Attachment 7.15

CEG, Estimating the E[Rm] in the context of recent regulatory debate

May 2014

COMPETITION ECONOMISTS GROUP

Estimating $E[R_m]$ in the context of recent regulatory debate

June 2013

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Table of Contents

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List of Figures

List of Tables

1 Introduction

1. My name is Tom Hird. I have a Ph.D. in Economics and 20 years' experience as a professional Economist. My curriculum vitae is provided separately.

1.1 Terms of reference

2. My terms of reference for this report are set out below.

1. Critically review concerns raised by the AER and its consultants on the relationship between the expected return on the market (E[MRP]) and the risk-free rate

The consultant should consider all concerns considered relevant, including any raised in the AER's recent final decision for the Victorian gas access arrangement review. The consultant should provide an opinion on the term structure analysis of the outputs from the DGM, including:

- *Martin Lally's statement that a sensible convergence period of at least 10 years can be used to rule out scenarios where there is a rapid trajectory towards long-term dividend growth rates after the first two years of consensus forecasts*[1]
- *Martin Lally's use of market evidence to construct term structures for the mean, real return to the market portfolio.*

In its recent final decision for the Victorian gas access arrangement review, the AER relies on various sources (including findings from Martin Lally), to find that historical realised excess return data does not necessarily support a conclusion that the level of realised excess returns is inversely related to the level of the risk free rate. The consultant should assess and provide an opinion on these findings. In addition, the consultant should, for the purpose of answering this specific question, assume that the AER is correct and that there is no, or no strong, historical average inverse relationship between excess returns and the risk free rate. Given this instruction, the consultant should provide an opinion on how this instruction would alter findings and analysis responding to the questions under point 3 above.

2. Other potential analysis

The report should also consider:

- *The relationship between the debt risk premium (DRP) and the MRP;*
- *The views of the RBA on the relationship between the risk-free rate and the MRP, and on whether the risk-free rate is regarded as being at historically low levels; and*
- *Particular issues arising out of the report by McKenzie and Partington on the risk-free rate and the MRP*[2].

[1] Lally (2013a), The Dividend Growth Model, prepared by Martin Lally, School of Economics and Finance, Victoria University of Wellington, 4th March 2013; section 8, pages 16 to 20.

1.2 Summary of conclusions

3. In this report I make a number of observations most of which have their genesis in an analysis of regulatory precedent but which are informed by my recent report co-authored with Professor Bruce Grundy - *Estimating the expected return on the market*. Much of the analysis here is foreshadowed in that report. This report has the following structure:

   - Section 2 provides analysis that supports a conclusion that the AER's current methodology is creating a roulette wheel for customers and investors;
   - Section 3 provides a case study of how, in my view, the AER's methodology resulted in a serious error in estimating the expected return on the market (E[Rm]) in the Roma to Brisbane Pipeline (RBP) averaging period;
   - Section 4 provides an analysis that, consistent with that in section 3, demonstrates that an important dynamic in recent financial market conditions is a 'flight to quality' and that this has resulted in materially, and historically unprecedented, negative betas associated with investing in CGS;
   - Section 6 outlines how the AER, similar to McKenzie and Partington, adopt an unreasonable and arbitrary bias towards not altering the AER's methodology even though it is not giving the best estimate of E[Rm];
   - Section 7 outlines relevant views of experts including the RBA and IMF on the causes of currently low government bond yields and the implication of this for estimating E[Rm];
   - Section 7 explains why the AER should distinguish between:
     - a finding that there is not compelling evidence that, *on average through history*, lower than average government bond yields are associated with higher than average expected excess return on the market (E[MRP]); and
     - an assessment of whether low government bond yields *today* are associated with higher than average E[MRP] *today*;
   - Section 9 explains why the analysis by Associate Professor Martin Lally of historical average Australian data is flawed.

4. I acknowledge that I have read, understood and complied with the Federal Court of Australia's *Practice Note CM 7, Expert Witnesses in Proceedings in the Federal Court of Australia"*. I have made all inquiries that I believe are desirable and appropriate to answer the questions put to me. No matters of significance that I regard as relevant have to my knowledge been withheld. I have been provided with

[2] McKenzie M., and G. Partington, (2013), Report to the AER, Review of the AER's Overall Approach to the Risk-Free Rate and Market Risk Premium, Michael McKenzie and Graham Partington on behalf of SIRCA Limited, 28th February 2013; page 15.

a copy of the Federal Court of Australia's *Guidelines for Expert Witnesses in Proceeding in the Federal Court of Australia*, and confirm that this report has been prepared in accordance with those Guidelines.

5. I have been assisted in the preparation of this report by Daniel Young and Johanna Hansson from CEG's Sydney office. However, the opinions set out in this report are my own.

Thomas Nicholas Hird

28 June 2013

2 AER practice is creating a roulette wheel for customers/businesses

6. It is a key contention of this report that the factors that drive 10 year CGS are not, in general, the factors that drive risky asset yields (including E[Rm]) – and that low risk and high risk asset yields commonly move in opposite directions. However, the AER methodology to estimate E[Rm] as a fixed premium above CGS yields has the effect that 100% of any change in CGS yields is reflected in an equal change in the estimated E[Rm].

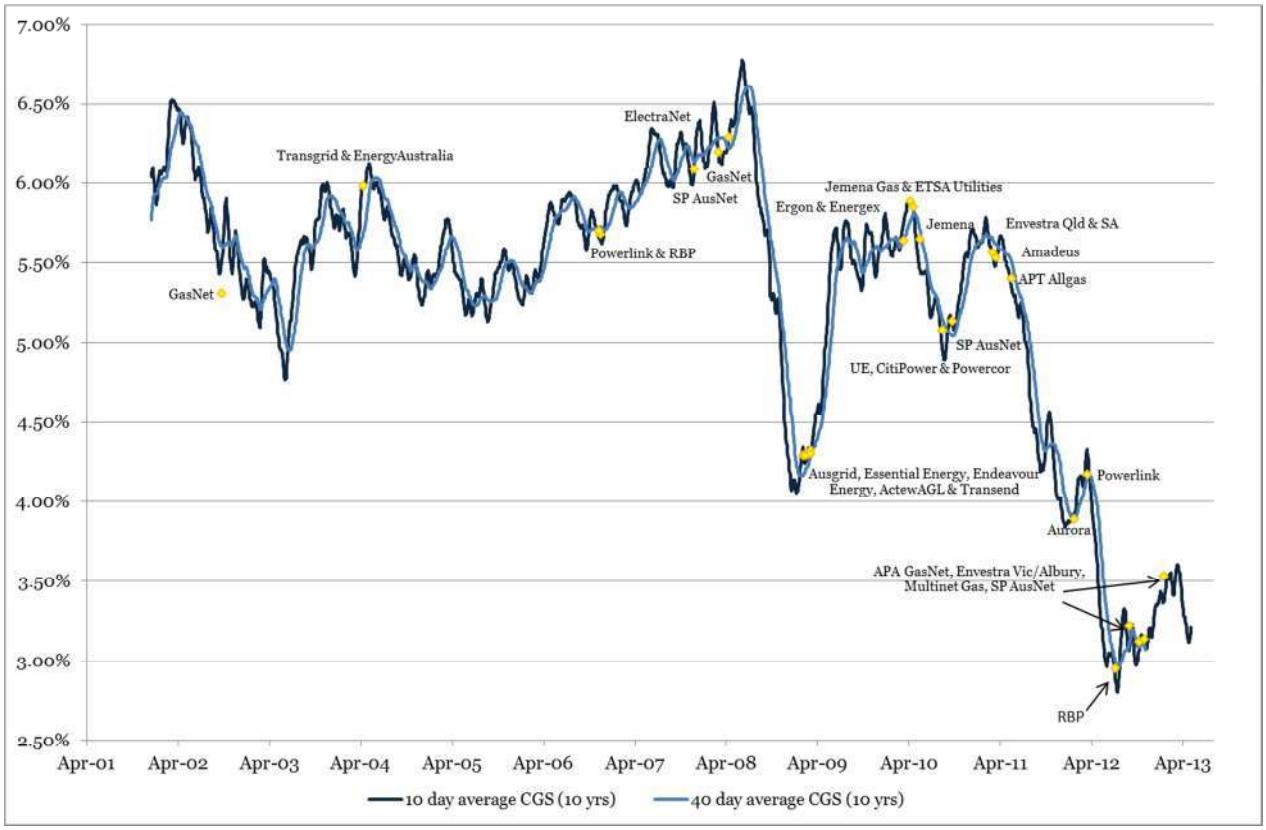
7. This creates risk for businesses (and customers) because the volatility in allowed returns (and prices) bears no relation to the actual efficient costs of providing the services.

2.1 Historical overview

8. Figure 1 below illustrates this instability and the impact on the allowed cost of equity in regulatory decisions. This figure shows the movements in yields on 10 year maturity Commonwealth Government Securities (CGS) on a daily basis and on a 10/40 day moving average (representative of a 10/40 day regulatory averaging period). Also marked on the chart are the dates of averaging periods for specific regulatory decisions.

9. The vertical axis begins at 2.5% - approximately expected inflation - so that the distance from the horizontal axis can be read as reflecting approximately the real CGS yield allowed (i.e., very close to zero recently)).

Figure 1: Risk free rate decisions for regulated energy businesses



Source: Regulator's decisions, CEG analysis. Note that 2009 decision for EnergyAustralia et al is before amendment by the ACT.

2.2 Pre 2008

10. Prior to 2008, the 10 year CGS yield was relatively stable – trading in a range of between 5% and 7%. Regulatory estimates of the cost of equity in this period were correspondingly stable.

2.3 The period July 2008 to June 2010

11. The first significant swing occurred in the aftermath of the collapse of Lehman Brothers and the near collapse of other financial institutions in late 2008. CGS yields fell by 3% (from almost 7% to below 4%) and then recovered again to around 5.5% to 6.0%.

12. Just prior to this collapse in yields, SP AusNet, ElectraNet and GasNet all had regulatory decisions in which the CAPM formula was populated with spot CGS yields of above 6.0%. However, the NSW and ACT electricity distribution companies and the NSW and Tasmanian electricity transmission companies all had regulatory averaging periods in early 2009; when CGS yields were at their lowest.

13. After the recovery in CGS yields in mid-2009, Envestra, Ergon and Energex all had regulatory decisions for which the risk free rate was estimated at between 5.5% and 6.0%.

2.4 The period July 2010 to June 2011

14. The period July 2010 to June 2011 covered the averaging period for Victorian electricity businesses. This period involved a relatively small dip in CGS yields (by comparison with what had just occurred and what was about to occur). Jemena Electricity Networks had the earliest averaging period (just before the dip in CGS yields occurred) while other businesses (SP AusNet, Citipower/Powercor and United Energy) had their averaging periods at the bottom of the dip. The effect of was that most Victorian electricity businesses were allowed 0.56% lower cost of equity than that which was allowed for Jemena even though the averaging periods of the respective Victorian businesses were separated by only two months.

2.5 The period June 2011 to September 2011

15. Since mid-2011, CGS yields have had their largest fall. This has been associated with the European sovereign debt crisis (largely triggered by the 2008/09 global financial crisis and subsequent world recessions), which has itself led to a banking and currency crisis in the Eurozone.

16. Recent AER decisions affected by the fall in CGS yields are the final decision for Aurora (30 April 2012), the final decision for the Roma to Brisbane Pipeline (averaging period 25 June 2012 to 20 July 2012), final decisions for APA GasNet (13 September 2012), SP AusNet (12 November 2012), MultiNet Gas (24 October 2012) and Envestra (Victoria and Albury) (31 January 2013).

17. The 10 year CGS yield in the RBP final decision was 2.95% which is 2.61% lower than the 5.56% yield that was applied to the Envestra (SA and Qld 2011) final decisions and also 0.58% below Envestra's Victorian allowance (set just five months later).

2.6 Allowed returns and commercial uncertainty

18. The pattern described above gives rise to a 'roulette-wheel' for equity investors and business customers – with the timing of their averaging period equivalent to the fall of the ball on the roulette-wheel.

19. The circumstances surrounding RBP's averaging period provide an exemplar of the problems with assuming that E[Rm] can be estimated assuming a fixed E[MRP]. I provide more specific analysis of the market events driving historically low CGS yields in the RBP averaging period is sections 3, 4 and 7 below. For current

purposes, it is sufficient to note that RBP's real (inflation adjusted) allowance for the cost of equity was just 5.07% per annum.[3] The 261 basis points difference between the RBP risk free rate and the Envestra QLD/SA risk free rate accounts for over half of the actual real return allowed to RBP. Put another way, Envestra's real allowance for the cost of equity (7.62%) was more than 50% higher than RBP's allowance - solely due to the higher CGS yields in Envestra's averaging period.

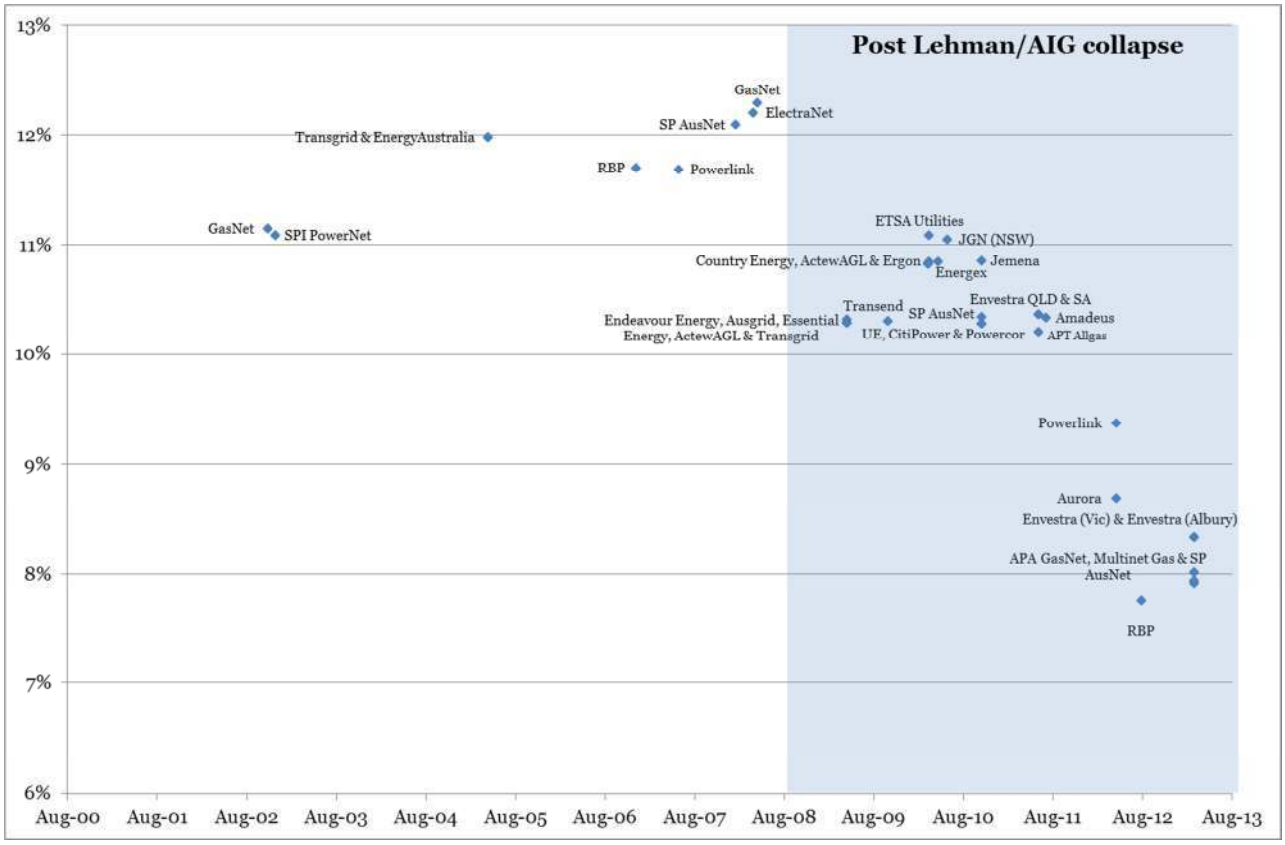
20. These two 5 year regulatory periods are separated by 12 months and I have chosen them to illustrate the extreme impact on allowed equity returns of fluctuations in the risk free rate. However, the same point can be made with a number of pairwise comparisons including in relation to averaging periods that are closer together. For example:

    - Aurora received 151 basis points (per annum for five years) less compensation than APT Allgas simply because the averaging periods of the two businesses were separated by seven months;
    - RBP received 122 basis points less than Powerlink (and 245 basis points less than APT Allgas) simply because the averaging periods of the respective businesses were separated by four months (14 months).

21. The return on equity assumed in the RBP final decision is the lowest cost of equity allowance set by the AER, or the ACCC before it, for an Australian energy network business.

[3] This is calculated as the nominal cost of equity of 7.75% deflated, using the Fisher equation, by the estimated inflation rate of 2.55% for the RBP decision.

Figure 2: Nominal cost of equity decisions for regulated energy businesses



Source: Regulator's decisions, CEG analysis. Note that the 2009 decision for Energy Australia et al is before amendment by the ACT.

22. Figure 2 describes the impact of a regulatory methodology that populates the Sharpe-Lintner CAPM formula with an estimate of E[MRP] based on long run average market conditions and a spot estimate of the risk free rate.

23. Under this methodology, the return on equity and the associated investment incentives for a business, depend critically on the precise date of the proposed short term "averaging period". An averaging period that is just a few weeks later or earlier can result in an allowance for the cost of equity that is more than 100 basis points different – and this difference is locked in for 5 years even if the CGS yields do not stay at the level observed in that averaging period.

24. The post financial crisis fall in allowed compensation for investment by equity financiers occurred despite economic indicators suggesting that attracting such investment was becoming more – not less – difficult. I discuss this evidence in sections 3, 4, and 7.

25. That is, the cost of equity did not move in line with movements in the risk free rate. Consequently, there was no 'natural hedge' to the businesses for the volatility in the

compensation provided to them. In the absence of such a hedge, the volatility creates commercial uncertainty for businesses. Even if a business is earning an adequate return on new investments in its current regulatory period, it cannot be sure whether this will be the case in the next regulatory period or whether its averaging period will fall in a period of market turmoil and extremely low CGS yields, as occurred with RBP.

26. This uncertainty is despite the fact that the AER methodology provides certainty and stability in the estimate of E[MRP]. Indeed, it is the stability in the AER's estimate of the E[MRP] that creates the instability in the allowed cost of equity as a result of volatility in CGS yields.

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3 Failure of AER methodology in RBP averaging period

27. Market conditions influencing spot CGS yields at any given time will also be influencing spot E[Rm] and, therefore, the spot E[MRP] estimate (which is simply the difference between these two if CGS yields are used as the proxy for the zero beta rate in the CAPM). Moreover, there will be times when market conditions are such that very low spot CGS yields are associated with a normal (or even a heightened) spot expected return on the market E[MRP] – such that the spot E[MRP] estimate is heightened relative to average conditions.

