lie above or below the MRP estimate derived using historical excess returns.[254]

370 In support of this conclusion, the AER refers to advice provided by Partington and Satchell:

> Partington and Satchell have previously advised that we should not assign more weight to dividend growth model estimates because of inaccuracy, upward bias of the estimates and sensitivity of the model to inputs and assumptions. They concluded that it is 'very unlikely that the DGM will produce a forward looking MRP commensurate with the prevailing conditions in the market for funds'. They also noted that 'DGM-based estimates of the MRP in a 10 year horizon context are probably better down-weighted than given more weight'.
>
> Partington and Satchell advised that 'the DGM…is more useful as a conceptual tool than a forecasting model'. This is consistent with our Guideline approach of using dividend growth model estimates to inform if a point estimate may be above or below the historical excess estimate.

371 A major piece of evidence that Partington and Satchell cite in support of this view is evidence from a study by Duarte and Rosa (2015).[255] We have previously cited the conclusions of the same study in submissions to the AER:

> …expected excess stock returns [MRP] 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.[256]

372 The AER has dismissed the evidence from that study as unpersuasive because it uses US data and because the MRP estimates derived by Duarte and Rosa are not

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[252] McKenzie and Partington (2014), pp. 36-37.

[253] AER, 2013, Rate of Return Guideline, Explanatory Statement, Appendices, p. 115.

[254] See, for example, TransGrid Draft Decision, 2017, Attachment 3, p. 81.

[255] Duarte, F. and C. Rosa, 2015, "The Equity Risk Premium: A Review of Models," Federal Reserve Bank of New York Economic Policy Review, December.

[256] Duarte and Rosa (2015), p. 54.

Appendix F: The reliability of DGM estimates of the MRP

10-year MRP estimates. However, the AER adopts the conclusions of Partington and Satchell, arrived at by reference to the same Duarte and Rosa paper.

373 In any event, we explain below that Partington and Satchell draw precisely the wrong conclusions from the findings of the Duarte and Rosa study.

374 First, we note that the main finding of the Duarte and Rosa paper is that the MRP has increased since the end of the GFC, and that the main cause of this has been a material decline in the risk-free rate. Partington and Satchell attempt to downplay this key finding by noting that Duarte and Rosa acknowledge that there is "considerable uncertainty" around their MRP estimates. But this does not detract from their central finding—that the MRP has increased since the GFC because government bond yields have fallen dramatically—which is repeated several times in the paper.

375 Second, Partington and Satchell focus on a minor finding in the paper to argue that the DGM is a poor estimator of the MRP. However, it appears that Partington and Satchell misunderstand Duarte and Rosa and, consequently, draw precisely the wrong conclusion. Partington and Satchell argue that Duarte and Rosa show that mean historical excess returns are "positively correlated" with the MRP estimated in the study—using a technique known as principal components analysis (PCA)—whereas "the DGM is not".[257]

376 By way of background, Duarte and Rosa use PCA to derive an estimate of the MRP by drawing on information from 20 different models, including two models that calculate the historical mean of excess returns, and eight differently-specified DGMs. PCA works by identifying successive linear combinations of the 20 models, where each linear combination explains progressively less of the variation in the data. The first of these linear combinations, known as the first principal component (FPC), is the combination that captures as much of the variation in the data as possible. By construction, the second linear combination explains less of the variation than the FPC, and is uncorrelated with (orthogonal to) the FPC, and so on. Duarte and Rosa find that the FPC explains approximately 76% of the variation of the underlying models, suggesting that relatively little would be gained by examining the remaining principal components. Therefore, Duarte and Rosa use the FPC to derive their estimate of the MRP. The FPC might be thought of as a conglomeration of the most useful information on the true (but unobservable) MRP available from the 20 underlying models.

377 Partington's and Satchell's confusion appears to arise from the following sentence in Duarte and Rosa:

[257] Partington and Satchell (2017), April, p. 25.

> The first principal component puts positive weight on models based on the historical mean, cross-sectional regressions, and the survey of CFOs. It weights DDMs … mostly negatively.[258]

378 It appears that Partington and Satchell interpret this sentence to that mean historical excess returns do a better job of predicting the MRP estimated by Duarte and Rosa than does the DGM.[259] However, this conclusion is incorrect.

379 Duarte and Rosa present data (reproduced in Table 11 below) that show that there is a high degree of correlation between several models considered in the study. In such circumstances, examining the principal component weights attached to *individual* models, as Partington and Satchell do, is meaningless. This is because when a number of models are contributing similar information, the individual impact of each cannot be isolated. By analogy, if a multiple regression on a number of correlated independent variables, the coefficient on each cannot be reliably interpreted (the so-called multicollinearity problem) even though their collective effect is statistically valid. So too, the weight ascribed to each model in the principal components analysis is irrelevant.

[258] Duarte and Rosa (2015), p. 48.

[259] It is interesting to note from column three in Table 7 in Duarte and Rosa (2015) that surveys and Fama-French estimates, like mean historical excess returns, receive large positive weights from the FPC. The AER gives only "some consideration" to surveys and gives no weight at all to Fama-French estimates. If the AER accepts Partington's and Satchell's advice on how to interpret the Duarte and Rosa study, then presumably the AER should give material weight to surveys and Fama-French estimates, alongside mean historical excess returns.