28. In this section I address a specific set of market circumstances that provides a near perfect illustration of the problems with the AER's current methodology for setting the cost of equity. On the 24th of August 2012 the RBA Governor (Glenn Stevens) made a statement to the House of Representatives Standing Committee on Economics that included the following statement.

> *But, as we said at the last hearing, sorting out the problems in the euro area is likely to be a long, slow process, with occasional setbacks and* ***periodic bouts of heightened anxiety****. We saw* ***one such bout of anxiety*** *in the middle of this year, when financial markets displayed increasing nervousness about the finances of the Spanish banking system and the Spanish sovereign. The* ***general increase in risk aversion*** *saw yields on bonds issued by some European sovereigns spike higher, while those for Germany, the UK and the US* ***declined to record lows****. This* ***'flight to safety'*** *also saw market yields on Australian government debt decline to the* ***lowest levels since Federation****.* [Emphasis added]

29. As it happens, the Roma to Brisbane Pipeline (RBP), regulated by the AER, had its averaging period during the period described by RBA Governor Glenn Stevens as a 'flight to quality'. The RBP averaging period started on the 25 June 2012 and ended on 20 July 2012. The RBP decision's averaging period occurred over the particular time interval to which Governor Stevens was referring in his remarks:

> *This 'flight to safety' also saw market yields on Australian government debt decline to the lowest levels since Federation.*

30. Notwithstanding that the fall in CGS yields was a direct corollary of "*heightened anxiety*", an "*increase in risk aversion*", and a "*flight to safety*", the AER passed the full amount of this fall in CGS into an assumed lower cost of equity for RBP.

31. This is not the first time that I have written a report drawing the AER's attention to the averaging period and have attempted to explain why it is an exemplar of the

problems I have identified. In a report for the Victorian gas businesses[4] I made precisely the above observations.

32. I also drew the AER's attention to other contemporaneous market evidence suggesting that risk premiums during the RBP averaging period were unusually high.

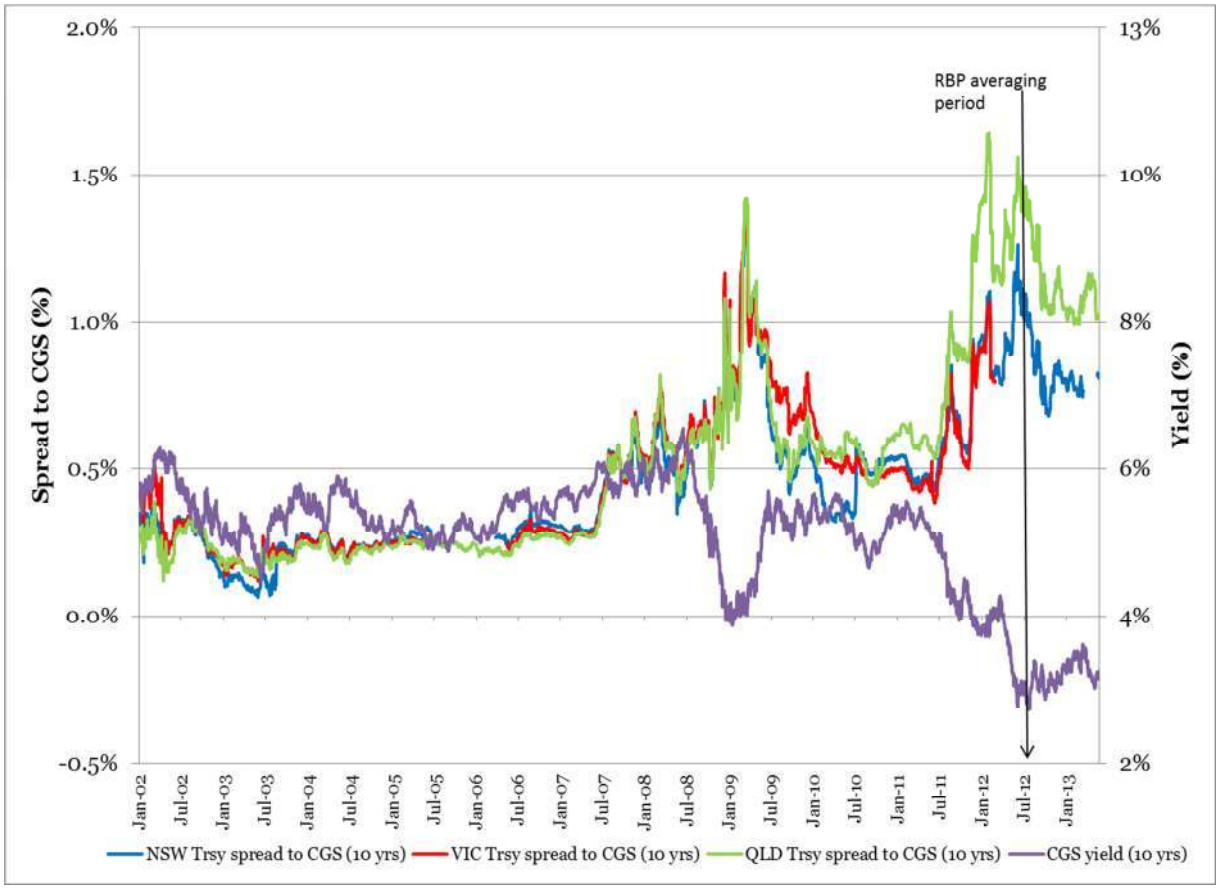
3.1 Required returns on low risk assets and the RBP averaging period

33. The following three figures illustrate spreads between CGS yields and the yields on other very low risk assets. These figures show that required returns on these very safe assets *did not* fall one-for-one with CGS yields during the RBP averaging period. This finding is in contrast to the AER's assumption that required returns on equity in regulated business *did* fall one-for-one with falls in CGS yields.

34. Figure 3 shows that the required return on state government debt (rated AAA for NSW and Victoria and rated AA+ for Queensland) has increased materially relative to the required return on CGS since mid-2011. As a result, the difference in these returns (the "spread") has increased materially. Moreover, this spread was at levels not seen since the midst of the 2008/09 financial crisis during the RBP averaging period. This figure provides ample evidence to the effect that required returns on low risk assets have not fallen in line with required returns on CGS.

4 CEG, *Response to AER Vic gas draft decisions, Internal Consistency of MRP and Risk-Free Rate*, November 2012.

Figure 3: Spread between 10 year state government debt and 10 year CGS



Source: Bloomberg, CEG analysis.

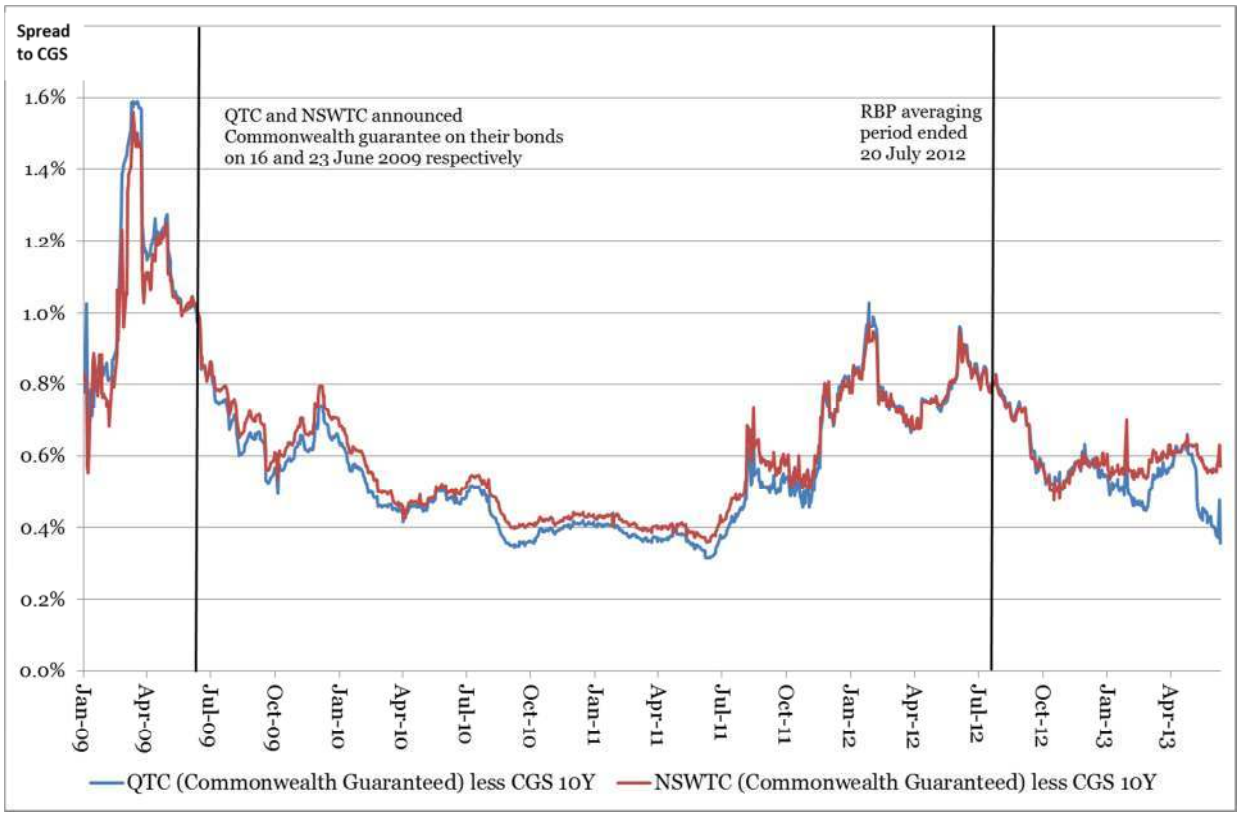
35. This is strong evidence that the forces driving down required yields on CGS are not driving down required yields on all other asset classes to the same extent. Put simply, if heightened demand for safe/liquid assets is causing risk premiums relative to CGS for the next most safe/liquid assets to rise by 70bp (and in so doing trebling in magnitude), then risk premiums relative to CGS for the much riskier and much less liquid equity market must be rising by many multiples of this.

36. As a further illustration of this, I note that there are a number of state government bonds that are directly guaranteed by the Commonwealth Government.[5] Thus, they have an identical default risk to CGS. Despite this, even these bonds have traded at a heightened spread to CGS – presumably because they are perceived as less liquid than CGS or because international investors (who now account for nearly 80% of all CGS holdings, and for whom the share of overall holdings has increased steadily

5 These bonds include a Queensland Government bond maturing in 2021, and a NSW Government bond maturing 01/05/2023. These are the longest dated Commonwealth Guaranteed state government debt on issue.

from around 30% in 2000)[6] have mandates that prevent them from owning debt other than that of a sovereign government. These spreads to CGS were at very high levels in the RBP averaging period. In other words, even the yields on Commonwealth Government guaranteed state government bonds did not fall one-for-one with CGS during the market circumstances surrounding the RBP averaging period. It is therefore preposterous to argue that the best estimate is that required returns on the equity market ($E[R_m]$) did so.

Figure 4: QTC and T-Corp Commonwealth guaranteed bonds



Source: Bloomberg, CEG analysis. QTC bond matures on 06/14/2021, NSWTC bond matures on 05/01/2023.

37. Another very low risk financial asset is an interest rate swap. Before 2008, these traded at a spread of around 40bp or so – see Figure 5 below. The spread spiked in 2008/09 and then returned to levels above, but much closer to, pre GFC levels. Then, over 2011 and the first half of 2012, spreads to CGS rose to a new post 2008/09 spike – with its peak just before the RBP averaging period. This demonstrates, once more, that required returns on swap contracts did not fall one-for-one with the falls in CGS yields in the lead up to the RBP averaging period.

6 See graph 4.3 from the RBA November 2012 Statement on Monetary Policy.

Figure 5: Spread between 10 year swaps and CGS

Source: Bloomberg and CEG analysis.

3.1.1 Required returns on higher risk assets and the RBP averaging period

38. The dividend yield on listed equities can also be used to arrive at a direct estimate of the prevailing cost of equity using a simple dividend growth model. In what follows I use the method used by AMP Capital Investors. Prior to the GFC, this methodology was relied on by the AER in support of a position that the then MRP of 6.0% was generous.[7]

> *A more recent estimate is from AMP Capital Investors (2006), who base the growth rate on the expected long-run GDP growth rate, similar to Davis (1998). AMP Capital Investors (2006) estimate the forward looking Australian MRP for the next 5-10 years to be 'around 3.5 per cent' (specifically 3.8 per cent), 1.9 per cent for the US and 2.4 per cent for the 'world'. AMP Capital Investors (2006) considers an extra 1 to 1.5 per cent*

7 AER, Explanatory Statement, *Electricity transmission and distribution network service providers Review of the weighted average cost of capital (WACC) parameters,* December 2008, p. 173

could be added for imputation credits resulting in a 'grossed-up' Australian MRP of around 4.5 to 5.0 per cent.

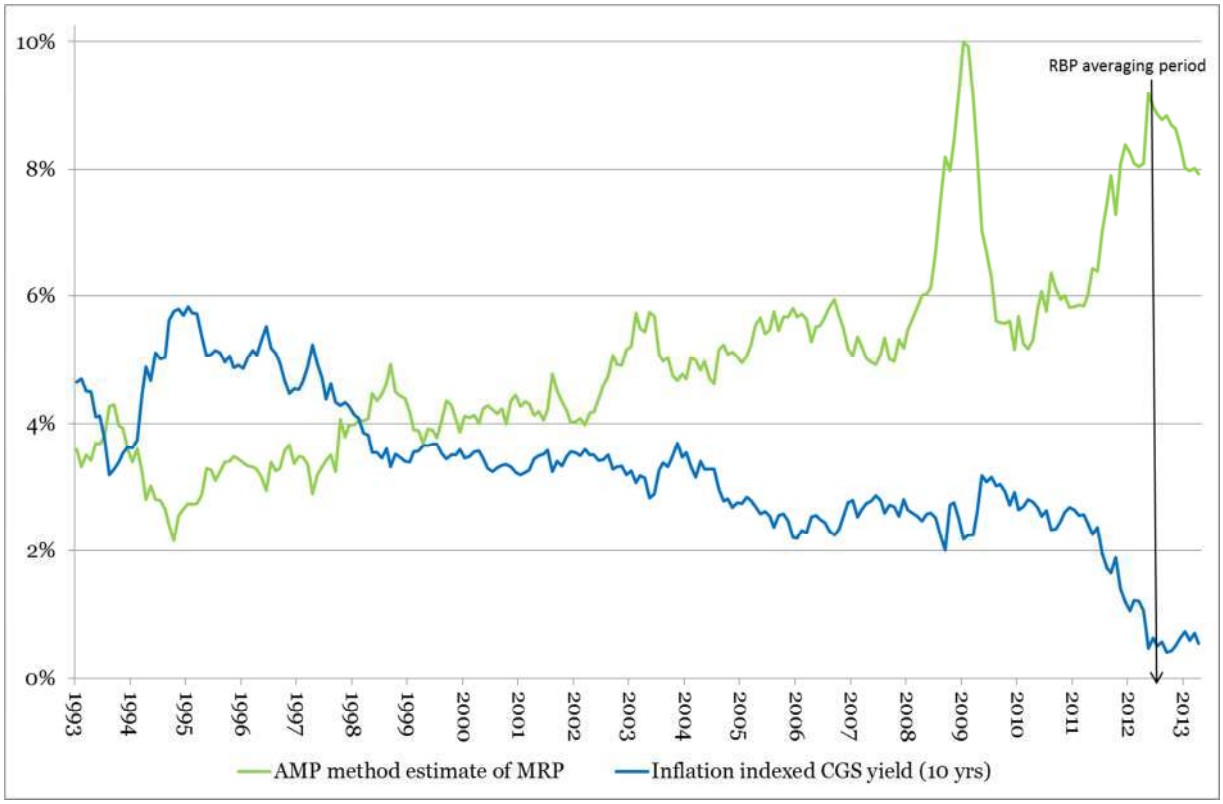
39. The AMP methodology involves approximating a cost of equity by adding the long term average real growth in GDP (as a proxy for long term average nominal growth in dividends) to the prevailing dividend yield for the market as a whole. This gives a 'cash' cost of equity. To convert this into a cost of equity including the value of imputation credits, the cost of equity needs to be scaled up by the relevant factor. In Figure 6 below I have used 3.9% per annum as the long run growth path for real GDP[8] and a scaling factor of 1.1125 to capture the value of imputation credits.[9] These assumptions are important for the level but not for the variation in the cost of equity estimate. I compare the cost of equity estimated in this manner with the real yield on CPI indexed CGS. When I do this I derive the following chart.

8 The Australian Bureau of Statistics (ABS) publishes economic growth figures on its website starting in 1959. Here I use growth in real domestic income of 3.9% (A2304314X of ABS Catalogue 5206.0) rather than nominal growth, since future expectations of inflation are not consistent with the high levels of inflation that were experienced at various times over this period. The average annual rate of growth in real gross domestic income between the December quarter 1959 and June quarter 2012 was 3.9%.

By way of comparison, equivalent real growth in the US since 1929, starting immediately prior to the great depression, was 3.3%. If the data series begins instead at 1933 the real average growth rate is 4.0%. (The longest published series by the Bureau of Economic Analysis at the US Department of Commerce http://www.bea.gov/national/index.htm#gdp.)

9 This is based on the assumption of a corporate tax rate of 30%; and, that the value of imputation credits distributed (theta) is 35% of their face value, consistent with Australian Competition Tribunal precedent; and that the proportion of dividends that are franked is 75% (consistent with Brailsford, T., J. Handley and K. Maheswaran, Re-examination of the historical equity risk premium in Australia, Accounting and Finance 48, 2008, page 85). The value of 1.1125 is calculated as 1+.30*.35*.75/(1-.3).