Appendix F: The reliability of DGM estimates of the MRP

Table 11: Correlation of MRP models considered in Duarte and Rosa (2015)

	Long-run mean	Mean past five years	E/P-ten year	1/CAPE-ten year	E/P-real ten year	Exp E/P-real ten year	Exp E/P-ten year	Two-stage DDM	Six-stage DDM	Free cash flow	Fama and French	Carhart	Duarte	Adrian, Crump, and Moench	D/P	Goyal and Welch	Campbell and Thompson	Fama and French	Sentiment	CFO survey
Long-run mean	100																			
Mean past five years	32	100																		
E/P-ten year	8	15	100																	
1/CAPE-ten year	-9	0	78	100																
E/P-real ten year	-11	25	98	23	100															
Exp E/P-real ten year	-58	42	70	84	60	100														
Exp E/P-ten year	-83	-61	84	95	46	98	100													
Two-stage DDM	17	27	88	54	89	66	79	100												
Six-stage DDM	3	-38	26	39	-30	32	52	-31	100											
Free cash flow	-43	-55	59	70	35	80	94	27	62	100										
Fama and French	69	29	-8	-36	-21	-69	-91	9	-29	-77	100									
Carhart	71	30	-5	-31	-24	-71	-91	10	-25	-75	99	100								
Duarte	71	30	-3	-29	-22	-70	-91	11	-28	-74	99	100	100							
Adrian, Crump, and Moench	-1	-52	36	62	6	54	63	27	23	33	-28	-28	-25	100						
D/P	49	12	27	12	27	42	54	24	74	42	44	54	55	21	100					
Goyal and Welch	25	12	25	21	-7	-36	-60	20	29	-9	7	13	14	-24	61	100				
Campbell and Thompson	27	31	14	-7	81	49	-60	28	-51	-40	60	57	58	-33	54	50	100			
Fama and French	1	-30	-24	-29	37	-27	-37	-18	22	38	36	38	37	-9	40	23	43	100		
Sentiment	-10	33	-4	-20	68	-23	-29	27	-38	-20	18	17	18	-12	-38	-8	21	6	100	
CFO survey	-43	-33	12	30	1	1	13	16	5	-3	-36	-37	-39	60	14	-21	-32	-3	-36	100

Source: Duarte and Rosa (2015), Table 8, p. 49.

380 What is meaningful is the extent to which estimates from different models move in line with the MRP estimated by the PCA. In this regard, Duarte and Rosa find the following:

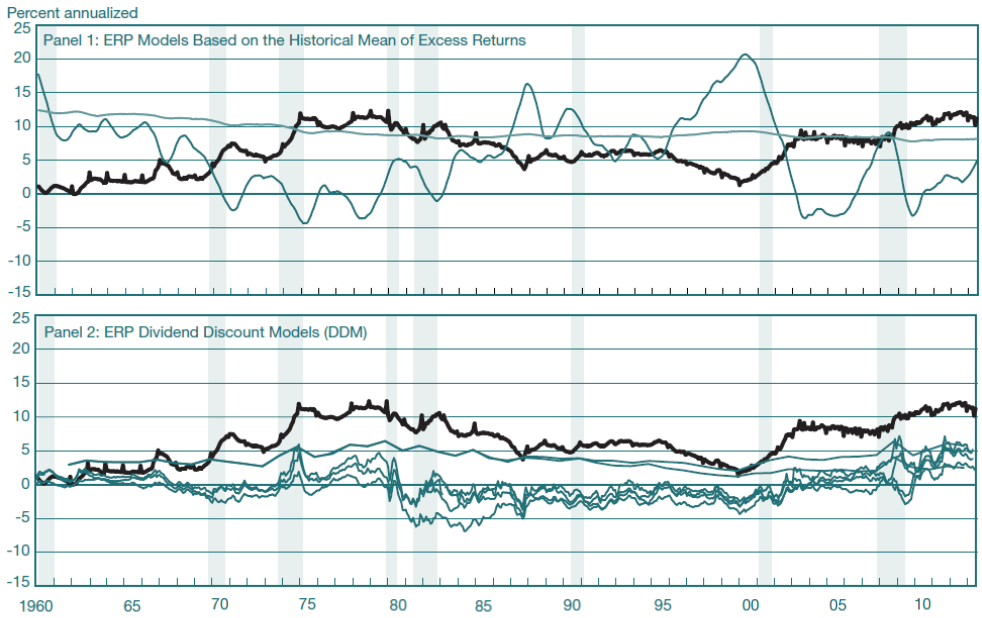
> …the first principal component covaries negatively with historical mean models but positively with DDMs…

381 In other words, Duarte and Rosa find that the DGMs they considered tended to produce high MRP estimates when the FPC (i.e., their estimate of the true MRP) was high, and vice versa. However, importantly, they found that mean excess returns tended to be *low* when their estimate of the true MRP was *high*, and vice versa. In other words, the mean excess returns moved in precisely the opposite direction to their estimate of the MRP.

382 This result can be seen graphically in the two charts below in Figure 23, reproduced from the Duarte and Rosa paper.

Appendix F: The reliability of DGM estimates of the MRP

Figure 23: Performance of mean excess returns and DGM as estimators of the MRP



Source: Duarte and Rosa (2015), Chart 1, p. 47.