Figure 6: AMP method estimate of the E[MRP] relative to 10 year indexed CGS yields



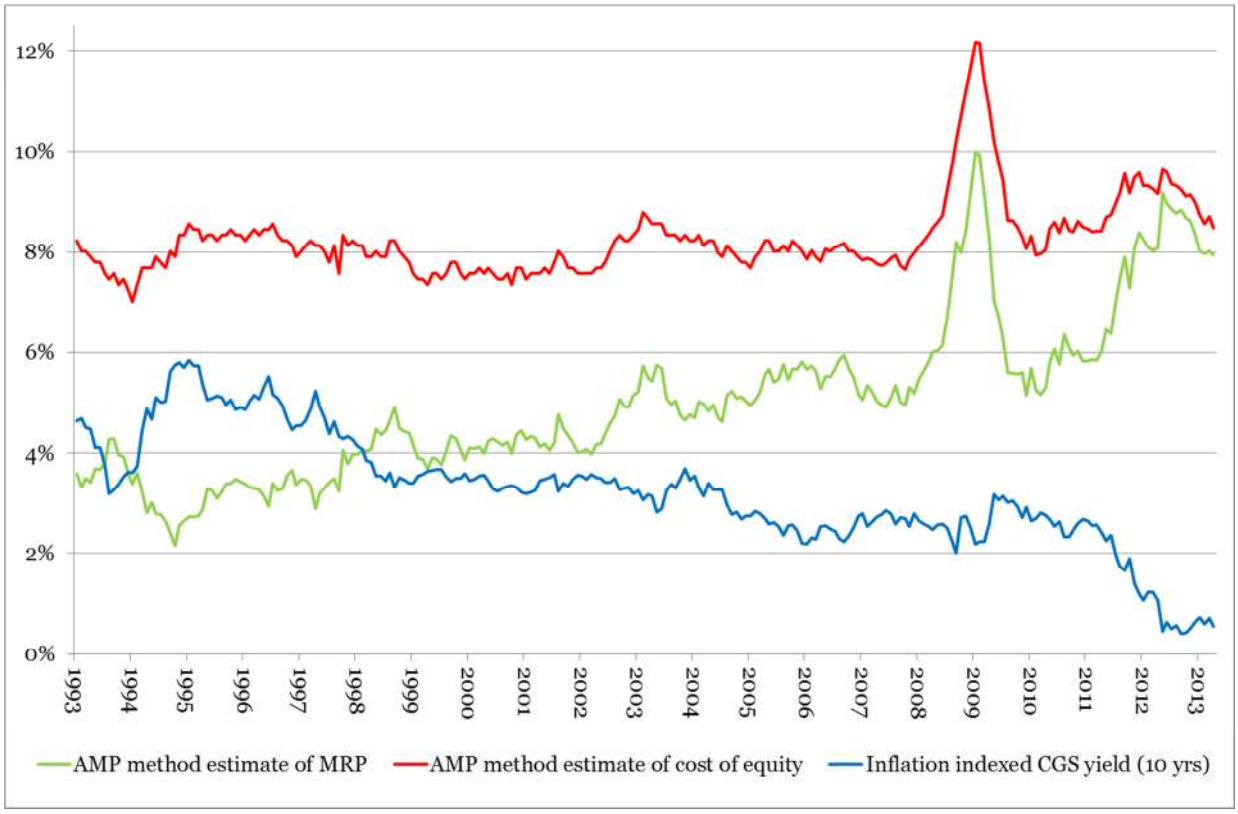
Source: RBA, CEG analysis.

40. Notably, the fall in CGS yields in the lead up to the RBP averaging period has been associated with a more than offsetting rise in E[MRP] measured relative to CGS yields – such that the estimate of E[Rm] has risen materially since mid-2011. I note that the path of these parameters over time is similar to those recently estimated and presented by Capital Research.[10]

41. The estimate of E[Rm], being the sum of the CGS and MRP time series is much more stable than either of these two time series – as shown below in Figure 7.

[10] Capital Research, *Forward Estimate of the Market Risk Premium: Update*, A report prepared for the Victorian gas transmission and distribution businesses: APA Group, Envestra, Multinet Gas and SP AusNet, March 2012; Figure 11, Implied MRP from Constant Dividend Growth model, net theta = 0.2625.

Figure 7: AMP method estimate of real E[Rm] and E[MRP] relative to 10 year indexed CGS yields



Source: RBA and CEG analysis.

3.2 AER statements on RBP period in the Victorian gas draft decision

42. In the following extended quote from the AER Victorian gas draft decision it is not obvious that the AER realised that the period in question covered the RBP averaging period. In this quote, the AER concedes that the spot CGS yield might be depressed by factors that do not depress required equity returns (such that E[MRP] measured relative to the spot CGS yield is heightened). However, the AER fails to acknowledge the implications for its choice of E[MRP] in the RBP averaging period.[11]

> *A definition of a flight to quality may include:*

[11] AER, *Access Arrangement draft decision SPI Networks (Gas) Pty Ltd 2013–17: Part 3,* September 2012, p. 7.

> Flight to quality episodes involve a combination of extreme risk- or uncertainty-aversion, weaknesses in the balance sheets of key financial intermediaries, and strategic or speculative behavior, that increases credit spreads on all but the safest and most liquid assets.[12]

There have been periods since the onset of the GFC that could be described as being flight to quality periods. However, the AER does not consider there has been a sustained flight to quality since the onset of the GFC. Glenn Stevens recently made the following comment:

> We saw one such bout of anxiety in the middle of this year when financial markets displayed increasing nervousness about the finances of the Spanish banking system and the Spanish sovereign.
>
> The general increase in risk aversion saw yields on bonds issued by some European sovereigns spike higher; while those for Germany, the US and the UK declined to record lows. This flight to safety also saw market yields on Australian government debt decline to the lowest levels since Federation. Meanwhile many European economies saw a further contraction of economic activity and share markets decline sharply.[13]

A flight to quality would not provide justification to depart from a prevailing estimate of the risk free rate. Demand for highly liquid assets is likely to increase in a flight to quality period.[14] This would, all else the same, push the yield on risk free assets down. These actions reflect changes in investor expectations and perceptions of the relative value of a risk free asset and would not undermine the risk free nature of that asset.[15]

Shortly before RBA Governor Glenn Stevens made the comments above, the RBA provided the following advice:

> I therefore remain of the view that CGS yields are the most appropriate measure of a risk-free rate in Australia.[16]

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12 Caballero, R. and Kurlat, P., *MIT Department of Economics Working Paper No. 08-21, Flight to Quality and Bailouts: Policy Remarks and a Literature Review*, 9 October 2008, p. 1.

13 Glenn Stevens, *Opening Statement to the House of Representatives - 24 August 2012 - Hansard script*, p. 2.

14 Caballero, R. and Kurlat, P., *MIT Department of Economics Working Paper No. 08-21: Flight to Quality and Bailouts: Policy Remarks and a Literature Review*, 9 October 2008, p. 2.

15 Discussed further in section 4.3.2.

16 Reserve Bank of Australia, *Letter to the ACCC: The Commonwealth Government Securities Market*, 16 July 2012, p. 1 (RBA, *Letter regarding the CGS market*, July 2012).

> *This suggests that the RBA does not consider a flight to quality period makes CGS an inappropriate proxy for the risk free rate.* [The italicised text above represents AER drafting while the indented small text represents quotes from third parties which the AER reproduced.]

43. The AER's conclusion in the last paragraph of this quote is beside the point. The point of concern is not whether CGS yields are the best estimate of the risk free rate. The question is how must the E[Rm] and, therefore, the E[MRP] be estimated relative to the CGS yield.

44. Moreover, the AER's focus on the need to establish a 'sustained flight to quality since the onset of the GFC' is misguided. There may, or may not, be a sustained flight to quality[17] but the point, amply demonstrated in the above discussion, is that even if a very brief flight to quality occurs during a business's averaging period, then CGS yields will be pushed down even though the cost of equity not be similarly pushed down.

45. Failing to address the impact of a flight to quality on the E[MRP] in the RBP averaging period 'cordons off' discussion of the E[MRP] from E[Rm] and the required return on a zero beta asset. In effect, these are estimated over different time periods and gives rise to outcomes that diverge substantially over time and are far from commensurate with prevailing costs of equity for firms with the same degree of risk.

3.3 What the AER said about this event in the Victorian gas final decision

46. As already noted, I made the above observations in a report for the Victorian gas businesses.[18] The relevant section of that report was entitled "Error in AER

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17 Indeed, there is a good case to argue that there will be a sustained elevation in risk premiums. This is the view expressed by the RBA Head of Financial Stability Department, Luci Ellis in a 24 October 2012 address to the CPA Australia Finance and Accounting Expo 2012:

> *To conclude, five years on we are still in a world where risk aversion is high and some parts of the financial system seem dysfunctional. In some countries – though not Australia, I believe – the supply of credit is tighter than the underlying risks would require. I hope I won't come back in five years' time to deliver a speech titled 'Ten Years of Financial Crisis'. But I do think that the experience of the past five years has affected a whole generation of financial market participants and policymakers. We will never be able to regulate the financial boom-bust dynamic away entirely. There will always be people with the risk appetite and the incentives to become over-exuberant. It would not surprise me, though, if the next five or ten years see a lot less of that over-exuberance than we saw in the five or ten years leading up to 2007. The challenge will be to be ready to respond when those memories fade and the next generation of the overconfident are gearing up for a party.*

18 Response to the AER Vic gas draft decisions, November 2012.

methodology - RBP June/July 2012". I pointed out to the AER that, the very period it had identified as a 'flight to quality' episode, was the same period used to measure RBP's cost of equity.

47. In the final decision, the AER has a section entitled 'Consistency in flight to quality periods'. Most of this section fails to address even indirectly the analysis of the RBP averaging period that I provided. The one part of the section that does address that analysis, albeit indirectly, is repeated in full below.

> *Further, in the draft decision the AER identified a statement by RBA Governor Glenn Stevens that suggested a flight to quality had occurred in the middle of 2012.[19] The AER then identified advice provided by the RBA at around the same time that concluded that CGS yields remained the best proxy for the risk free rate.[20]*
>
> *As the RBA simultaneously supported the use of CGS yields as a proxy for the risk free rate, the AER's cost of equity could only have been found unreasonable if:*
>
> - *the MRP was inappropriate*
> - *the AER had not considered any relationship between the risk free rate and the MRP.*
>
> *In the APTPPL decision the AER considered the evidence before it and concluded an MRP of 6 per cent was appropriate.[21] The AER also considered the possibility of a relationship between the risk free rate and the MRP.[22] There was insufficient evidence of a relationship to suggest the MRP was inappropriate or to justify a change of approach.[23]*

48. In my view, the AER has simply not addressed the specific point that I made, namely, that the RBP averaging period fell in a period of time that was described by the RBA Governor as follows:

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19 AER, *Draft decision: Access arrangement draft decision: APA GasNet Australia (Operations) Pty Ltd 2013-17*, September 2012, Appendix B, p. 4.

20 AER, *Draft decision: Access arrangement draft decision: APA GasNet Australia (Operations) Pty Ltd 2013-17*, September 2012, Appendix B, pp. 4-5.

21 AER, Final decision: APT Petroleum Pipeline Pty Ltd, Access arrangement final decision, Roma to Brisbane Pipeline 2012–13 to 2016–17, August 2012, p. 21.

22 AER, Final decision: APT Petroleum Pipeline Pty Ltd, Access arrangement final decision, Roma to Brisbane Pipeline 2012–13 to 2016–17, August 2012, p. 23.

23 AER, Final decision: APT Petroleum Pipeline Pty Ltd, Access arrangement final decision, Roma to Brisbane Pipeline 2012–13 to 2016–17, August 2012, p. 23.

> *We saw one such **bout of anxiety** in the middle of this year when financial markets displayed increasing nervousness about the finances of the Spanish banking system and the Spanish sovereign.*
>
> *The general **increase in risk aversion** saw yields on bonds issued by some European sovereigns spike higher; while those for Germany, the US and the UK declined **to record lows**. This flight to safety also saw market yields on Australian government debt decline to **the lowest levels since Federation.** Meanwhile many European economies saw a further contraction of economic activity and share markets decline sharply.*[24] [Emphasis added]

49. I provided extensive and mutually corroborating evidence that risk premiums measured relative to CGS yields (i.e., E[MRP]) were at historic highs – just as CGS yields were at historic lows.

50. In essence, the AER response to me on this issue is simply that it "considered the evidence before it and concluded an MRP of 6 per cent was appropriate" without engaging with that evidence or setting out reasoning for that conclusion. This is beside the point. Whether, based on the information before it, the AER made an error is irrelevant (though I note that Governor Steven's statement, and my own analysis of the RBP averaging period, were not before the AER when the AER was making a decision about the Roma to Brisbane pipeline). The point is whether the AER considers that, based on the information now before it, the RBP averaging period provides an example of the problem with adopting, or having a strong *a priori* preference towards adopting, a fixed E[MRP] in all averaging periods.

51. In order to address this question the AER does need to engage with the evidence that I put before it in my report for the Victorian gas businesses and again in this report.

52. The specific point that I made, and am making again, is that assuming that E[Rm] fell one for one with the fall in CGS yields in this period is inconsistent with this period being characterised by *a bout of anxiety*, and an *increase in risk aversion* and a *flight to safety* from risky assets (such as equity). Put another way, the evidence was inconsistent with an assumption that $E[R_m]$ was at its *lowest level since Federation*.[25]

53. The remainder of the section, from the AER's final decision for Victorian gas distribution, which addresses flight to quality does not engage at all with my use of the RBP averaging period as an exemplar of the problems that more generally beset

[24] Glenn Stevens, *Opening Statement to the House of Representatives - 24 August 2012 - Hansard script*, p. 2.

[25] Noting that the AER's method of applying a fixed premium to CGS yields means that if the latter are at their lowest levels since federation, then so is the expected return on the market.

the AER approach. The relevant section from the final decision for Multinet Gas, is reproduced below[26].

Little evidence has been presented supporting the suggestion that flight to quality periods make the AER's approach unreasonable. CEG has not provided a definition of flight to quality periods, nor identified academic literature that does so. In the draft decision the AER attempted to identify a possible definition from academic literature.[27] CEG has not responded to this definition, nor provided its own in response.

The following statement offers an understanding of CEG's position:

> ...there will be times when market conditions are such that very low spot CGS yields are associated with a normal (or even heightened) spot cost of equity for the market—such that the spot MRP is heightened relative to normal.[28]

It appears CEG suggests there is a negative relationship between the risk free rate and the MRP during flight to quality periods. CEG concludes that such periods make the AER's approach unreasonable:

> ...if even a very brief flight to quality occurs during a business's averaging period then CGS yields will be pushed down even though the cost of equity (neither spot nor long term forecast) is not similarly pushed down.[29]

On the other hand, SFG states:

> ...it is well-known, and generally accepted by finance academics and financial market professionals, that periods of historically low government bond yields are caused by a phenomenon known as "flight to quality".[30]

The AER is unable to verify this statement as SFG provides no evidence to support it. Lally also notes this point.[31]

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26 AER (2013), Access arrangement final decision, Multinet Gas (DB No. 1) Pty Ltd, Multinet Gas (DB No. 2) Pty Ltd, 2013–17, Part 3: Appendices, Australian Energy Regulator, March 2013; page 28.

27 AER, *Draft decision: Access arrangement draft decision: APA GasNet Australia (Operations) Pty Ltd 2013-17*, September 2012, Appendix B, p. 4.

28 CEG, *Response to the AER Vic gas draft decisions*, Internal Consistency of MRP and Risk-Free Rate, November 2012, p. 12.

29 CEG, *Response to the AER Vic gas draft decisions*, Internal Consistency of MRP and Risk-Free Rate, November 2012, p. 14.

30 SFG, *The required return on equity*, November 2012, p. 56

31 Lally, *Review of the AER's methodology*, February 2013, pp.16-17.

The suggestion APA GasNet, CEG and SFG put forward is also not well supported with evidence. CEG identifies a number of sources of information it suggests may provide evidence of flight to quality periods.[32] These include various debt spreads and dividend yields.[33] Sections B.5.3 and B.6.4 consider the explanatory power of these sources of evidence. The evidence presented is anecdotal and inconclusive.

In any case, it may be true that during flight to quality periods the risk free rate and the MRP falls. It may also be true that this provides some explanation for bond yields that are low by historical comparison. This would not make the AER's approach inconsistent.

Flight to quality periods do not make CGS an inappropriate proxy for the risk free rate; CEG acknowledges this.[34] During such periods the MRP may increase. However, the AER has considered the available evidence on the MRP and concludes that 6 per cent is the best estimate of the 10 year forward looking MRP at this time. The flight to quality theory is one of a number of competing theories about the MRP, some of which suggest there may be a positive relationship.

As the evidence CEG and SFG have presented is anecdotal and inconclusive, it is not sufficient to justify an adjustment to the MRP.

54. In response I note:

- Rather than providing 'little evidence' or 'anecdotal evidence' 'not well supported with evidence' I provided very specific evidence including the views of the RBA Governor. In contrast, the AER supplied no evidence to support the view that E[Rm] fell one for one with CGS yields in the RBP averaging period (i.e., that E[MRP] was constant in that period).
- The AER could have at least partly verified the statement by SFG by reference to the RBA Governor's statement that the AER had seemingly endorsed as relevant in the draft decision;
- Whether flight to quality periods make "…CGS an inappropriate proxy for the risk free rate" is not the issue. The point that I was making, with the support of the RBA Governor and the AER draft decision, was that there are clear

32 CEG, *Update to March 2012 Report*, On Consistency of the Risk-Free Rate and MRP in the CAPM, November 2012, p. 11-18.

33 CEG, *Update to March 2012 Report*, On Consistency of the Risk-Free Rate and MRP in the CAPM, November 2012, p. 11-18.

34 CEG, *Response to the AER Vic gas draft decisions*, Internal Consistency of MRP and Risk-Free Rate, November 2012, p. 14.

examples of market circumstances, such as the RBP averaging period, where the best estimate of E[Rm] does not follow CGS yields down one-for-one.

4 Summary of DGM estimates of E[Rm]

55. This section provides a summary of recent estimates of $E[R_m]$ based on DGM analysis. These are all around 12%:

    - SFG has applied a data intensive DGM analysis to arrive at an estimate of $E[R_m]$ of 11.0%, applicable to the second half of 2012[35] This is the discount rate used by investors to discount future cash dividends. The result from the DGM does not include any assumed value accruing to investors from imputation credits. If the DGM output is scaled up to include the value of imputation credits implicit in regulatory precedent (gamma =0.25) then SFG estimate that it would be 12.2%.[36]
    - Over the same period (July to December 2012), the simple AMP DGM method as described in the previous section, gives an estimate of 11.8% including the value of imputation credits (12.1% in the RBP averaging period);
    - Associate Professor Lally has also arrived at a range for the DGM cost of equity. He estimates a range of 9.2% to 11.7% (for December 2012 when the 10 year CGS yield was 3.26%). There are a number of problems with Lally's calculations as detailed in Appendix C. Fixing only some of these raises the range to 10.7% to 13.2%[37].

56. By contrast, the AER's method arrives at an estimate for $E[R_m]$ over the second half of 2012 of just 9.1% (8.95% in the RBP averaging period). This is around 3.0% lower than the first two DGM estimates – slightly more than the fall in CGS yields over the year leading up to July 2012. The result from the AER's approach is also 1.4% lower than the mid-point of Lally's unadjusted range (2.9% lower than the mid-point of the adjusted range).