383 The green curves in the top chart plot the results of the two mean historical excess returns models considered by Duarte and Rosa, while the green curves in the bottom chart present the results from the eight DGM estimates considered in the study. The black curve in both charts plots Duarte's and Rosa's estimate of the MRP. The light green vertical bands identify periods of recession. A number of features should be noted about the charts above:

a. First, the PCA estimate of the MRP tends to be rising or peaking during periods of recession, and falling at other times. This is what we would normally expect. A notable exception to this pattern is post-2009, during which time Treasury yields in the US fell significantly, just as CGS yields have fallen in Australia. During this period, Duarte and Rosa find that the MRP rose significantly.

b. Second, the DGM estimates in the bottom chart follow a fairly similar pattern to the PCA estimate of the MRP: typically rising or peaking during periods of recession, and falling during other times — except post-GFC, when DGM estimates tend to rise.

c. Finally, mean historical excess returns in the top chart tend not to move in line with the PCA estimate of the MRP. Specifically, the long-run mean excess return remains relatively flat through as the PCA estimate of the MRP rises and falls. The five-year rolling mean (depicted by the more volatile green curve) tends to be high when the PCA estimate of the MRP is low, and vice versa. The mean historical excess returns have a tendency to fall during periods of recession, most likely due to declining asset prices.

Appendix F: The reliability of DGM estimates of the MRP

384 Hence, contrary to the advice provided by Partington and Satchell, the Duarte and Rosa study actually suggests that DGMs perform *better* than mean historical excess returns as estimators of the prevailing MRP.

9.4 Summary and conclusions

385 As set out above, we consider that the various concerns that the AER and its advisers have raised in relation to the 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);[260]

c. Produces imprecise estimates with wide confidence intervals (especially the shorter periods that the AER considers).[261]

386 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. That was our interpretation (and the interpretation of other stakeholders) of the Guideline approach to the MRP.

387 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 to now "down-weight" DGM estimates. These points had already been brought to the AER's attention at the time of the Guideline by its advisers,[262] but the AER did not express these as material concerns in the Guideline materials, and did not say in the Guideline that the DGM should be used only as directional evidence due to these potential limitations. Rather, the AER's view in the Guideline was 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

[260] For example, the shortest period that the AER considers in its recent Decisions begins in 1988 and produces an estimate that is materially different from all other estimates. See TransGrid Draft Decision, 2017, Attachment 3, Table 3-19, p. 202.

[261] 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%.

[262] When discussing a number of the issues above, 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.*

> looking as they estimate expectations of future cash flows and equate them with current market prices through the discount rate.[263]

and:

> …we consider DGM estimates have strong theoretical grounding and are more likely to reflect prevailing market conditions than other approaches.[264]

388 The AER went on to say that, regardless of the issues raised by Lally (2013)[265] and McKenzie and Partington (2013),[266] it had decided to give:

> …significant consideration to DGM estimates of the MRP,[267]

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

> …the most significant development in this area.[268]

389 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 the model. As previously stated in our assessment of the dividend growth model, it may capture current conditions to a certain extent but fails to adequately provide a 'true' estimate of the forward looking MRP.[269]

390 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%.

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[263] AER, 2013, Rate of Return Guideline: Explanatory Statement, Appendices, p. 84.

[264] AER, 2013, Rate of Return Guideline: Explanatory Statement, Appendices, p. 85.

[265] Lally, M., 2013, *The Dividend Growth Model*, March.

[266] McKenzie, M. and G. Partington, 2013, *The Dividend Growth Model*, December.

[267] AER, 2013, Rate of Return Guideline, Explanatory Statement, p. 97.

[268] AER, 2013, Rate of Return Guideline, Explanatory Statement, Appendices, p. 89.

[269] TransGrid Draft Decision, 2017, Attachment 3, p. 76.

Appendix F: The reliability of DGM estimates of the MRP

10 Appendix: Instructions

ActewAGL for you

Professor Stephen Gray
Frontier Economics

By email: Stephen.Gray@frontier-economics.com.au

ACTEWAGL DISTRIBUTION - EXPERT REPORT ON MARKET RISK PREMIUM

ActewAGL Distribution (**AAD**) is seeking an expert report from Frontier Economics in relation to issues pertaining to the market risk premium (**MRP**) in the context of the Australian Energy Regulator's (**AER's**) distribution determination for AAD for the 2019-24 regulatory period.

BACKGROUND

AAD is the distribution network service provider (**DNSP**) for the Australian Capital Territory electricity distribution network.

AAD is currently preparing its regulatory proposal for the 2019-24 regulatory period, which is due to be submitted to the AER in January 2018. AAD's regulatory proposal is required to include a building block proposal for direct control services classified under the proposal as standard control services.

The building block proposal must be prepared in accordance with (among other things) the requirements of Part C of Chapter 6 of the National Electricity Rules (**NER**). In particular, the building block proposal must be prepared in accordance with clause 6.4.3 of the NER, which specifies the building blocks by which the 'annual revenue requirement' for a DNSP for each year of a regulatory control period is to be determined. The building blocks include a return on capital for that year (calculated in accordance with clause 6.5.2 of the NER).

NER provisions

Clause 6.5.2(a) of the NER provides that the return on capital for each regulatory year must be calculated by applying a rate of return for the relevant DNSP for that regulatory year that is determined in accordance with clause 6.5.2 (the allowed rate of return) to the value of the regulatory asset base for the relevant distribution system as at the beginning of that regulatory year. Clause 6.5.2(b) of the NER provides that the allowed rate of return is to be determined such that it achieves the allowed rate of return objective. It further requires that both the return on equity and the return on debt are to be estimated such that they contribute to the achievement of the allowed rate of return objective. The allowed rate of return objective is that the rate of return for a DNSP is to be commensurate with the efficient financing costs of a benchmark efficient entity with a similar degree of risk as that which applies to the DNSP in respect of the provision of standard control services.

Clause 6.5.2(d) of the NER provides that, subject to clause 6.5.2(b), the allowed rate of return for a regulatory year must be:

- a weighted average of the return on equity for the regulatory control period in which that regulatory year occurs (as estimated under clause 6.5.2(f)) and the return on debt for that regulatory year (as estimated under clause 6.5.2(h)); and

- determined on a nominal vanilla basis that is consistent with the estimate of the value of imputation credits referred to in clause 6.5.3.

Under clause 6.5.2(e), in determining the allowed rate of return, regard must be had to:

- relevant estimation methods, financial models, market data and other evidence;

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

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

Clause 6.5.2(f) and (g) of the NER requires that the return on equity must be estimated such that it contributes to the achievement of the allowed rate of return objective, having regard to the prevailing conditions in the market for equity funds.

Rate of Return Guideline

In accordance with clauses 6.2.8(a) and 6.5.2(m) and (n) of the NER, on 17 December 2013 the AER published a Better Regulation Rate of Return Guideline, December 2013 (Rate of Return Guideline) which sets out the AER's proposed approach to determining the allowed rate of return (including the return on equity) in accordance with the National Electricity Law (NEL) and the NER.

Due to recent proceedings in the Australian Competition Tribunal (Tribunal) and Federal Court (discussed below), clause 6.5.2(p) of the NER was amended to provide the AER with up to 5 years (i.e. until December 2018) to review the Rate of Return Guideline. The rule change introduced transitional arrangements for affected service providers (including AAD) that will be part way through the regulatory determination process when the new Guideline is published[1]. To provide regulatory certainty, the transitional arrangements apply the 2013 Rate of Return Guideline to the full 2019-24 regulatory determination process, regardless of when the AER publishes the revised Guideline.

Clause 6.2.8(c) of the NER provides that the Rate of Return Guideline is not mandatory. However, a building block proposal must identify any departure from the methodologies set out in the Rate of Return Guideline and the reasons for that departure, and, if the AER makes a distribution determination that is not in accordance with the Guideline, the AER must state its reasons for departing from the Guideline in that determination (clauses 6.2.8(c) and S6.1.3(9) of the NER).

[1] AEMC 2016, Rule Determination: National Electricity Amendment (Rate of Return Guidelines Review) Rule 16, National Gas Amendment (Rate of Return Guidelines Review) Rule 2016, October.

The Rate of Return Guideline states that the AER's proposed approach to estimating the return on equity is to:

- use the Sharpe Lintner Capital Asset Pricing Model (SL-CAPM) as the 'foundation model'. The SL-CAPM is estimated by adding the product of the equity beta and MRP to the risk free rate;
- adopt a risk free rate determined by reference to the yields on Commonwealth Government Securities (CGS) with a 10 year term over an averaging period of 20 consecutive business days as close as practicably possible to the commencement of the regulatory control period;
- use a point estimate of 0.7 for the equity beta;
- estimate a range for the MRP having regard to theoretical and empirical evidence, and then select a point estimate from within that range; and
- determine a final point estimate for the expected return on equity equal to the foundation model point estimate, or alternatively, a different value that is a multiple of 25 basis points (drawing on the analysis and evaluation of a range of other information).

The Rate of Return Guideline states that the AER proposes that:

- the Black capital asset pricing model informs the equity beta estimate input to the SL-CAPM;
- dividend growth models inform the MRP estimate input to the SL-CAPM; and
- the Fama-French Three Factor Model has no role.

Return on equity in 2015-19 period

In the AER's distribution determination for AAD for the 2015-19 period, the AER used a foundation model approach to estimating the return on equity and used the SL-CAPM as the foundation model. The AER adopted a risk free rate of 2.55%, an equity beta of 0.7 and a MRP of 6.5% as the input parameter values for the SL CAPM, resulting in a return on equity of 7.1%.

The AER's decision in respect of return on equity was the subject of an application to the Tribunal in 2015. AAD sought a review of the AER's decision in respect of the return on equity estimate, and proposed a return on equity of 9.83% (estimated by reference to four models - the SL-CAPM, Black-CAPM, Fama-French Three Factor Model and Dividend Growth Model).

In the Tribunal proceedings, the Tribunal concluded that the grounds of review in relation to the AER's return on equity estimate were not made out, and did not find error in the AER's use of the SL-CAPM as the foundation model or its selection of an equity beta of 0.7 and MRP of 6.5%. The Tribunal's reasons are set out in *Applications by Public*

Interest Advocacy Service Ltd and Ausgrid Distribution [2016] ACompT 1 (**the Ausgrid decision**).