35 See table 4 of SFG, *Dividend discount model estimates of the cost of equity*, June 2013.

36 See table 2 in Appendix 2 of SFG, *Dividend discount model estimates of the cost of equity*, June 2013.

37 The reader is referred to Table 4 in Appendix C.

5 Flight to safety is a dominant theme in financial markets since the GFC

57. As described in the previous section there is ample evidence that E[Rm] today has not fallen in line with 10 year CGS yields since the GFC. In addition to the analysis of the RBA Governor already quoted, other RBA analysis confirms a general market dynamic whereby government bond yields are affected by flight to safety/quality episodes. The RBA noted in relation to events in August 2011:

> *S&P subsequently downgraded the credit ratings of a number of US agencies, banks and clearing houses whose status is dependent on that of the sovereign.* ***This contributed to the increased market turbulence in August.*** *Japan's sovereign credit rating was also downgraded in August; Moody's reduced the rating one notch to the equivalent of AA-, bringing it into line with S&P's rating, which had been downgraded earlier in the year.* ***Despite rating changes, long-term government bond yields in the United States and Japan have fallen since the start of August as risk aversion has grown.*** [Emphasis added.][38]

58. In the same document the RBA reiterates the fact that the falling CGS yields in the second half of 2011 were contemporaneous with heightened risk aversion:[39]

> ***Risk aversion and volatility in global financial markets have increased sharply since the start of August*** *(Graph 1.1) …. Across many countries, prices of shares and other risk assets have declined sharply since early August. Bank and insurer share prices have been particularly affected, falling by more than 15 per cent in most countries, to be around their lowest levels since early 2009 (Graph 1.2)…* [Emphasis added.]

59. If this market dynamic was important we would also expect to see this show up in the measured beta of CGS. That is, while 10 year CGS are risk-free in nominal terms if held to maturity, they are not "risk-free" in the sense that the term is used in the CAPM. Commonwealth Government bonds with a ten-year tenor do not have a certain payoff in nominal terms unless held for 10 years (i.e., to maturity). Over their life the value of 10 year CGS can vary dramatically – as indeed has been the case since the GFC. In addition, nominal CGS are **not** risk free in real terms even if held to maturity. The CAPM defines its parameters in real terms and nominal CGS do not have a certain pay-off when measured in real terms (i.e., they are subject to inflation risk). For investment horizons different to 10 years, (such as the weekly or monthly investment horizon used by the AER to estimate beta for utility

38 RBA, *Financial Stability Review,* September 2011, p. 8

39 Ibid, pp. 5-6

companies), 10 year CGS have risky payoffs even in nominal terms. Professor Grundy and I make a similar point when he states that long-dated default free bonds can have non-zero beta over the investment horizon[40].

60. Bond returns differ from bond yields in that bond returns include the change in the value of a bond over the relevant year (that is bond returns include both coupons and capital gains while bond yields assume that the bond is worth the same at the end of the year as it was at the beginning).

61. Bond yields and bond returns tend to move in opposite directions. If, as has been the case since the global financial crisis, bond yields have tended to fall then this will be associated with an increase in bond prices – raising bond returns even though bond yields are falling. Indeed, this is how lower yields are achieved in the market; investors pay more for a bond, and that higher price reduces the yield (the return on the purchase price) delivered by the bond's coupons.

62. An example using a perpetual bond will illustrate this. A perpetual bond is a bond that pays a fixed coupon forever and this property allows us to use a simple formula for the relationship between the price and yield on the bond:

$$Yield\ on\ bond = \frac{Bond\ coupon}{Price\ of\ bond}$$

63. Now consider a situation where the yield on the bond halves from 4% to 2%. This is just another way of saying that the price of the bond doubled. Thus, a reduction in yield of 2% is associated with a capital gain on the bond of 100%. This illustrates how capital gains/losses and bond yields move in opposite directions and why capital gains/losses can dwarf yields. The relationship between bond prices to bond yields is more complex with non-perpetual bonds but the basic principle is the same. Higher/lower bond yields are brought about by lower/higher bond prices.

64. The price and yield of long term CGS has of late been volatile (noting that volatility in prices is the flipside of volatility in yields). Moreover, if this volatility is explained by a flight to quality dynamic, consistent with commentary by the RBA then we should observe CGS prices moving in the opposite direction to equity prices. When

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40 See section 6 of CEG, *Estimating the return on the market,* June 2013. See also, Grinblatt and Titman, Financial Markets and Corporate Strategy, (2002) a corporate finance textbook. Page 396 of Grinblatt and Titman states that:

'for a long horizon, the beta of the certain cash flow, measured over long horizons, is zero, and the risk-free rate is the long-term riskless rate. However, if one believes the CAPM is correct, it is also appropriate to track a long-horizon certain cash flow with short-horizon riskless bonds and the market portfolio. Since, over short intervals of time, the values of both the certain cash flow and the market portfolio tend to decrease when expected inflation increases, and vice versa, the certain cash flow is likely to have a positive beta when measured against the short-term return of the market portfolio. Indeed, as this chapter noted earlier, a typical default-free long-term zero-coupon bond has a beta, measured over short horizons, of about 0.2.'

there is bad economic news investors should tend to buy CGS, pushing their price up and their yield down, and sell equities, pushing their price down (and *vice versa* when there is good news). If correct this will show up in a negative beta for CGS. Of course, this need not imply that this is the only dynamic influencing CGS prices – just that it is a relevant factor.

65. Following and updating the work of Davis[41] I have estimated a time series for 3 year monthly betas (10 year CGS vs ASX200 accumulation index). The time series for this estimate is illustrated in Figure 8 below.

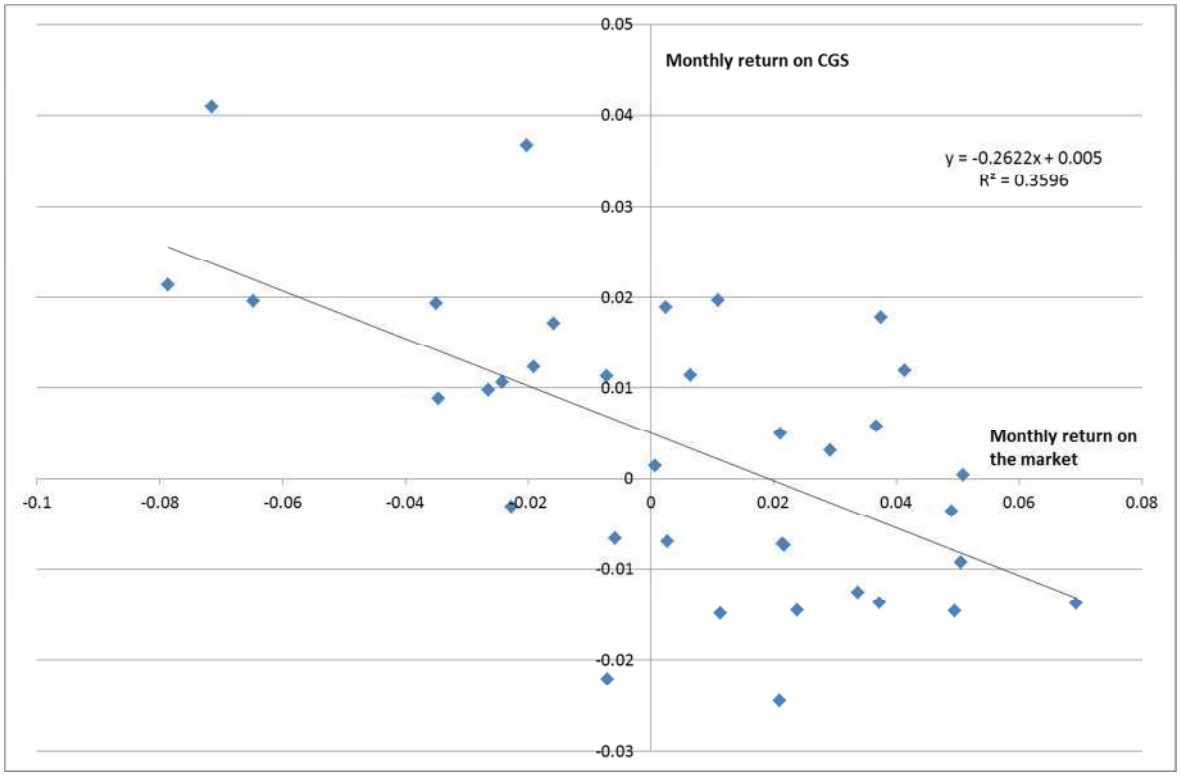
Figure 8: CGS beta over time

66. This figure shows that over the last 30 years the beta for CGS has varied materially and, since the GFC, has been significantly negative – and more negative than at any other time in the period analysed. This is consistent with the evidence provided above. Specifically, over the last five years, the monthly market return has tended to have the opposite sign to the monthly return on 10 year CGS. That is, in a month when the market fell, the price (yield) of 10 year CGS rose (fell).

41 Davis, Kevin, 2005, "The systematic risk of debt: Australian evidence," Australian Economic Papers 44, 30-46.

67. This is exactly what one would expect if CGS yields were being strongly influenced by a 'flight to quality' phenomenon since the GFC. The months in which investors "shunned" equities tended to be the months during which they "flooded into" CGS and *vice versa*. This phenomenon is seen more clearly in the following scatter diagram of monthly returns over the last 3 years.

Figure 9: Scatter plot – Monthly CGS returns vs ASX200 returns (May 2010 to April 2013



Source: RBA data, CGS analysis

68. This scatter plot demonstrates that flight to safety/quality has indeed been an important dynamic in market dynamics over the last three years. Months when equity market returns are positive tend to be months when CGS returns are negative and *vice versa*. Of course, this is not the only factor determining stock and equity returns (i.e., as is generally the case with beta regressions, the level of market returns does not explain all or even most of the variation in the CGS returns) but the purpose of beta regressions is not to explain all the variation in the dependent assets return by reference to the market return, the purpose is simply to estimate beta (the coefficient in a beta regression).

69. Note that the 3 year monthly beta estimate to April 2013 is -0.26. Notably, CGS yields only began their most recent fall in March 2011. If beta estimates only use data from since March 2011 the beta is -0.40. On this basis it can reasonably be

assumed that the 'current' estimate of beta being applied by investors to 10 year CGS is between -0.26 and -0.40 (i.e., around negative 0.3).

70. This is not a surprising result. The years since the global financial crisis have been characterised by heightened uncertainty and a generalised flight to safety. In such market conditions one would expect CGS returns to move in the opposite direction to equity market returns and a negative beta estimate formally tells us that this has happened.

71. The fact that this is how CGS yields behave in periods of heightened financial market uncertainty provides an explanation for why CGS yields are so low today. That is, they provide not just a 'safe harbour' for investors but a hedge against equity market movements.

72. This has not always been the case. Observation of Figure 8 demonstrates that prior to 2008/09, the average CGS beta was materially positive. Note that the monthly data underlying Figure 8 is only available back to 1980. However, it is possible to estimate the historical average beta for CGS by drawing upon the same data[42] series that the AER employs to estimate the historical average MRP from 1883 to 2012.

73. The data from Brailsford et al (2008 and 2012), as amended by NERA, contains an historical series for the realised return on the market (Rm) and the 10 year CGS yield for 128 years. From this yield series it is possible to create an annual return to CGS series (see section A.2 for details). This annual return series can be used to estimate the historical average beta for CGS over the entire time series from 1884 to 2007 (i.e., up to the beginning of the GFC). The resulting beta estimate is based on 123 data points and is +0.11. The underlying data and beta regression are shown in the scatter plot below.

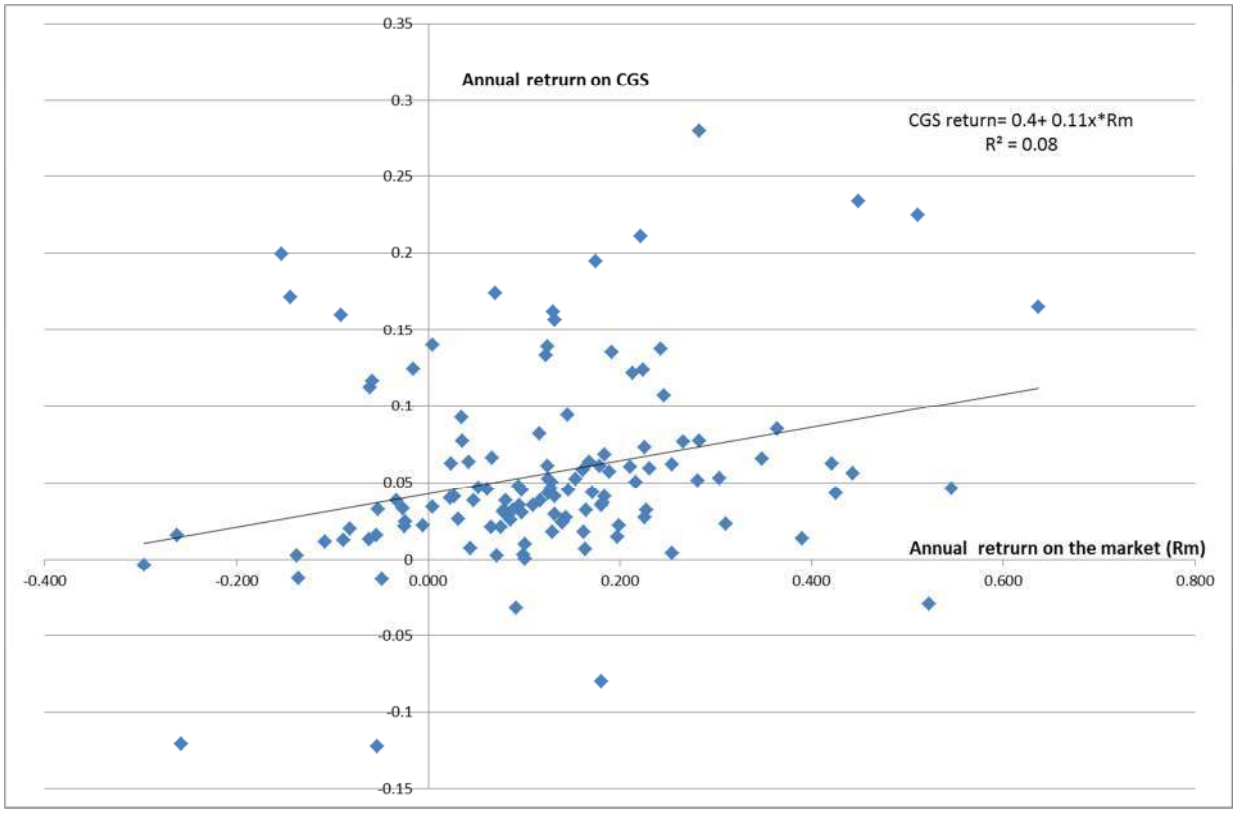
[42] This is based on the data in:

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

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

I have used this data with some amendments made by NERA who have more carefully analysed the historical record in the very early part of the series. Please see NERA, The Market, Size and Value Premiums, A report for the Energy Networks Association, prepared by NERA Economic Consulting, June 2013.

Figure 10: Annual return on CGS vs Annual return on the market 1884 to 2007

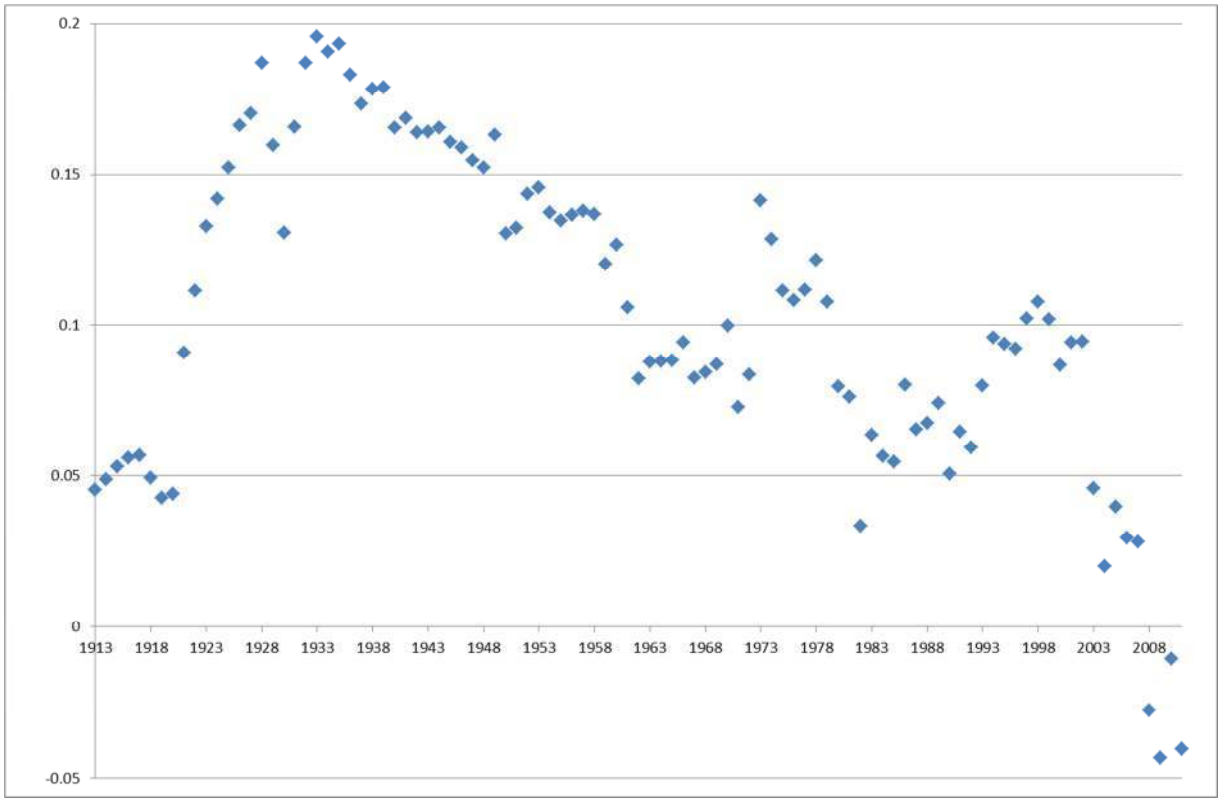


Source: CEG analysis, Brailsford et al. data with NERA amendments.

74. Figure 10 illustrates that, on average over the 123 years to 2007 buying a 10 year CGS and holding it for a year provided a return that tended to move with the return on the buying the market portfolio and holding it for a year. Specifically, a 1.00% higher return on the market in any given year tended to be associated with a 0.11% higher return on CGS (a beta of 0.11). This figure also shows that returns on CGS can be volatile and are not uncommonly negative (i.e., the capital loss on holding a 10 year CGS can be more than the coupon payments received over any given year).