AAD proposal

AAD proposes to adopt the AER's 2013 Rate of Return Guideline in respect of the return on equity for its regulatory proposal for 2019-24. Specifically, AAD currently anticipates that it will adopt the SL-CAPM as the foundation model, consistent with the decision of the Tribunal on the cost of equity in the Ausgrid decision and estimate the risk free rate using the prevailing yield on 10 year CGS. As set out further below, AAD is seeking your expert opinion on the appropriate estimate for the MRP for the purposes of its regulatory proposal.

SCOPE OF WORK

AAD would like Frontier to provide a report giving your expert opinion on the appropriate MRP for estimating the return on equity and WACC for AAD for the 2019-24 regulatory period. Your expert report should address the appropriate approach to estimating the MRP within the framework of the SL-CAPM and NER, including:

- explaining where the estimation of the MRP fits within the AER's regulatory framework;
- explaining the approach to estimating the MRP that the AER set out in its 2013 Rate of Return Guideline and contrasting that approach in the Explanatory Statement with the AER's approach to the MRP in recent decisions;
- summarising the evolution of the relevant evidence and empirical estimates since 2013;
- explaining the implications of applying a constant, or substantially constant, MRP to contemporaneous estimates of the risk-free rate; and
- providing a reasonable, current estimate of the MRP; and
- any other matters that you consider relevant.

In undertaking the above work, AAD expects Frontier to consider the following information:

- Such information that, in your opinion, should be taken into account to address the questions outlined above.
- Relevant literature on estimating the return on equity.
- The AER's 2013 Rate of Return Guideline, including explanatory statements and supporting expert material.
- Material submitted to the AER as part of its consultation on the Rate of Return Guideline.

- Previous decisions of the AER and other relevant regulators on the return on equity and value of imputation credits, and any supporting expert material, including in expert material relied on by the AER in recent decisions

- Previous decisions of the Tribunal and Federal Court on the return on equity, and the submissions made by the parties in the relevant proceedings before them and any supporting expert material.

EXPERT WITNESS

AAD anticipates providing a copy of your report to the AER.

Attached to this letter is the Federal Court of Australia Expert Evidence Practice Note (GPN-EXPT) including Annexure A (Harmonised Expert Witness Code of Conduct) to that Practice Note. The Practice Note replaces the Federal Court's Practice Note CM 7, titled 'Expert witnesses in Proceedings in the Federal Court of Australia', with effect from 25 October 2016.

Please read the Practice Note carefully and ensure that your report complies with each of its elements, including in particular clause 5 of the Practice Note and clause 3 of the Code, which set out requirements for the content of your report. Please also:

- Confirm in your report that:
    - you have read, complied with and agree to be bound by the Practice Note; and
    - your opinions are based wholly or substantially on specialised knowledge arising from the expert's training, study or experience.
- Declare that you have made all the inquiries you believe are desirable and appropriate (save for any matters identified explicitly in your report) and that no matters of significance which you regard as relevant have, to your knowledge, been withheld.
- Annex your curriculum vitae, containing your qualifications and relevant experience, to your report.

Limitations and qualifications

You must qualify the opinion given in your report if either of the following apply:

- you consider your report may be incomplete or inaccurate without the qualification; or
- you are unable to form a conclusive opinion because of insufficient research, insufficient information, or for any other reason.

If you change your opinion

You must provide a supplementary report if you change your opinion after giving us your original report.

TIMING

AAD requests that Frontier deliver its final report or reports by 20 December 2017.

Please let us know if you have any questions regarding this letter.

Yours sincerely

Alexis Hardin
Manager Regulatory Finance and Strategy
Regulatory Affairs, ActewAGL

11 Appendix: Curriculum Vitae of Professor Stephen Gray

Stephen Gray is Professor of Finance at the University of Queensland Business School and Chairman of Frontier Economics (Australia). He has Honours degrees in Commerce and Law from the University of Queensland and a PhD in financial economics from the Graduate School of Business at Stanford University.

In his university role, he teaches a range of award and executive education courses in financial management, asset valuation, and corporate finance. He has received a number of teaching awards, including a national award for university teaching in the field of business and economics. He has published widely in highly-ranked journals and has received a number of manuscript awards, most notably at the *Journal of Financial Economics*.

Stephen is also an active consultant to industry on issues relating to valuation, cost of capital, and corporate financial strategy. He has acted as a consultant to many of Australia's leading companies, government-owned corporations, and regulatory bodies. His clients include the Independent Pricing and Regulatory Tribunal (IPART), Australian Competition and Consumer Commission (ACCC), Melbourne Water, Qantas, Telstra, Origin Energy, AGL, Foxtel, ENERGEX, Queensland Treasury Corporation, Rio Tinto Alcan and the Australian Securities and Investments Commission (ASIC). Projects include corporate cost of capital reviews, asset valuation, independent valuation of executive stock options, and the assessment of capital structure and financing strategies.

He has also appeared as an independent expert in several court proceedings relating to the valuation of assets and businesses and the quantification of damages.

Key experience

Cost of capital

Energy sector

- **TransGrid (2015) –** Advised the electricity transmission operator in NSW on the appropriateness of the Australian Energy Regulator's (AER's) proposed transitional arrangements before the full introduction of a trailing average approach to setting the cost of debt allowance for regulated networks. The AER recently revised its rate of return methodology. In doing so, the AER announced that it would adopt a trailing average approach to setting cost of debt allowances (similar to the approach used by Ofgem in Great Britain). However, the AER argued that it should phase this approach in to allow businesses sufficient time to align their debt management practices to the new methodology. Frontier prepared a report on behalf of TransGrid explaining

the circumstances in which such transitional arrangements would not be appropriate.