75. The same data can be used to generate a time series for the CGS beta using overlapping 30 year periods (starting with the 30 years from 1884 to 1913 and ending with the 30 years to 2011). That is, a beta regression is run using the first 30 years of data to generate the first point in the time series. The second point is generated by running the same regression dropping the oldest data point and adding a new year and so on.

Figure 11: Time series of 30 year betas 1913 to 2011



Source: CEG analysis, Brailsford et al. data with NERA amendments. The horizontal-axis shows the first year within each 30-year overlapping period

76. Figure 11 clearly demonstrates that the inclusion of just 2008 (i.e., one out of 30 years) in the data causes the 30 year beta to become negative for the first time in history. The measured beta remains negative (in fact, it falls even further) with the inclusion of the additional three years to 2011.

77. This figure highlights that 10 year CGS are an imperfect proxy for the zero beta asset in the CAPM. Over most periods CGS have positive beta risk (i.e., CGS returns tend to move in the same direction as the return on the market) but the strength of this relationship is not constant and, since the global financial crisis, the relationship has strongly reversed – with CGS returns moving in the opposite direction to the market.

78. As noted in the report of the expected return to the market, co-authored with Professor Grundy, the implication is that a mismatch error is created if one estimates E[Rm] by adding to *current CGS yields* a historical average excess return on the market measured relative to *historical average CGS yields*. Even if one believed that the E[MRP] measured relative to the CAPM zero beta risk free rate was a constant "X":

- the historical average realised return relative to CGS can be expected to be less than "X" (due to positive historical average beta risk for CGS); and
- the prevailing E[MRP] relative to the prevailing CGS can be expected to be more than "X" (due to currently negative CGS beta risk).

79. Consequently, adding the historical average realised excess return relative to CGS yields to the current CGS yield will underestimate E[Rm] – even if E[MRP] is constant when measured relative to the true zero beta asset in the CAPM.

6 Burden of proof

80. The AER has, in past regulatory decisions, argued in a manner consistent with a belief that a material burden of proof exists in order to justify it changing its 6% E[MRP] estimate. Experts advising it have adopted a similar view.

81. In doing so the AER and its experts are implicitly arguing that the AER should not adopt, on the balance of all of relevant evidence, the most accurate estimate of E[Rm]. Rather, the AER should adopt:

- what is effectively a null hypothesis that "E[Rm] = CGS yield + 6%"; and
- only depart from this if there is "sufficient evidence". In effect, only depart from this if the null hypothesis can be rejected at a sufficiently high (but undisclosed and unexplained) level of certainty.

82. Under this approach, the best (most accurate) estimate of E[Rm] might be 12% but one cannot rule out with, say, 90% confidence that AER's E[Rm] estimate of 9% is wrong. If the AER's undisclosed required level of confidence is 90% then it will adopt an estimate of 9% rather than the most accurate estimate of 12%.

83. I reach the conclusion, based on a reading of the AER's recent final decision for APA GasNet, that the AER has been proceeding 'as if' there is a null hypothesis that its regulatory practice gives the right answer. In that decision, most, if not all, of the evidence put to the AER that its regulatory practice does not result in the best estimate of E[Rm] is met with a conclusion that the evidence is "not sufficiently" compelling for the AER to alter its practice. A sample of such conclusions is provided below (all emphasis is added).

> *As was the case in the APTPPL final decision, there is **insufficient evidence** of a strong relationship to suggest the MRP is inappropriate or **justify a change of approach**.*[43]
>
> *The evidence has not persuaded the AER that the cost of equity is relatively stable or there is a **sufficient negative relationship** between the risk free rate and the MRP.*[44]
>
> *The evidence has not persuaded the AER that there is a **strong** negative relationship between the 10 year risk free rate and the 10 year MRP. Therefore it is not **sufficiently well established** to form the basis for any **adjustment**.*[45]

43 AER, 2013, APA GasNet Final Decision, Appendices (Part 3), p. 44.

44 AER, 2013, APA GasNet Final Decision, Appendices (Part 3), p. 24.

45 AER, 2013, APA GasNet Final Decision, Appendices (Part 3), p. 24.

> *Based on the above considerations, the AER considers DGM estimates should be treated with caution when estimating the appropriate MRP. While DGM analysis is producing high MRP estimates, it was producing MRP estimates below 6 per cent prior to 2008. In addition, the AER's preferred MRP estimate of 6 per cent falls in the DGM MRP estimation range calculated by Lally.*[46]

84. The first quotations above provide examples where the AER is considering evidence that suggests that the E[Rm] should not be assumed to fall one-for-one with falls in CGS yields. The AER does not conclude that its estimate is the most accurate but rather that the evidence is not sufficiently strong to justify an adjustment to the AER's practice. There is an implicit presumption that the AER's approach is the best.

85. The evidence provided by the AER's experts is quite clear that the best estimate would require an adjustment. For example, in the last AER quote above the AER relies on the fact that:

> *"...the AER's preferred MRP estimate of 6 per cent falls in the DGM MRP estimation range calculated by Lally."*

86. However, the 6% E[MRP] is at the very bottom end of the range provided by Lally. The range for the E[MRP] provided by Lally is actually 5.9% to 8.4%.

> *My view is that a convergence period of at least 10 years is sensible, and this narrows the band of MRP estimates from 5.90% to 8.39%.*[47]

87. If one is approaching the analysis with a view to arriving at the best estimate of the E[MRP] then the Lally evidence would clearly fall into the category of evidence inconsistent with a 6% E[MRP] and more consistent with an estimate of around 7.6% (the midpoint of the Lally range). Only if the AER is approaching the task by asking 'is there overwhelming evidence for an E[MRP] greater than 6%' does the Lally evidence fall into the category of evidence supporting an E[MRP] estimate of 6%.

88. Similarly, the AER states in relation to advice provided by CEPA:

> *As a result, CEPA considered there is not enough evidence to justify making a firm conclusion about the relationship between the risk free rate and the MRP.* [48]

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46 AER, 2013, APA GasNet Final Decision, Appendices (Part 3), p. 76.

47 Lally, The Dividend Growth Model, March 2013.

48 AER, 2013, APA GasNet Final Decision, Appendices (Part 3), p. 48.

89. However, in support of this claim the AER references "CEPA, *Advice on estimation of the risk free rate and market risk premium,* March 2013, p.25". Page 25 of the CEPA report provides unambiguous advice that the best practice for a regulator would be to estimate E[Rm] assuming that the low levels of the government bond yields would tend to be associated with high levels of the E[MRP] measured relative to those government bond yields.

> *The latter has been implied by several authors (e.g. Smithers and Co, Wright) on the basis that the real cost of equity is stable in the long run, and so if a regulator allows for an adjustment in the risk-free rate (based on observable data) it must therefore also make an equal and opposite adjustment to the MRP in order to keep a constant MRP* [sic] *(assuming an equity beta of 1). Given our assessment above on the arguments in favour of a stable long run real cost of equity (which we consider to be reasonably strong), we consider that this argument is reasonably logical.*[49]
>
> *(*Note that the second MRP appears to be typographical error and CEPA presumably mean *"…to keep a constant expected return on the market")*

90. CEPA do state that, the empirical evidence in support of this is less than perfectly conclusive (which is unsurprising given the noise in realised return data). In the next paragraph CEPA state:

> *However, this leads us on to the former point, which is whether a negative relationship is supported by empirical evidence. Unfortunately, this relationship is difficult to test empirically as the MRP is unobservable and any regressions would rely on developing a robust/consistent time series of investors' expectations.*
>
> …
>
> *Overall, we do not think that there is enough evidence to justify making a firm conclusion about the relationship between the MRP and risk-free rate. Our research indicates that there* may *be a relationship, but that we have been unable to conclude either that this relationship* definitely does *or* definitely does not *exist.* [50]

91. Even so, it is this latter statement that the AER relies on in support of its approach – not the prior statement where CEPA sets out their view of what would be the best estimate.

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49 CEPA, *Advice on estimation of the risk free rate and market risk premium,* March 2013, p.25.

50 CEPA, *Advice on estimation of the risk free rate and market risk premium,* March 2013, p.25.

92. Similarly, McKenzie and Partington[51] provide the AER with a literature review on the determinants of E[Rm] and E[MRP]. As explained by CEG in the report of the expected return to the market[52], this literature is large and there are a number of articles that come to contradictory conclusions. Neither McKenzie and Partington nor the AER seek to use that literature to arrive at a conclusion about how to most accurately estimate variations in E[Rm] over time. Rather, the AER's key conclusion from the McKenzie and Partington literature survey is that there is an imperfect consensus in that literature. This imperfect consensus is then used as an input into its assessment of whether there is sufficient evidence to be certain that the AER's approach to estimating E[Rm] is wrong.

93. For example, I provided evidence that the current low CGS yields are associated with high spreads to other debt instruments (including low risk state government debt) and that this is an indicator of heightened risk premiums generally. The AER responded to this by relying on McKenzie and Partington, to conclude:

> *The AER considered the use of credit spreads to inform the forward looking MRP. However, there is no consensus in academic literature on the direction or magnitude of the relationship between observed credit spreads and the MRP. The lack of academic consensus on the direction of any relationship casts doubt on the reliability of drawing any conclusions on the MRP from observable debt premiums. Moreover, the inability to reliably quantify the magnitude of any relationship limits its usefulness in a regulatory framework. For these reasons, the AER has given limited weight to credit spreads when estimating the MRP.*[53]

And:

> *The above analysis, including the summary included in the McKenzie and Partington report, demonstrates that the relationship between debt and equity premiums is complex and unresolved. For these reasons, the AER has given limited weight to the analysis provided by SFG and CEG.*[54]

94. The AER did not attempt to determine whether, despite a lack of perfect consensus in the literature, the general thrust of the evidence and literature tended to imply a higher E[MRP] than otherwise. Rather, the AER relied on a lack of consensus in the

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51 McKenzie, M., and G. Partington (2013), Review of the AER's overall approach to the risk-free rate and market risk premium, prepared on behalf of the Securities Industry Research Centre of Asia-Pacific (SIRCA) Limited, 28th February 2013.

52 CEG, Estimating the return on the market, prepared for the Energy Networks Association, June 2013.

53 AER (2013), Access arrangement final decision, Multinet Gas (DB No. 1) Pty Ltd, Multinet Gas (DB No. 2) Pty Ltd, 2013–17, Part 3: Appendices, Australian Energy Regulator, March 2013; page 46.

54 AER (2013), Access arrangement final decision, Multinet Gas (DB No. 1) Pty Ltd, Multinet Gas (DB No. 2) Pty Ltd, 2013–17, Part 3: Appendices, Australian Energy Regulator, March 2013; page 47.

literature to conclude that this could not provide overwhelming evidence that its estimate was wrong.

95. Of course, there is, equally, a lack of consensus in the literature that the best estimate of the E[MRP] is invariant through time and should be based on a historical average. Indeed, as described in my companion report[55] co-authored with Professor Bruce Grundy, the vast majority of the evidence and literature would reject this as the best estimate of the E[MRP]. The overwhelming evidence from the literature would support the E[MRP] being estimated using the DGM. Similarly, an argument that starts with 'nobody knows for sure' and ends with a justification for adopting an E[MRP] estimate based on historical averages could just as easily be used as a justification for arriving at an E[Rm] estimate based on historical averages. Indeed, as Professor Grundy and I demonstrate in our companion report,[56] the latter is a more justified end point of such an argument.

96. Another example of the AER's approach is provided by the below quote from the AER. In this quote the AER is reporting that McKenzie and Partington[57] again report a 'lack of consensus' in the literature – this time about the negative relationship between government bond rates and E[MRP]. Despite, in this instance, McKenzie and Partington reporting on the 'weight' of the evidence in the literature that would suggest a higher E[MRP] be paired with a low rate on the zero beta proxy (such as CGS), the AER's focus is on the lack of consensus.

> *However, McKenzie and Partington have performed a comprehensive literature review and found there is academic support for both a negative and a positive relationship. They conclude the relation between the MRP and the level of interest rates is an open question and this relation is not sufficiently well established to form the basis for a regulatory adjustment to the MRP[58].*
>
> [T]here are competing theoretical and empirical models which support both positive and non–positive relations between the debt risk premium and the equity risk premium. There is no clear consensus, **but the weight of evidence may somewhat favour a non–positive relation**. What

55 CEG, Estimating the return on the market, prepared for the Energy Networks Association, June 2013.

56 See section 5 of CEG, Estimating the Return on the Market, prepared for the Energy Networks Association, June 2013.

57 McKenzie, M., and G. Partington (2013), Report to the AER, The relationship between the cost of debt and the cost of equity, prepared on behalf of the Securities Industry Research Centre of Asia-Pacific (SIRCA) Limited, 14th March2013; page 10.

58 AER (2013), Access arrangement final decision, Multinet Gas (DB No. 1) Pty Ltd, Multinet Gas (DB No. 2) Pty Ltd, 2013–17, Part 3: Appendices, Australian Energy Regulator, March 2013; page 32.

is clear, given the mixed evidence, is that the relation is not strong and stable. [Emphasis added.]

97. A direct consequence of this AER position is that the AER does not seek, and nor does it rely upon evidence about the current E[Rm] (and therefore the E[MRP] today) to justify a position that the expected return on the market has fallen (stayed constant). Rather, the AER relies almost entirely on evidence to the effect that it is 'difficult' to know the right answer and so its preferred null hypothesis (E[MRP] is constant/independent of CGS yields) cannot be rejected with a "sufficient" degree of certainty.

98. The AER is clearly not pursuing an objective of arriving at the best estimate of E[Rm] in the prevailing market conditions. I am instructed that the Rules that govern AER decisions have changed and that, even if it was acceptable under the old Rules, under the new Rules it is clearly not acceptable for the AER to take strong positions that past practice in setting E[MRP] should be retained.

7 Views of experts

7.1 RBA and Treasury/AOFM letters

99. In response to a report written for the Victorian gas businesses,[59] the AER sought two letters from the RBA and Treasury/AOFM[60]. The Victorian gas draft decision refers to these letters as support for rejecting arguments that CGS is not the best proxy for the risk free rate. However, in my view, these letters provide support for my firm view is that the factors driving down CGS yields cannot be presumed to be driving down equity yields.

7.1.1 My interpretation of RBA and Treasury/AOFM letters

100. Nothing in the letters contradicts the observations that I put and, on the contrary, the content of these letters is strongly supportive of my views. Specifically:

- Increased demand for CGS is driven by increased levels of risk/risk aversion leading to a 'flight to quality'.
  - RBA paragraph 2 on page 1, first sentence.
  - Treasury/AOFM paragraph 3 on page 1. Also, paragraph 2 under the first question answered on page 2.
- A factor contributing to the elevated demand for CGS is the reduced supply of alternative AAA rated liquid government bonds. Hence, there has been heightened demand for for CGS by foreigners.
  - RBA paragraph 2 on page 1, second sentence.
  - Treasury/AOFM paragraphs 3 and 4 under the first question answered on page 2.
- Risk premiums for other assets, including but not restricted to equities, measured relative to the CGS have increased as part of the same 'flight to quality'.
  - RBA paragraph 2 on page 1, in particular the last two sentences. Note the last sentence:

59 CEG, 'Internal consistency of risk free rate and MRP in the CAPM', March 2012.

60 RBA, *Letter regarding the Commonwealth Government Securities Market*, Guy Debelle, Assistant Governor, Financial Markets, Reserve Bank of Australia, 16th July 2012, p. 1–2.

Australian Government, The Treasury, *Letter to Joe Dimasi, ACCC, regarding the Commonwealth Government Securities Market,* 18th July 2012.

"This widening indeed confirms the market's assessment of the risk-free nature of CGS and reflects a general increase in risk premia on other assets."

I regard this as a clear statement in support of my central position.

- Treasury/AOFM final paragraph under the first question answered on page 2.

- As a general rule market risk premia are unstable and adding a fixed MRP to a floating CGS yield cannot be presumed to give accurate results. An important cross-check is provided by asking whether the assumption of a fixed MRP is consistent with the observed changes in risk premiums on debt.
  - RBA last two paragraphs on page 1 (including overleaf to page 2).

101. Notably, the AER interprets the last two paragraphs on page 1 of the RBA letter in a different manner than I do above. In order to describe why I believe the AER's interpretation is incorrect, consider the two paragraphs from the RBA letter in question:

I therefore remain of the view that CGS yields are the most appropriate measure of a risk-free rate in Australia.

That said, market risk premia are unlikely to be stable through time. While it is a reasonably simple matter to infer changes in debt risk premia from market prices, it is less straightforward to do so for equity premia. In making use of a risk-free rate to estimate a cost of capital, it is important to be mindful of how the resulting relativity between the cost of debt and that of equity can change over time and whether that is reasonable.

102. Noting also, for context, that the RBA has already said in its letter that there has been a "general increase in risk premia on other assets" (which the RBA does not limit to debt assets). My interpretation of what the RBA is saying is embodied in my paraphrasing below:

"Be conscious that market risk premiums are unstable through time. While you can easily and directly measure risk premiums in debt markets and these are rising (as we described above), you can less easily observe risk premiums for equities. However, the natural assumption would be that if risk premiums on debt assets are widely rising then risk premiums on equities are as well. Using a historically low CGS as the risk free rate, but applying fixed risk premia for equities, might result in an unrealistically low cost of equity – especially in the context where debt risk premiums have been rising. It would be prudent to be mindful of this relativity given that debt and equity risk premiums are likely to be related."

7.1.2 AER interpretation of RBA letter

103. By contrast, the AER takes a very different interpretation of the RBA letter.[61]

> *Further, recent advice from the Reserve Bank of Australia (RBA) also touches on the relationship between the cost of debt and the cost of equity. The RBA noted that there was a general increase in the spread between CGS and other Australian-denominated debt securities (i.e. an increase in the DRP). However, the RBA cautioned against directly equating changes in the cost of debt with changes in the cost of equity:*
>
> While it is a reasonably simple matter to infer changes in debt risk premia from market prices, it is less straightforward to do so for equity premia. In making use of a risk free rate to estimate a cost of capital, it is important to be mindful of how the resulting relativity between the cost of debt and that of equity can change over time and whether that is reasonable.[62]
>
> *Consistent with this advice from the RBA, the AER is mindful of the relative positions of the cost of debt and cost of equity set in this decision. The AER considers that, since the cost of equity exceeds the cost of debt, this check indicates that the AER's estimates are reasonable.*

104. In my view, the above quote from the RBA letter does not provide the full context relevant to its interpretation. The above quote does not include the first sentence of the paragraph from the RBA letter.[63] The AER also does not include the preceding one sentence paragraph which, in my view, is critical to the interpretation of the RBA letter. In short, the following (highlighted) critical introduction to the AER's version of the quote is missing:

> *I therefore remain of the view that CGS yields are the most appropriate measure of a risk-free rate in Australia.*
>
> ***That said,*** *market risk premia are unlikely to be stable through time. While it is a reasonably simple matter to infer changes in debt risk premia from market prices, it is less straightforward to do so for equity premia. In making use of a risk-free rate to estimate a cost of capital, it is important to be mindful of how the resulting relativity between the cost of debt and that of equity can change over time and whether that is reasonable.* [Emphasis added.]