- **Australian Energy Markets Commission (AEMC) (2012)** – The regulator (AER) and a group of large energy users (EURCC) proposed changes to the National Electricity Rules and National Gas Rules (Rules). The AEMC, which is the government agency that is responsible for maintaining the Rules, conducted a year-long review and consultation process in relation to the proposed rule changes. Stephen was appointed to advise the AEMC on rate of return issues. His role involved the provision of advice to the AEMC secretariat and board, the preparation of a number of public reports, the co-ordination and chairing of public hearings, and a series of one-on-one meetings with key stakeholders. The process resulted in material changes being made to the Rules, with revised Rules being published in November 2012.

- **Energy Networks Association (2013) –** The National Electricity Rules and National Gas Rules (Rules) require the regulator to publish a series of regulatory guidelines every three years. The Australian Energy Regulator (AER) conducted a year-long process in 2013 that ended with the publication of its first Rate of Return Guideline. Throughout this process, Stephen advised the Energy Networks Association (ENA) on rate of return issues. This involved working with the ENA's Regulatory Affairs Committee, specialist working groups, and legal advisors, preparing expert reports, drafting submissions, and representing the ENA at stakeholder forums.

- **TransGrid (2013) Return on Debt Analysis –** The 2012 changes to the National Electricity Rules included, inter alia, a provision that permitted the allowed return on debt to be set according to a trailing average approach. TransGrid sought an analysis of the effect that such a change would have on the residual cash flows that were available to its shareholders. Stephen developed a Monte Carlo simulation model that generated many scenarios for the possible future evolution of interest rates, incorporating empirical relationships between government bond yields, credit spreads, and inflation. His analysis quantified the extent to which the trailing average approach would better match the actual cost of servicing debt under TransGrid's longstanding debt management approach, thereby reducing the volatility of the cash flow to equity holders.

- **Aurizon Network (2014) Split Cost of Capital Analysis –** In a discussion paper, the Queensland Competition Authority advocated consideration of a split cost of capital regulatory approach. Under the proposed approach the regulator would allow a standard "debt and equity" regulated return on assets

during their construction, but a "100% debt" return once the asset had been included in the firm's regulatory asset base. Stephen was retained by Aurizon (operator of a regulated coal rail network). His role was to prepare an expert report that considered the economic and financial basis for the proposed approach, and which considered the likely consequences of such an approach. After his presentation to the QCA board, the proposal was shelved indefinitely.

- **Energy Networks (2014-15) Regulatory Reviews –** Stephen has prepared expert reports and submissions on behalf of all businesses that are in the current rounds of regulatory resets. These reports cover the whole range of regulatory cost of capital issues. Clients over the last year include ATCO Gas, DBP, ActewAGL, TransGrid, Jemena, United Energy, CitiPower, Powercor, SA Power Networks, Ausgrid, Essential Energy, Endeavour Energy, ENERGEX, and Ergon Energy.

- **Legal and Appeal Work –** Stephen has assisted a number of regulated business, and their legal teams, through merits review and appeal processes. One example is the 2011 *Gamma* case in the Australian Competition Tribunal. That case involved the "gamma" parameter, which quantifies the impact that dividend imputation tax credits have on the cost of capital. The regulator (AER) proposed an estimate that was based on (a) an assumption that was inconsistent with the observed empirical evidence, and (b) a point estimate that was based partly on a paper with questionable reliability and partly on data that was irrelevant to the task at hand. Stephen's role was to prepare a series of expert reports, to assist the legal team to understand the issues in detail, and to attend the hearings to advise as the matter was heard. The end result was that the Tribunal set aside the entire basis for the AER's proposed estimate and directed us to perform a "state of the art" empirical study. Stephen performed the required study and its results were accepted in full by the Tribunal, who set the estimate of gamma on the basis of it.

Water sector

- **Melbourne Water (2015) –** In preparation for the 2016 Victorian price review, Stephen is part of the Frontier team currently advising Melbourne Water on ways in which the rate of return methodology used by the Victorian regulator, the Essential Services Commission (ESC), could be improved, and the likely revenue impact of any methodological changes. At the last (i.e. 2013) price reset, the ESC indicated that it intended to review its rate of return methodology but to date has not done so. By comparison, most other major Australian regulators have revised their methodologies significantly, in part due to recognition of the need to make their estimation approaches more resilient to the effects of global financial crises. A comparison of the methodologies

used by different regulators in Australia suggests that the ESC's methodology is out of line with best regulatory practice. Frontier's advice has focused on identifying the areas for improvement, and the development of the economic arguments that would support the case for change.

- **Unity Water, SEQ Water, Gladstone Area Water Board (2013-14) –** Stephen has prepared a series of reports for a number of Queensland water utilities. These reports include (a) a response to the QCA's (Queensland regulator) proposed split cost of capital approach (which has now been shelved indefinitely), and (b) a response to the QCA's proposed cost of capital estimates.

Telecommunications sector

- **NBN Co (2012-13) –** Stephen advised NBN Co on a range of cost of capital issues in relation to their proposed special access undertaking. This work included the drafting of expert reports, meetings with and presentations to various NBN Co committees and working groups, and representing NBN Co in discussions with the regulator (ACCC). Key issues included the length of the proposed access arrangement, the extent to which higher risk during the construction and proof-of-concept phases justified a higher allowed return, and the process by which early year losses might be capitalized into the regulatory asset base.

- **C7 Case (2006-07), Federal Court of Australia**

  The Seven Network brought an action against a number of Australian media and entertainment firms in relation to the abandonment of its cable TV business, C7. Seven alleged that the respondents colluded to prevent C7 from securing the rights to broadcast AFL and NRL matches and that this prevented its C7 business from being economically viable.

  Stephen was retained by a group of respondents including PBL, Telstra, and News Corporation. His role was to address various matters relating the quantification of damages. He prepared several reports, was involved in several discussions with other valuation expert witnesses, and was cross examined in the Federal Court.

  The Court found in favour of the respondents.

Transport sector

- **CBH Group (2015) –** Stephen was part of the Frontier team that developed, on behalf of CBH (a major Australian grain producer and access seeker to rail infrastructure in Western Australia) and its legal counsel, a submission to the Economic Regulation Authority (ERA) of Western Australia on the

regulator's approach to estimating WACC. The submission focused on, amongst other issues, the ERA's approach to estimating the market risk premium, the estimation approach to beta, and the way in which the WACC ought to be used within the negotiate-arbitrate arrangements within the rail access regime.

- **Brockman Mining Australia (2015) –** Stephen was part of the Frontier team that advised Brockman, a potential access seeker to rail infrastructure in Western Australia, on its submission to the Economic Regulation Authority (ERA) of Western Australia in relation to the ERA's approach to WACC under the Railways (Access) Code 2000. Subsequently, the ERA released a Revised Draft Decision on its proposed WACC methodology. Frontier was engaged again by Brockman to help develop its submission to the ERA on the Revised Draft Decision. The submissions focused on the appropriateness of the beta estimates proposed by the ERA, the methodology used to estimate the market risk premium (and consistency between the methodologies used by the ERA in different sectors), the appropriateness of the ERA's credit rating assumption for the benchmark efficient entity (which affects the cost of debt allowance under the ERA's methodology).

- **Brookfield Rail (2014) –** The WA Railways (Access) Code requires railway operators to provide certain information to access seekers to enable them to compute "floor" and "ceiling" prices as defined in the Code. Brookfield provided access seekers with certain information and other relevant information was available from public sources. Stephen prepared an expert report that considered whether the information available to an access seeker, together with specialist assistance from relevant experts, would be sufficient to compute floor and ceiling prices.

- **Brisbane Airport Corporation (2013-14) –** Stephen was engaged by Brisbane Airport Corporation (BAC) to advise on a range of regulatory and cost of capital issues in relation to the development of the airport's new parallel runway (NPR). BAC identified the need for an additional runway to accommodate steadily increasing demand. The development of a new runway required a large capital commitment ($1.5 billion) and would take approximately eight years to complete. BAC proposed that the airlines would contribute to the financing of the NPR during construction – the alternative being the capitalisation of a return on capital expenditure until completion and a sharp spike in landing fees when the NPR become operational. One of the key issues in the negotiations with airlines was the WACC that would be used to determine the return on capital. Stephen's role was twofold. He produced an expert report providing a strong basis for BAC's proposed WACC. He also advised BAC on the likely approach of the ACCC (the regulator in question) should they become involved – the regulatory arrangements provide for the parties to negotiate a commercial outcome and for the regulator to become involved if they are unable to do so. BAC was successful in their

negotiations with the relevant airlines and the NPR is now under construction.

- **Abbott Point Coal Terminal (2014) –** Stephen was engaged by a consortium of mining companies in relation to arbitration with Adani, the owner and operator of the Abbott Point Coal Terminal. The parties had in place a user agreement that was similar to a regulatory-style building block model. Stephen advised on a range of cost of capital and other issues including detailed reports on the cost of debt and the level of corporate costs.

Financial litigation support

- **APLNG (2014-15)**
  The Australia-Pacific LNG (APLNG) project is a joint venture between Origin Energy, ConocoPhillips and Sinopec that involves the extraction of coal seam methane and processing into liquefied natural gas (LNG) for export. The relevant Queensland royalties legislation provides that a 10% royalty is to be levied on the value of the gas at the first point of disposal. Since the project is integrated from end-to-end, there is no arm's length price at the relevant point. Stephen was retained by APLNG to prepare an expert report on the process for determining what the arm's length price at the first point of disposal would be if such a thing existed. This involves estimating the costs, including a fair return on capital, for a hypothetical upstream gas producer and a hypothetical downstream LNG operator, and allocating any excess profit between the parties.

- **CDO Case (2013)**
  This case involved a class action against the Australian distributor of collateralised debt obligations (CDOs) and the international credit ratings agency that assigned credit ratings to them. The CDOs in question were financial products with a payoff that depended on the number of defaults (or "credit events") among a reference set of 150 different corporate bonds issued by companies in different industries and different geographical locations. A typical CDO structure would involve the investor being repaid all of their initial investment plus an attractive rate of interest so long as there were less than say 7 defaults out of the reference set of 150 bonds during the five-year life of the CDO. However, if there were say 11 or more defaults, the investor would lose their entire investment. If the number of defaults was between 7 and 11, the return to the investor would be proportional (e.g., 8 defaults would involve a 25% loss of principal).