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61 AER (2013), Access arrangement draft decision, Multinet Gas (DB No. 1) Pty Ltd, Multinet Gas (DB No. 2) Pty Ltd, 2013–17, Part 3: Appendices, Australian Energy Regulator, September 2012; page 67.

62 RBA, *Letter regarding the Commonwealth Government Securities Market*, Guy Debelle, Assistant Governor, Financial Markets, Reserve Bank of Australia, 16th July 2012, p. 1–2.

63 Which would normally be made transparent by inclusion of "…" at the start of the quote.

105. The first (omitted) sentence of the second paragraph begins with the words "that said", explicitly linking the use of CGS as a risk free rate[64] to the fact that risk premia (measured relative to CGS) are unstable. In the final sentence, the RBA cautions the AER, in the context of this instability, to be mindful when setting the MRP, of the relativity between debt and equity costs. Earlier in the same letter the RBA stated that:

> *…there has been a widening in the spreads between CGS yields and those on other Australian dollar-denominated debt securities. This widening indeed confirms the market's assessment of the risk-free nature of CGS and reflects a general increase in risk premia on other assets.*

106. Notwithstanding this context, the draft decision would seem to equate the sentence from the RBA letter that states:

> *While it is a reasonably simple matter to infer changes in debt risk premia from market prices, it is less straightforward to do so for equity premia.*

with an interpretation that: [65]

> *…the RBA cautioned against directly equating changes in the cost of debt with changes in the cost of equity.*

107. I think that this is the opposite of the correct interpretation of the RBA letter. The AER's interpretation would be unreasonable if the statement from the RBA was:

> *While it is a reasonably simple matter to infer changes in debt risk premia from market prices, it is less straightforward to do so for equity premia.*

108. That sentence simply makes the obvious point that yields on debt can be directly observed but this is not the case for equities. There is no obvious 'caution' involved in that factual statement. Moreover, if the RBA was trying to sound a cautionary note, then it would not have followed the previous sentence with the last sentence of the paragraph – which does come across as a direct recommendation to the AER to have regard to movements in the risk premiums on debt when setting the risk premiums on equity.

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64 It should be noted here that the RBA was not asked, and does not explicitly opine, on the use of CGS as a proxy for the required return on a zero beta asset in the CAPM. It is unclear whether the RBA's reference to 'risk free rate' simply means default free or the more technical meaning within the context of the CAPM. However, in any event, no part of my analysis of the RBA letter turns on which definition the RBA is using.

65 AER (2013), Access arrangement draft decision, Multinet Gas (DB No. 1) Pty Ltd, Multinet Gas (DB No. 2) Pty Ltd, 2013–17, Part 3: Appendices, Australian Energy Regulator, September 2012; page 67.

7.1.3 AER claim to satisfy RBA recommendation

109. The AER letter to the RBA attached to my report of March 2012 made clear that it was this report that had given rise to the questions that were being put to the RBA.[66][67]

> *I am writing to seek your advice regarding current conditions in the market for nominal Commonwealth Government Securities (CGS). This advice is sought in the context of a report the Australian Energy Regulator (AER) is reviewing by Competition Economists Group (CEG) titled 'Internal consistency of risk free rate and MRP in the CAPM' dated March 2012.*

110. It is therefore appropriate to interpret the RBA's reference to the 'cost of debt' and 'debt risk premia' in the context of my report. My report did not have any analysis of the relationship between the cost of debt for an individual firm and the cost of equity for the same firm. My report made the general point in relation to rising risk premia for a range of debt instruments consistent with the analysis in section 3 above.

111. The RBA's statements about being mindful of relativities must be interpreted in the context of my report which the RBA was asked to review – a report which precisely advised the AER to be mindful of the relativities between the equity risk premium and the risk premium on these debt instruments.

112. Unfortunately, the draft decision's interpretation appears to be simply that the RBA was advising them to make sure that the cost of equity for a regulated business was set above the cost of debt for that business: [68]

> *Consistent with this advice from the RBA, the AER is mindful of the relative positions of the cost of debt and the cost of equity set in this decision. The AER considers that, since the cost of equity exceeds the cost of debt, this check indicates that the AER's estimates are reasonable.*

113. In my view, such an interpretation is not a correct description of the RBA caution. Even if the RBA letter was referring to the relativity between the cost of debt and equity for a single business, it could not reasonably be interpreted as suggesting that the only thing necessary was for one variable to sit above the other.

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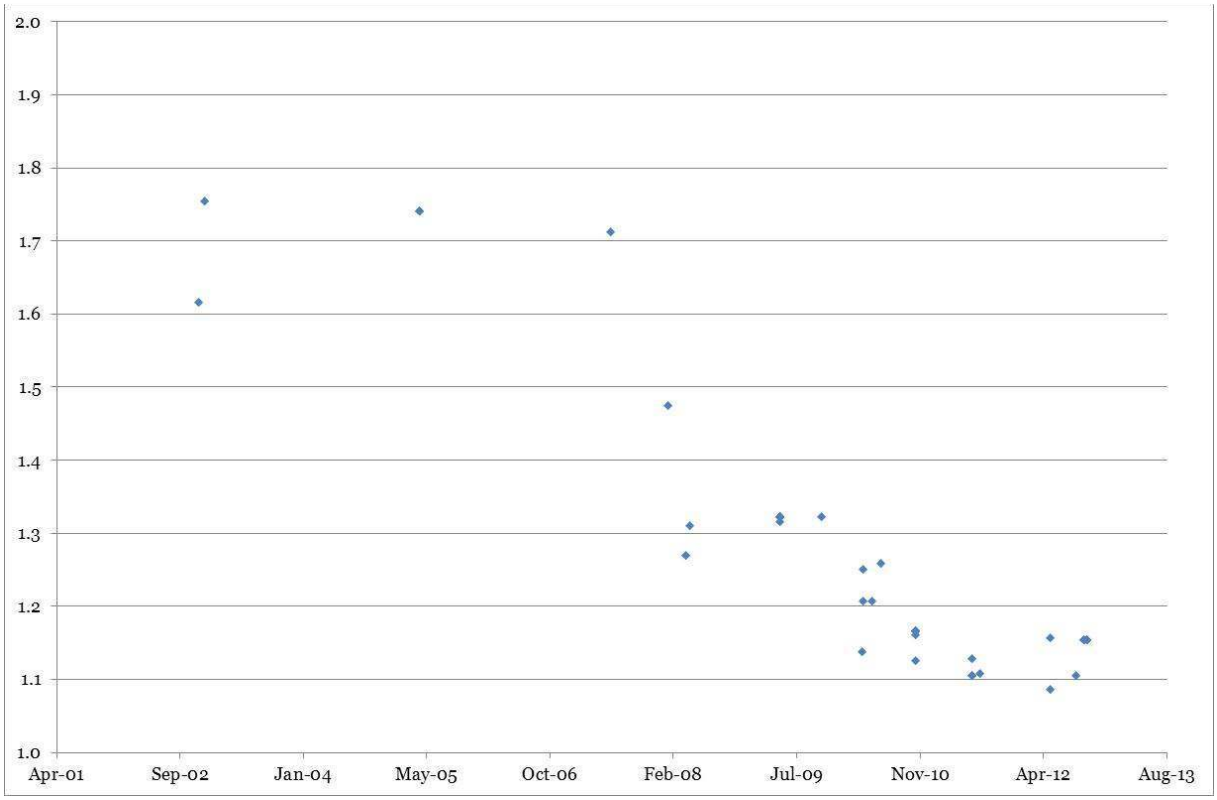
66 AER letter to the RBA dated 27 June 2012.

67 Indeed, the AER letter drew the RBA's attention to the fact that I had made numerous references to RBA publications. The AER letter stated "we would appreciate any views you may have on CEG's interpretation of those quotes". The RBA letter is explicitly silent on the question of whether I had correctly interpreted/characterised the RBA publications. However, I note that the letter expresses views consistent with the core of the views that my report contained.

68 AER (2013), Access arrangement draft decision, Multinet Gas (DB No. 1) Pty Ltd, Multinet Gas (DB No. 2) Pty Ltd, 2013–17, Part 3: Appendices, Australian Energy Regulator, September 2012; page 67.

114. I agree with the AER that the cost of equity should be greater than the cost of debt, but this is only a necessary and not a sufficient condition to ensure that their relativity is reasonable. I also note that it is striking to consider how the relativity between the AER allowed cost of equity and debt have changed over the last 10 years. The chart below shows the ratio of the cost of debt to the cost of equity for decisions since 2002.

Figure 12: Ratio of cost of equity to cost of debt in AER/ACCC decisions



Source: AER regulatory decisions, CEG analysis

7.1.4 RBA statement about rising risk premiums not restricted to debt

115. For completeness, note that the AER states:

> *The RBA noted that there was a general increase in the spread between CGS and other Australian-denominated debt securities (i.e. an increase in the DRP).*

116. The RBA did note this. The RBA also, in the following sentence, stated:

> *This widening indeed confirms the market's assessment of the risk-free nature of CGS and reflects a general increase in risk premia on other assets.*

117. This statement by the RBA is not confined to Australian-denominated debt securities – but would appear to cover all assets including equities.

7.2 IMF assessment of factors driving down safe asset yields

7.2.1 Shrinking supply of safe sovereign debt

118. In April 2012, the IMF released a detailed analysis of factors driving down the yields on safe assets worldwide (i.e., not just in Australia). The IMF summarised its analysis in the following manner:

> *On the **supply side**, concerns about high government debts and deficits in some advanced economies have reduced the perceived safety of government debt. Recent rating downgrades of sovereigns, previously considered to be virtually riskless, show that even highly-rated assets are subject to risks.*
>
> *The number of sovereigns whose debt is considered safe has fallen. IMF estimates show that safe asset supply could decline by some $9 trillion—or roughly 16 percent of the projected sovereign debt—by 2016. Private sector issuance of safe assets has also contracted sharply on poor securitization practices in the United States.*
>
> *Safe asset scarcity will increase their price, with assets perceived as the safest affected first. Investors unable to pay the higher prices would have to settle for assets that have higher levels of risk.*[69]

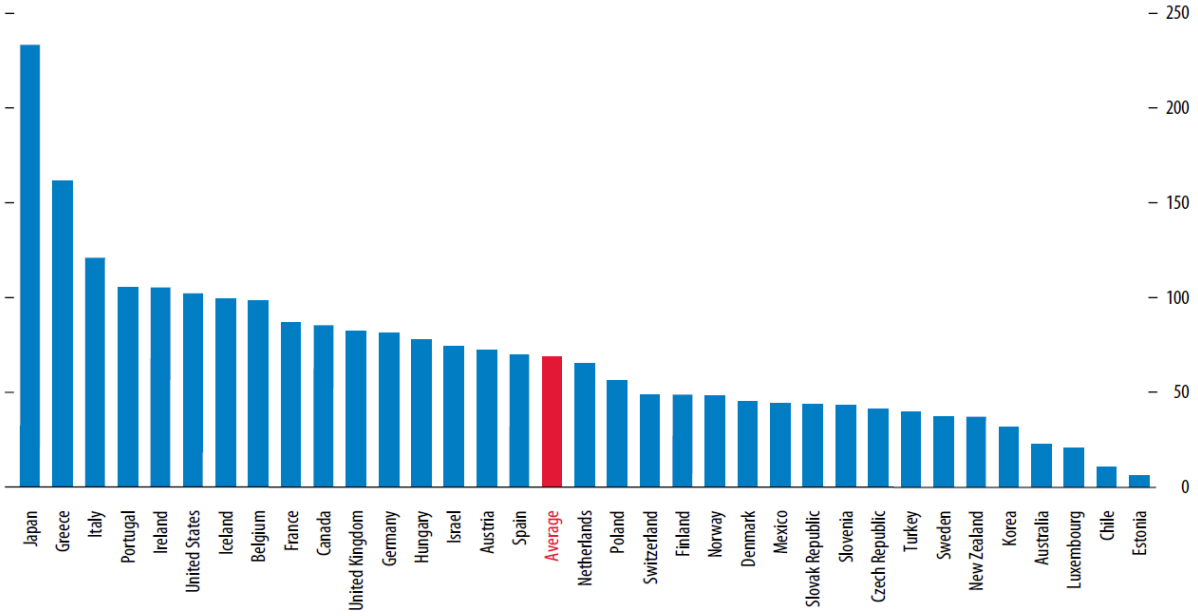
119. Put simply, the amount of sovereign debt that investors perceive as safe has dramatically declined with the Eurozone debt crisis.

120. The demand for Australian CGS has benefited from this reduction in the perceived safety of other sovereigns' debts. The relatively strong fiscal position of the Australian Commonwealth Government is illustrated in the IMF chart below.

69 See IMF summary at: http://www.imf.org/external/pubs/ft/survey/so/2012/POL041112A.htm.

Figure 13: IMF estimates of Sovereign indebtedness relative to GDP

Figure 3.12. OECD Countries: General Government Gross Debt Relative to GDP, End-2011
(In percent)



Source: IMF, World Economic Outlook database.

121. Australian CGS are now amongst very few developed country government bonds that have a AAA credit rating from S&P. The downgrade of US and French Government debt in 2011 (preceded by downgrades to most other Eurozone Government debt) left Australia one of only a very small club of AAA rated sovereigns.[70] This has been associated with a significant increase in demand for CGS by foreign institutions looking for AAA rated sovereign debt.

122. The head of the Australian Office of Financial Management (AOFM) has been quoted in the press explaining the fall in CGS yields as not just a flight from equities but also as a spill-over from the reduction in the availability of AAA rated government debt in the rest of the developed world. RBA Assistant Governor, Guy Debelle, was quoted in the same article commenting on increased demand for CGS from foreigners:[71]

70 The others being Canada, Denmark, Finland, Germany, Luxemburg, Netherlands, Norway, Singapore, Sweden, Switzerland and the UK.

71 The Age, *Australia reaps bond windfall*, Tim Colebatch, *February 16, 2012* available at: http://www.theage.com.au/opinion/political-news/australia-reaps-bond-windfall-20120215-1t6q2.html#ixzz1oQQsnHCl.

> *"It's the product of a whole lot of influences," he said. "Australia is a AAA-rated sovereign, and that's a shrinking club. Investors might be taking money out of equity markets and putting it into the safety of bonds paying fixed interest.*
>
> *"There have been changes in currency level and hedging costs. It's not surprising that demand for Australian government securities should have risen in the current circumstances."*
>
> *Reserve Bank assistant governor Guy Debelle said this week the demand for Australian bonds was coming largely from the sovereign wealth funds of foreign governments.*
>
> *Mr Debelle said the Reserve estimated that 75 per cent of Australian bonds were owned offshore. He said foreign demand for Australian bonds could be partly responsible for the recent strength of the Australian dollar.*

123. It is clear that the IMF, the AOFM and the RBA[72] all believe the shrinkage in the supply of safe sovereign debt globally is raising demand for the 'shrinking pool' of remaining safe sovereign debt – of which Australian CGS are a part. However, the key question is whether this is also leading to heightened demand for Australian listed equities. If the answer is 'no' then it is wrong to assume that historically depressed CGS yields are associated with historically depressed required equity returns (i.e., with a constant spot MRP).

124. In my view it is clear that this is not the case and this is consistent with the commentary of the IMF, AOFM and RBA.[73]

7.2.2 Shrinking supply of safe private debt (and inability to manufacture more)

125. The IMF also notes that the shrinking supply of safe sovereign debt has happened at the same time at which the perceived supply of safe private sector debt has also collapsed. Prior to the global financial crisis there was a large supply of highly rated private sector debt which investors regarded as substitutable for safe sovereign debt. However, as the IMF notes:[74]

> *The production of safe assets by the private sector largely collapsed with the onset of the global crisis. Total private sector securitization issuance declined*

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72 In addition to the above quote from RBA Assistant Governor Guy Debelle, see also section 7.1 *RBA and Treasury/AOFM letters*.

73 See also section 7.1.

74 IMF, Global Financial Stability Report, April 2012, Chapter 3, Safe assets: Financial System Cornerstone, p. 108.

from more than $3 trillion in the United States and Europe in 2007 to less than $750 billion in 2010 (Figure 3.14). The extraordinary volume of pre-crisis issuance was driven by the perception that the instruments were nearly risk-free while offering yields above those of the safest sovereigns. By construction, the high risk levels inherent to the lowest-rated (equity) tranches of the structured securities were expected to be offset by the near risk-free senior AAA-rated tranches. In reality, as the global financial crisis showed, the losses in the underlying portfolios were sufficiently large to threaten the solvency of even senior AAA-rated tranches. Moreover, the lack of information on the quality of the underlying assets made estimations of true asset value difficult and hence sensitive to sudden bad news. As a result, investors are still generally unwilling to invest much in these types of assets.

126. Consistent with this analysis, not only has the crisis led to a reduction in the supply of privately created safe assets it has also constrained the ability of the private sector to manufacture new assets perceived as safe.

7.2.3 Heightened demand for safe assets due to regulatory and other factors

127. The IMF nominates changes in banking regulations as an important driver for heightened demand for safe assets globally. The IMF argued that Basel III (and numerous other regulatory factors) would drive up demand for Government bonds.

128. In relation to Basel III heightened liquidity coverage ratios (LCRs) the IMF states: [75]

LCR requirements could have a sizeable impact on the global demand for safe assets. To fulfil the Basel III LCR requirements by end 2009, large G20 banks would have required approximately $2.2 trillion in additional liquid assets, at least partly in the form of sovereign debt assets, according to the 2010 Quantitative Impact Study (QIS) of the Basel Committee of Banking and Supervision… An extrapolation for smaller G20 banks and non-G20 banks – not included in the QIS sample – shows that the potential need for qualifying liquid assets globally is in the range of $2 trillion to $4 trillion, equivalent to 15 percent to 30 percent of banks' total current sovereign debt holdings.

129. The impact of Basel III on demand for CGS has been of particular concern domestically. In describing the implementation of Basel III, APRA's Charles Littrel has stated:[76]

75 IMF, Global Financial Stability Report, April 2012, Chapter 3, Safe assets: Financial System Cornerstone. Box 3.4 on page 100 "Impact of the Basel III Liquidity Coverage Ration on the Demand for Safe Assets".