  The CDOs in question were created by US investment banks and were distributed in Australia by a large Australian commercial bank. One of the key issues in the case was whether the Australian distributor made proper

disclosures about risk to investors, which included individuals, self-managed superannuation funds, and local councils. The CDOs in question were assigned strong investment grade credit ratings by an international ratings agency. The process used to assign those ratings did not properly take into account the correlation between defaults – the empirical fact that during recessions and financial crises many bonds default at the same time.

Stephen's role was to prepare an expert report that explained to the Court how CDOs were structured, how they operated, and what risks were involved. His report also examined the risk disclosures that were contained in the materials that were provided to potential investors and the process by which the credit rating agency assigned ratings.

- **Wright Prospecting litigation (2012-14)**
  Wright Prospecting Pty Ltd (WPPL) is involved in several legal disputes about the payment of royalty streams in relation to iron ore and coal mining operations. WPPL had assigned various rights and licenses in relation to iron ore mines in WA and coal mines in Queensland to other parties, in return for royalties on the revenues received from the sale of the ore. Stephen's role was to prepare a series of expert reports quantifying the present value of the royalty streams.

- **Public Trustee of QLD v. Octaviar Ltd (2009), Supreme Court of Queensland**
  The Octaviar Group (formerly the MFS Group) is a Gold Coast based group of listed companies with funds management and leisure services businesses. Octaviar was unable to refinance a loan in early 2008 and sought to raise equity via a rights issue as part of a substantial corporate restructure. The stock price fell some 70% on this announcement and Octaviar subsequently sold a 65% interest in its leisure business known as Stella. Octaviar then sought to make arrangements with its creditors, including the Public Trustee, as trustee for note holders.

  Stephen was retained by the Public Trustee. His role was to prepare several reports on (a) whether the companies in the Octaviar Group were insolvent, (b) the date the companies became insolvent, and (c) whether the note holders would be made better or worse off by the proposed arrangement, relative to a liquidation. He was cross examined by four parties with an interest in these proceedings on issues relating to the date of the insolvency.

- **Telstra v. ACCC (2008), Federal Court of Australia**

Telstra brought an action against the ACCC in relation to access charges that Telstra was allowed to charge its retail competitors for access to its fixed line and broadband networks – arguing that the return on capital allowed by the ACCC was unreasonably low.

Stephen was retained by Telstra. His role was to prepare several reports on the issue of whether the ACCC has been inconsistent in its application of valuation methods – in a way that reduced Telstra's allowed return. He was also involved in several discussions with other valuation expert witnesses, prepared a joint statement of experts, and was cross examined in the Federal Court individually and in a "hot tub" setting.

- **Alcan Northern Territory Alumina Pty Ltd v. Commissioner of Taxes (2006-07), Supreme Court of Northern Territory**
  First Engagement: Consulting Expert

Alcan bought out the equity of its joint venture partner in a combined bauxite mine and alumina refinery in the Northern Territory. The NT Revenue Authority claimed that the transaction was caught by the NT "land rich" provision, under which the transaction would be subject to stamp duty if more than 60% of the consideration was attributable to land assets.

The key economic issue is the apportionment of value between the mine (predominately land assets) and the refinery (substantially intangible assets arising out of intellectual property and expertise).

Stephen was retained by Alcan as consulting experts. Their role was to prepare a range of financial models and analysis to support the view that a substantial portion of the value of the transaction was attributable to non-land assets in the refinery. This involved complex financial modelling and market analysis. A full integrated model was produced, allowing users to select whether they preferred the appellant's or respondent's submission on each input parameter, and automatically re-calculating the land-rich ratio.

Stephen worked closely with Alcan's legal team, Counsel, and various independent experts. Stephen assisted the legal team during the trial and in preparing sections of final submissions.

Second Engagement: Independent Expert

The initial judgment contained findings about certain matters and was sent back to the Commissioner for re-assessment. A dispute arose between the parties about the effect of the judgment. In particular, the value of a primary 10-year lease had to be disaggregated from the value of an option to continue the project.

Stephen was retained by Alcan to produce an expert valuation report that addressed the matters in dispute. Two expert reports were prepared and Stephen was cross-examined on this material. Stephen prepared an easy to use spreadsheet calculator to assist the Court in testing how different input assumptions (where the experts could not agree) affected the bottom line. This was used by His Honour as an *aide memoire* and was considered to be particularly helpful in the case in terms of simplifying the effects of a number of complex matters.

Judgment was in favour of Alcan. Stephen's evidence was accepted and endorsed by the Court.

Career: Professional

2014-Present	Chair, Frontier Economics
1997-2014	Director, SFG Consulting

Career: Academic

2000 - Present	Professor of Finance, UQ Business School, University of Queensland
1997-1999	Associate Professor of Finance, UQ Business School, University of Queensland
1997-2001	Research Associate Professor of Finance, Fuqua School of Business, Duke University
1995-1997	Assistant Professor of Finance, Fuqua School of Business, Duke University

Education

1987	Bachelor of Commerce (Hons), University of Queensland
1989	Bachelor of Laws (Hons), University of Queensland
1995	PhD, Stanford University

Papers and publications: Cost of capital

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