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> *First, we intend to ensure that each bank reasonably optimises its use of Commonwealth Government Securities and semi-government securities, which are the most liquid assets in our market. But at the same time, holdings of this stock cannot allow the liquidity in these markets to be soaked up.*

130. The problem to which Charles Littrell is referring is that there simply are too few CGS and state government debt instruments on issue that will allow the Basel III induced demand for these assets to be satisfied (at least without destroying the liquidity of these assets). RBA Assistant Governor Guy Debelle has explained the magnitude of this effect in the following way.[77]

> *The Basel liquidity standard requires that banks have access to enough high-quality liquid assets to withstand a 30-day stress scenario, and specifies the characteristics required to be considered an eligible liquid asset.*
>
> *The issue in Australia is that there is a marked shortage of high quality liquid assets that are outside the banking sector (that is, not liabilities of the banks). As a result of prudent fiscal policy over a large run of years at both the Commonwealth and state level, the stock of Commonwealth and state government debt is low.* ***At the moment, the gross stock of Commonwealth debt on issue amounts to around 15 per cent of GDP, state government debt (semis) is around 12 per cent of GDP.[1] These amounts fall well short of the liquidity needs of the banking system.*** *To give you some sense of the magnitudes, the banking system in Australia is around 185 per cent of nominal GDP. If we assume that banks' liquidity needs under the liquidity coverage ratio (LCR) may be in the order of 20 per cent of their balance sheet, then they need to hold liquid assets of nearly 40 per cent of GDP.*
>
> ***The net stock of Commonwealth government debt on issue is considerably lower at 6 per cent*** *of GDP, reflecting the assets held by the Commonwealth government, including through the Future Fund.*

131. Lancaster and Dowling in the RBA Bulletin make the same observations about the impact of Basel III on demand for CGS and state government debt:[78]

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76 APRA's Basel III Implementation rationale and impacts, Charles Littrell, Exec. GM, Policy, Research and Statistics, APRA, APRA Finsia Workshop, Sydney, 23 November 2011.

77 Guy Debelle, RBA Assistant Governor (Financial Markets), Speech to the APRA Basel III Implementation Workshop 2011 Sydney - 23 November 2011.

78 Lancaster and Dowling, *The Australian Semi-government Bond Market*, RBA bulletin, September Quarter 2011.

> *The demand for semi-government securities is likely to increase over coming years as the introduction of Basel III reforms requires banks to hold higher levels of liquid assets,* ***which include semi-government securities, as well as Commonwealth Government securities (CGS),*** *balances held at the Reserve Bank of Australia and cash.* [Emphasis added.]

132. As a consequence of this recognised shortage of supply, the Basel Committee has explicitly stated that the RBA can attempt to fill the gap by providing a "Committed Liquidity Facility" as a substitute for banks holding CGS and state government debt. In order to access this facility banks would need to agree to pay a 15bp access fee even if they never used the facility (and a further 25bp of penalty interest rates in addition to the access fee if they did use the facility). This gives the bank the right to borrow (access liquidity) from the RBA using less liquid assets as collateral (under a margin scheme that prevents the RBA taking on any credit risk).

133. The only reason a bank would pay these fees for the right to borrow at a penalty interest rate would be if the scarcity/liquidity premium on CGS was high enough to justify this.

134. In justifying these fees Assistant Governor Debelle, in late November 2011 when CGS yields were at similar levels to those at the time of writing this report, made reference to the heightened liquidity premium that existed at that time.[79]

> ***While at times like the present, liquidity can have considerable value****, the Reserve Bank will not be varying the size of the fee through the cycle. Consequently, the facility is to be priced at a level that takes into account the value of liquidity in more normal conditions, as well as in stressed circumstances.*
>
> *…*
>
> *However, part of the point of the new liquidity regulations is to recognise that the market has under-priced liquidity in the past. Consequently, it is appropriate to levy a fee which is greater than [that] implied by a long run of historical data.* ***The net outcome is thus a weighted average of a relatively low liquidity premium in normal times and a much higher liquidity premium in stressed times.*** [Emphasis added.]

135. Importantly, Assistant Governor Debelle was clearly expressing the view that the liquidity premium in the CGS market was, in November 2011, at historically very high levels (and seemingly well in excess of 15bp). The implementation of Basel III is one reason to believe that this will remain so in the foreseeable future.

---

79 Guy Debelle, RBA Assistant Governor (Financial Markets), Speech to the APRA Basel III Implementation Workshop 2011 Sydney - 23 November 2011.

136. Basel III is only one of the regulatory developments following the global financial crisis that the IMF concludes will increase demand for safe assets. The others include:

- A shift of over-the-counter derivatives to central counterparties where safe assets are required for collateral;[80]
- limits on the reuse of collateral and the resulting reduction in the 'velocity' of collateral; [81] and
- higher risk weights in banking regulation for the holding of downgraded sovereign debt. [82]

7.2.4 Heightened demand for safe assets due to heightened uncertainty

137. The IMF analysis also argues that heightened uncertainty amongst investors is leading to heightened demand for safe assets.[83] Notably, the IMF analysis of a shortage of safe assets is not dependent on the existence of this heightened uncertainty. In fact, it is only one of the causes of the supply and demand imbalance and it is a cause which, in the IMF's view, is likely to be transitory. Hence, even if heightened uncertainty subsides, there will remain a supply and demand imbalance.

138. The RBA September 2011 Financial Stability Report makes the following consistent observations:[84]

> *Continued net inflows, particularly into superannuation and deposits, offset negative valuation effects associated with falls in share prices. Given the volatility in equity markets in recent years and higher returns being offered on deposits, households have become more conservative in their investment preferences, directing a larger share of their discretionary savings to deposits while* ***reducing direct equity investments. This is also consistent with surveys showing an increase over the past few years in the proportion of households nominating bank deposits as the wisest place for their savings and fewer nominating equities and real estate.***

80 IMF, op.cit., Box 3.2 on p. 96.

81 IMF, op.cit., see section "The Role of Safe Assets as Collateral, beginning on p. 96.

82 IMF, op.cit., see Box 3.3 on p. 97.

83 IMF, op.cit., see pp. 82, 83, 99 and 113 and summary Table 3.3.

84 RBA, *Financial Stability Review*, September 2011, p. 48

139. In response to a previous report that I prepared at the request of the Victorian gas businesses, the AER sought two letters from the RBA and Treasury/AOFM. In my view, the responses to the AER request provide strong support for my core proposition which is that the factors driving down CGS yields cannot be presumed to be driving down equity yields. I discuss these letters more fully in section 7.1, however, the following reproduction of the first paragraph of the RBA letter is pertinent:

> *In recent years, changes in investors' risk preferences and/or their perceptions of risk have seen a significant increase in demand for risk-free assets, such as CGS, globally. Within the Australian market, one notable source of demand for risk-free assets has come from non-resident investors, whose holdings of CGS now comprise more than three-quarters of outstanding supply. As a result, there has been a widening in the spreads between CGS yields and those on other Australian dollar-denominated debt securities. This widening indeed confirms the market's assessment of the risk-free nature of CGS and reflects a general increase in risk premia on other assets.*

140. This statement lines up closely with the IMF analysis provided above. It amounts to a rejection of the notion that one can assume that risk premiums relative to CGS have remained constant in the face of heightened demand for CGS. Indeed, the first two sentences nominate changed perceptions of risk as the reason for falling CGS yields. The third sentence makes clear that this has been associated with widening risk premiums.

7.2.5 IMF summary

141. The following table is the IMF's summary of the influences on the global supply and demand for safe assets. It summarises the reasons why the IMF believes:

> *The price of assets regarded as safe is on the rise, with supply dwindling and demand rising amid uncertainty in financial markets, regulatory reforms, and increased demand from central banks in advanced economies.*
>
> …
>
> *While the "price of safety" will inevitably rise, a smooth adjustment process can be ensured if policymakers are aware of their actions and their potential consequences.* [85]

[85] See IMF summary at: http://www.imf.org/external/pubs/ft/survey/so/2012/POL041112A.htm.

Table 1: IMF Table 3.3 (reproduced)

Table 3.3. Demand and Supply Factors and Their Anticipated Impact on Safe Asset Markets

Source of Demand	Investor Type	Important Short- to Medium-Term Factors	Expected Impact on Demand
Stable store of value in a portfolio management context	Reserve managers	Importance of safety considerations in strategic asset allocation and rising overall reserves, partly mitigated by increasing diversification and reallocation to sovereign wealth funds	↑
	Insurance companies and pension funds	Demand related to overall investment policy, but low-interest-rate environment may limit safe asset allocation by putting pressure on profitability	→
	Nonbank financial institutions	Flight to safety due to the European sovereign debt crisis (temporary effect related to the market turmoil)	↑
High-quality collateral for financial transactions	Banks and other financial institutions	Gradual shift of over-the-counter derivatives to central counterparties	↑
		Limits on the reuse of collateral and decreasing velocity of collateral	↑
		Increasing importance of secured funding sources for financial institutions with more differentiation in terms of applied haircuts in repo transactions[1]	→
Cornerstone in prudential regulations	Banks	Introduction of the liquidity coverage ratio (Basel III) (temporary effect)	↑
		Higher risk weights for riskier or downgraded sovereign debt	2
	Insurance companies	Treatment of sovereign debt and covered bonds under Solvency II	↑
Part of crisis-related liquidity provision	Central banks	Crisis-related monetary easing	↑
Benchmark for other assets	Banks and other financial institutions	Shift in the structure of demand toward assets that are perceived as relatively safer (e.g., U.S., U.K., Germany)	3

Source of Supply	Important Short- to Medium-Term Factors	Expected Impact on Supply
Sovereign issuers	Considerable deterioration of fiscal profiles in some advanced economies	↓
Private sector	Reduced effectiveness of traditional hedging instruments	↓
Central banks	Crisis-induced extension of liquidity provision	↑
Emerging markets	Restricted ability to generate safe assets (financial development, legal institutions, etc.) and lower degree of financial depth than advanced economies	→

Source: IMF staff.

Note: → indicates no impact; ↑ indicates an increase; ↓ indicates a decrease.

[1]Temporary effect due to disruptions of funding markets but possibly a more structural trend in the future.

[2]Possibly less demand for riskier or downgraded sovereign debt and higher demand for relatively safer or higher-rated sovereign debt as substitute.

[3]Overall impact will depend on evolution of perceptions of safety for benchmark assets.

8 True now versus true on average through history

142. AER regulatory precedent involves setting the cost of equity using the CAPM formula with a spot risk free rate proxy and an estimate of the E[MRP] that is *not* an explicit estimate of the forward looking E[Rm] less the spot risk free rate proxy. This is a violation of the CAPM formula unless the AER also argues that:

> *The best estimate of the forward looking prevailing cost of equity on the market is the prevailing 10 year CGS yield plus a more or less invariant MRP based predominantly on historical average excess returns.*

143. This is clearly not how the AER has previously argued for a 6% MRP.[86] In any event, this implies that the best estimate of the cost of equity for the market is an invariant increment to the 10 year CGS yield – such that the cost of equity for the market moves in 'lock step' with CGS yields.

144. The major propositions of this report are:

- that this is not a safe conclusion in general;
- it is not a safe conclusion in the specific context of the decline in CGS yields since late 2011; and
- even if it were a safe conclusion in general, including since 2011, it is not a safe conclusion in all relevant circumstances (i.e., in all averaging periods for the risk free rate).

145. The stronger form of this proposition states that, on average across most market circumstances, movements in the risk free rate are less than fully reflected in movements in the cost of equity. The weaker forms of this proposition state that:

- there are some periods where financial markets are beset by particular conditions, such as high degrees of uncertainty and/or risk aversion, the result of which is that the risk free rate and the MRP move in the opposite direction (i.e., the cost of equity does not fall in lock-step with the risk free rate);
- at least some of these market circumstances are able to be sufficiently clearly identified by the AER such that its cost of equity estimate can be set so as to

86 Notably, when the AER increased the MRP from 6.0% to 6.5% in the 2009 WACC review the logic clearly involved *not* setting an MRP that was 'right' at the time but one that it regarded would be 'right' on average over the period for which the SORI MRP would be in effect (i.e., 10 years for some businesses). The AER expected the 'prevailing' MRP to fall from above 6.5% to below 6.5% over the period for which the SORI (Statement of Regulatory Intent) would be applicable.

avoid incorrectly passing on the full reduction in CGS yields into the cost of equity estimate.

146. Even if the AER only accepted the weakest form of this proposition it still must, at a minimum, give material weight to evidence on the forward looking cost of equity for the market *from within the averaging period used to estimate the risk free rate*. That is, the AER needs to develop robust methods for estimating the forward looking cost of equity and these methods need to be deployed in *each* averaging period from which the prevailing risk free rate is estimated. Such an approach will inevitably require the AER to give more weight to DGM estimates of the cost of equity.

147. If the AER had put in place a method of this type, then it would not have made the error that I consider it clearly did make in the context of the RBP averaging period.

148. Moreover, when considering criticisms of its current method, the AER needs to distinguish between the strong form and the weak form of the proposition. To date, it has focussed on rejecting the strong form of the proposition and has implicitly assumed that this amounts to a rejection of the weak form of the proposition. This is an error.

149. Indeed, the weak form of the proposition is, in my view, impossible to reject. Examples where CGS yields have moved in the opposite direction to the forward looking MRP are undeniable and are entirely supported by the literature. The AER seemed itself accepted the truth of this in its Victorian draft decision.[87]

150. The AER has to date gathered no evidence that the prevailing cost of equity has fallen one-for-one with CGS yields. Rather, as described in the previous section, most of the evidence gathered by the AER has been to the effect that this cannot be ruled out with certainty.

151. Moreover, the evidence that the AER has regard to is only relevant to assessing the strongest proposition – that on average through time there has been a negative relationship between MRP and risk free rate. This includes evidence on historical patterns and relationships between bond yields and excess returns.

152. However, the weaker forms of the proposition are at least as important, if not more important, in terms of informing how the AER develops its approach to estimating the cost of equity. What is important is making sure the AER has the tools to arrive at the best estimate of E[Rm] in the discrete future windows that are business averaging periods. The AER may not be in a position to describe with high levels of confidence the behaviour of E[MRP] and E[Rm] in all market circumstances – but this does not mean that there is no relevant information to suggest E[MRP] or E[Rm] are different in the averaging period than they have been through history.

87 See section 3.2 above.

9 Lally analysis of stability of realised MRP and Rm

153. Professor Bruce Grundy and I have, in our companion report, separately surveyed the published academic literature on the predictability of realised returns and excess returns.[88]

154. Professor Lally[89] has attempted to perform his own empirical analysis to shed light on the reasonableness of the AER methodology. Lally examines a rolling average of 30 year real realised Rm and the realised MRP (Rm less 10 year CGS) and asks which of these is more stable. Lally concludes that realised MRP (30 year rolling average of) is more stable and therefore concludes along the lines:

> *If one must choose between holding E[MRP] or E[Rm] constant one should choose E[MRP] not E[Rm].*

155. Lally's analysis is flawed:

- Even if his empirical analysis was correct, the choice posed is not the choice facing the AER. Based on Lally's analysis the realised MRP and CGS yields are materially inversely related and this should be factored into the AER's estimate of E[Rm].
- Lally's empirical analysis is flawed:
  - Lally's empirical analysis suggests that the realised return excess return (relative to a 30 year rolling average of 10 year CGS) is more stable than the 30 year average realised Rm. This would support the AER's practice if the AER set the E[Rm] equal to 6% plus a 30 year rolling average of 10 year CGS yields. This is not what the AER does.
  - If this is what the AER did then it would result in a much higher (and, in my view, likely more accurate) E[Rm] than the AER methodology actually estimates today. What the AER actually does is add 6% to a 30 *day* average (not a 30 *year* average) of E[Real 10 year CGS yields].
  - In order to use historical realised return data to test this approach one needs a series for expected inflation (so that an E[Real 10 year CGS yields] can be derived and compared with the subsequent 10 year realised E[Real Rm]. No such series of expected inflation exists – making it impossible to use realised returns to test the accuracy of the AER's methodology.

88 CEG, Estimating the return on the market, prepared for the Energy Networks Association, June 2013.

89 Lally, M., "Review of the AER's methodology for the risk free rate and the market risk premium", Martin Lally, School of Economics and Finance, Victoria University of Wellington, 4th March 2013.

156. A more detailed discussion of these issues is provided in Appendix B.

Appendix A Estimating betas for CGS

A.1 Extending the Davis analysis of monthly CGS betas

157. If held to maturity, 10 year nominal CGS have a certain return, in nominal terms. However, they have an uncertain return in real terms – which is what matters to investors (noting also that the CAPM is a model of real returns). Moreover, they are not risk free in a CAPM sense for investment horizons less than 10 years (such as the weekly or monthly investment horizon used by the AER to estimate beta for utility companies). Following and updating the work of Davis[90] (previously relied on by the ACCC) I have estimated a time series for 3 year monthly betas (the sensitivity of monthly returns on 10 year CGS to the monthly return on the ASX200 accumulation index).

158. In order to estimate betas for 10 year government bonds, I calculated 36 month returns from a historical series of yields for a hypothetical[91] 10 year Government bond interpolated by the Reserve Bank of Australia (RBA)[92] for the period July 1995 to April 2013. The approach taken follows Davis' *interpolated yield method,* with some differences:

- The pricing formula: I used the excel price function to convert the yield data into prices rather than the RBA pricing formula used by Davis[93]. The RBA pricing formula adjusts for the time to next payment while the Excel price function does not. I do not consider this significant since the timing of coupon payments isn't relevant to the systemic economic conditions. Additionally, adjusting for the time to next payment is impractical since the yield data corresponds to a *hypothetical* 10 year bond.
- Market portfolio index: I used the All Ordinaries accumulation index to calculate market returns. Davis constructed and used a broader index by adding in returns on government bonds, but found that the correlation between returns on the All Ordinaries accumulation index and on the broader index was above 0.96 for all 36 month sub periods[94], though he found that the use of a broader index increased bond betas.[95]

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90 Davis, K., *The systematic risk of debt: Australian evidence.*

91 In the sense that a 10 year maturity bond does not always exist so the yield/price on that bond must be interpolated from other shorter/longer dated bonds.

92 "Capital Market Yields –Government Bonds-Daily – 1995-2013 – F2" at: http://www.rba.gov.au/statistics/tables/index.html#interest_rates.

93 Davis, K., *The systematic risk of debt: Australian evidence*, p. 14.

94 Davis, K., *The systematic risk of debt: Australian evidence*, p. 15-16.

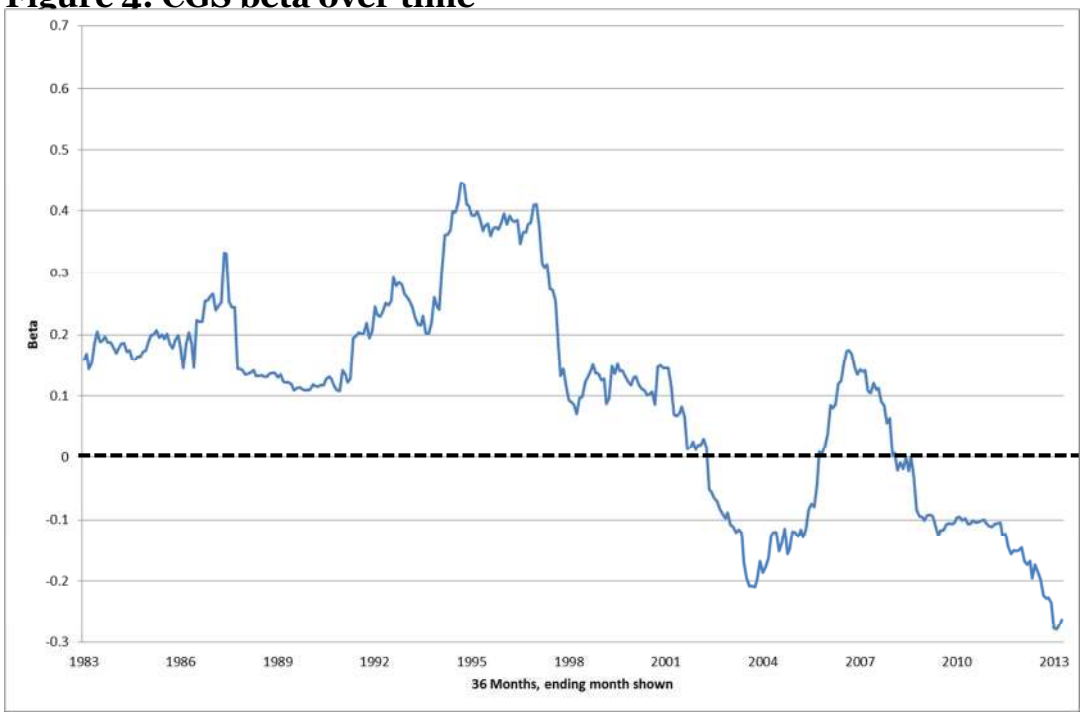
95 Davis, K., *The systematic risk of debt: Australian evidence*, p. 22.

159. For the period January 1983 to December 2003, our results (Figure 4) can be compared to Davis' 10 year betas (in blue in Figure 5). The results are very similar, with the only obvious difference being the level at which the betas plateaued over the period from January 1998 to February 2001 (0.1 versus 0.2 – it is not obvious to us why this difference exists).

160. I have extended the beta series beyond January 2004 (where Davis' series ends) through to January 2013, showing that the government bond 10 year beta increased to 0.17 in September 2006 before becoming negative in September 2008 and staying negative through to the end of our series in January 2013. The beta in January 2013 was the lowest since 1983, at -0.28.

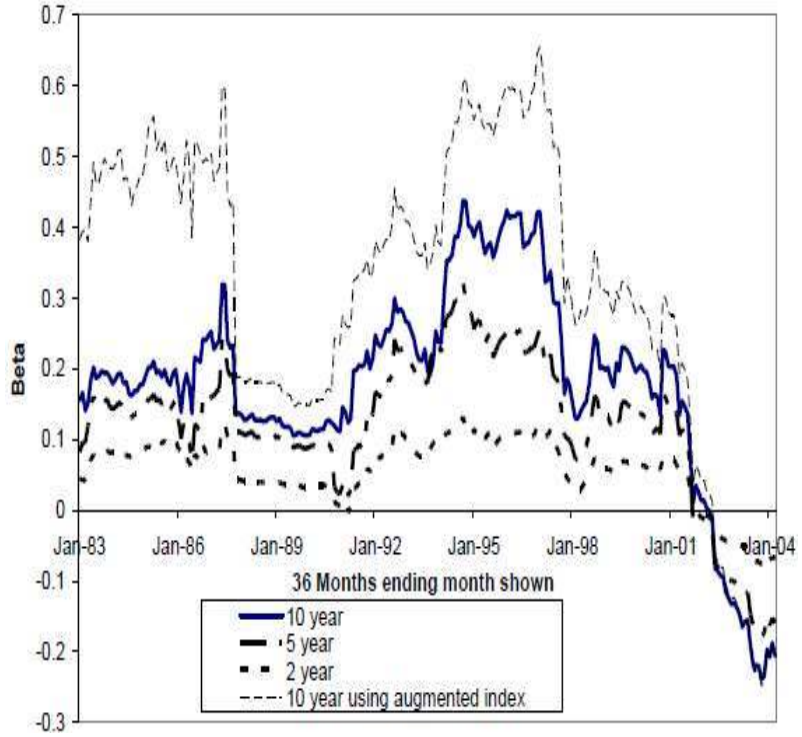
[See over page for graphical presentation of CEG and Davis results. These figures are not the same width in order for the reader to more clearly distinguish the period of time for which the CEG data does, and does not, overlap with the Davis data.]

Figure 4: CGS beta over time



Source: CEG analysis, RBA data.

Figure 5: Davis' CGS betas over time



Source: Davis, K., The systematic Risk of Debt: Australian Evidence, p. 29.

A.2 Calculating bond return series from the Brailsford et. al. data

161. I have estimated CGS betas using the same 100+ year data series used by the AER to estimate realised excess market returns relative to CGS yields. In doing so I have calculated a bond return series from the bond yield data used by Brailsford *et. al.*.[96] I have had to make an assumption about coupon payments associated with these bonds because coupon payments are not supplied in the Brailsford *et. al.* data. I have assumed that the bond yield reported by Brailsford *et. al.* reflects a 10 year bond yield and that the bond is bought in year t at par with a coupon that is equal to the yield in year t. I then use this information along with the yield in year t+1 to calculate the percentage change in price of the bond between year t and year t+1.

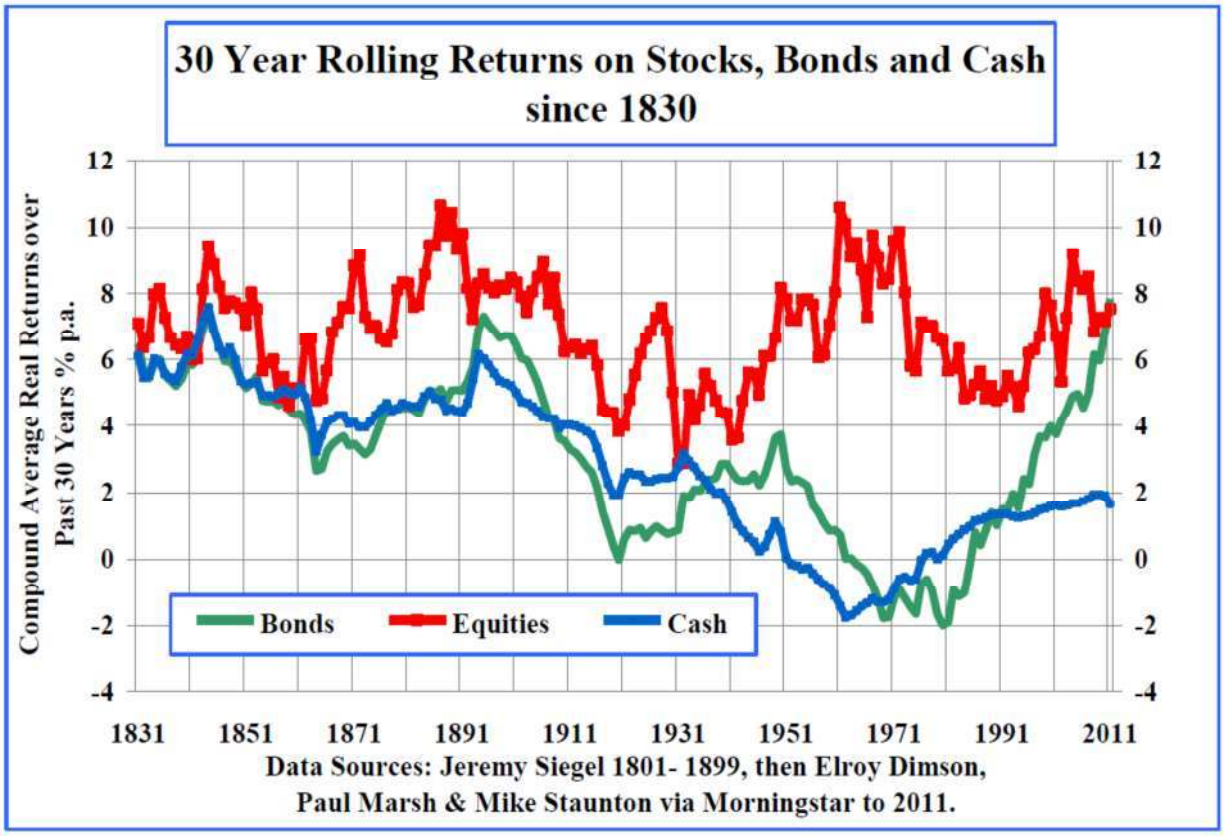
96 Brailsford, T., J. Handley and K. Maheswaran, The historical equity risk premium in Australia: Post-GFC and 128 years of data, Accounting and Finance, 2012, pages 237-247.

Appendix B Lally's analysis of historical Australian data

162. In section 2.2 of his report "Review of the AER's methodology for the risk free rate and the market risk premium", Lally responds to analysis by Wright provided[97] in support of a conclusion that the real market cost of equity is more stable than the market risk premium (MRP).

163. This figure below (from Wright) shows, using US data, the real return from buying stocks over different 30 year periods (the red line) and compares this with the real return from buying bonds (the green line) or cash (the blue line).

Figure 14: Reproduction of chart from page 5 of Wright



164. Lally argues that Wright's analysis can be made more relevant by:

97 The analysis that Lally is responding to is provided by Professor Stephen Wright on pages 5 and 6 of Wright's report named "Response to Professor Lally's Analysis" and dated 2 November 2012.

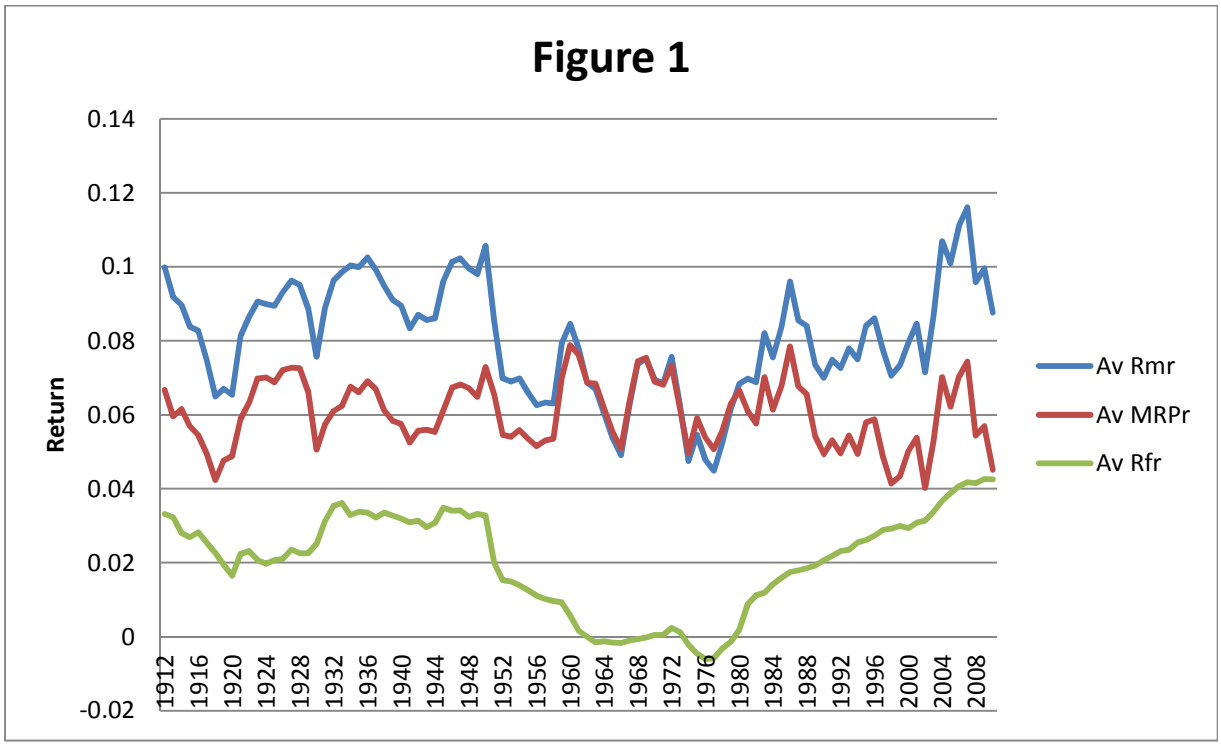
- Using Australian data; and
- Using bond yield rather than bond return data.

165. Lally performs his analysis using Australian data from Brailsford *et. al.* (2012). He constructs two series:

- a 30 year trailing average of real (i.e., inflation adjusted) market returns; and
- a 30 year trailing average of real (i.e., inflation adjusted) bond yields.

166. He then derives a third series as the difference between these which he describes as an "MRP" series. He then plots these series and his chart is reproduced below.

Figure 15: Reproduction of chart from page 14 of Lally



167. Notably, the 30 year average real yield on CGS has turned negative on occasion – which is symptomatic of the fact that CGS are exposed to inflation risk and, this observation alone, is sufficient to demonstrate that they are not a perfect proxy for the zero beta asset in the CAPM.

168. In Lally's chart it can be seen that 30 year average total real market returns are lower than average for the 30 year periods ending 1950 to 1990. This is more or less coincident with the period of lower than average 30 year bond yields. Consequently, Lally concludes that, measured using 30 year averages, the difference

between total market return and bond yields (the MRP series) is more stable than the total market return.

169. Lally confirms this using the standard deviation of the two series. He finds that the standard deviation of the total return series is more than the standard deviation of the MRP series (1.5% vs 0.9%). On this basis Lally concludes that the MRP series is much more stable than the real market cost of equity series. However this is due to Lally taking a different approach to the historically low real bond yield data between 1950 and 1990 in the construction of his Figure 1 than he takes elsewhere in his report to the estimation of the historical average MRP. Taking a consistent approach would lead to a higher standard deviation in the historical MRP series than in the historical Rm series.

170. In summary, Lally's key finding, namely, that his MRP series is more stable than his total return series, is driven by the behaviour of real interest rates in the period 1940 to 1990. However, elsewhere Lally states that this behaviour was "unusual" and driven by "abnormally high inflation". Elsewhere, Lally makes an adjustment to bond yields in this period the effect of which is to raise bond yields and lower the long run average MRP. However, the same adjustment would also increase the volatility of the Lally MRP series above that of the Lally total real return series – the reverse of his key finding in section 2.2 that the opposite is the case. [98]

[98] On page 29 of Lally, Review of the AER's Methodology for the Risk-Free Rate and the Market Risk Premium, 4th March 2013, Lally argues that the period from 1940 to 1990 was characterised by abnormally high inflation that tended to artificially lower real bond yields. This is the period that drives Lally's result in his Figure 1 (on page 14) that MRP is more stable than the total market return, i.e., the period where total market return and bond yields fall together – leaving the MRP series relatively constant.

Nonetheless, on page 29, Lally argues that this is not a real description of the behaviour of the truly expected MRP because he believes the realised real yield on CGS is artificially low due to unanticipated inflation. Lally argues that the MRP could be better estimated by assuming a 3.6% real risk free rate applied in these years (as a better proxy for the rates investors expected). This naturally leads Lally, on page 29, to arrive at a lower estimate of the historical average MRP (because he adopts a higher value for the real risk free rate and holds all else constant – thereby squeezing down the MRP series).

However, the same logic was not applied by Lally to the data in his Figure 1. Had Lally used his estimate of expected yields (rather than realised yields) from 1940 to 1990 his Figure 1 would give rise to a much more unstable MRP series – and one which is more unstable than the cost of equity series. This is because the real risk free rate series would not show the dramatic dip between 1950 and 1990 and, consequently, all of the dip in total market returns in that period would be manifested as a reduction in the MRP.

In terms of the specific effects on standard deviation estimates, I substitute a real risk free rate of 3.6% in the years from 1940 to 1990 into the Lally dataset. I then estimate a standard deviation in Lally's series of 30 year rolling average MRP of 1.7% - which is higher than the standard deviation in the 30 year rolling average total return series (1.5%). It is also the case that the negative correlation between the bond yield series and the MRP series would increase (from -0.12 to -0.39).

171. Even putting this internal inconsistency aside and focussing on the presentation of the historical data in section 2.2. alone, Lally acknowledged that there is an inverse relationship between his MRP series and his bond yield series. However, he argues that the correlation coefficient is "only -0.12" relative to a range of possible correlation coefficients from -1.0 to +1.0.

172. Lally also assesses views by Wright about why the expected MRP is inversely related to the risk free rate. He finds the arguments either plausible or uncontroversial. However, he argues that the existence of an inverse relationship is not sufficient because:

> *"...the **crucial question** is not whether the correlation is negative but whether it is sufficiently negative, because a negative correlation is not a sufficient condition for the real market cost of equity to be more stable than the MRP, i.e., it is not a sufficient condition for the time-series variance in the real market cost of equity to be less than that for the MRP."*

B.1 Flaws in Lally's section 2.2. analysis

173. Lally states he was asked to "critically evaluate the claims that the cost of equity is more stable over time than the market risk premium (MRP) and that the MRP is negatively correlated with the risk free rate, with the latter proxied by the Commonwealth Government Security (CGS) yield." In doing so he has sought to use Australian data to assess whether the US empirical evidence that Wright referred to is replicated in Australia.

174. However, Lally has not faithfully reproduced the analysis relied on by Wright using Australian data. Instead he has amended Wright's analysis by using bond yields rather than bond returns as the basis of his 30 year average bond series. As set out below, this is a significant change with significant implications.

175. Lally justifies this amendment on the grounds that it results in an analysis that is more relevant given Australian regulatory precedent. However, the end result provides neither:

- results that can be meaningfully interpreted nor directly compared with Wright's results; nor
- a series that is truly consistent with AER regulatory precedent.

B.1.1 Faithful reproduction of Wright's analysis

176. I have used Lally's data in order to create a more faithful reproduction of Wright's analysis – using bond returns rather than bond yields.

177. Bond returns differ from bond yields in that bond returns include the change in the value of a bond over the relevant year (that is bond returns include both coupons plus capital gains while bond yields assume that the bond is worth the same at the end of the year as it was at the beginning).

178. Bond yields and bond returns tend to move in opposite directions. If, as has been the case since the global financial crisis, bond yields have tended to fall then this tends to be associated with an increase in bond prices – raising bond returns even though bond yields are falling. Indeed, this is how lower yields are achieved in the market; investors pay more for a bond and that higher price reduces the yield (the return on the purchase price) delivered by the bond's coupons.

179. I repeat here an example from the body of this report using a perpetual bond. A perpetual bond is a bond that pays a fixed coupon forever and this property allows us to use a simple formula for the relationship between the price and yield on the bond:

$$Yield\ on\ bond = \frac{Bond\ coupon}{Price\ of\ bond}$$

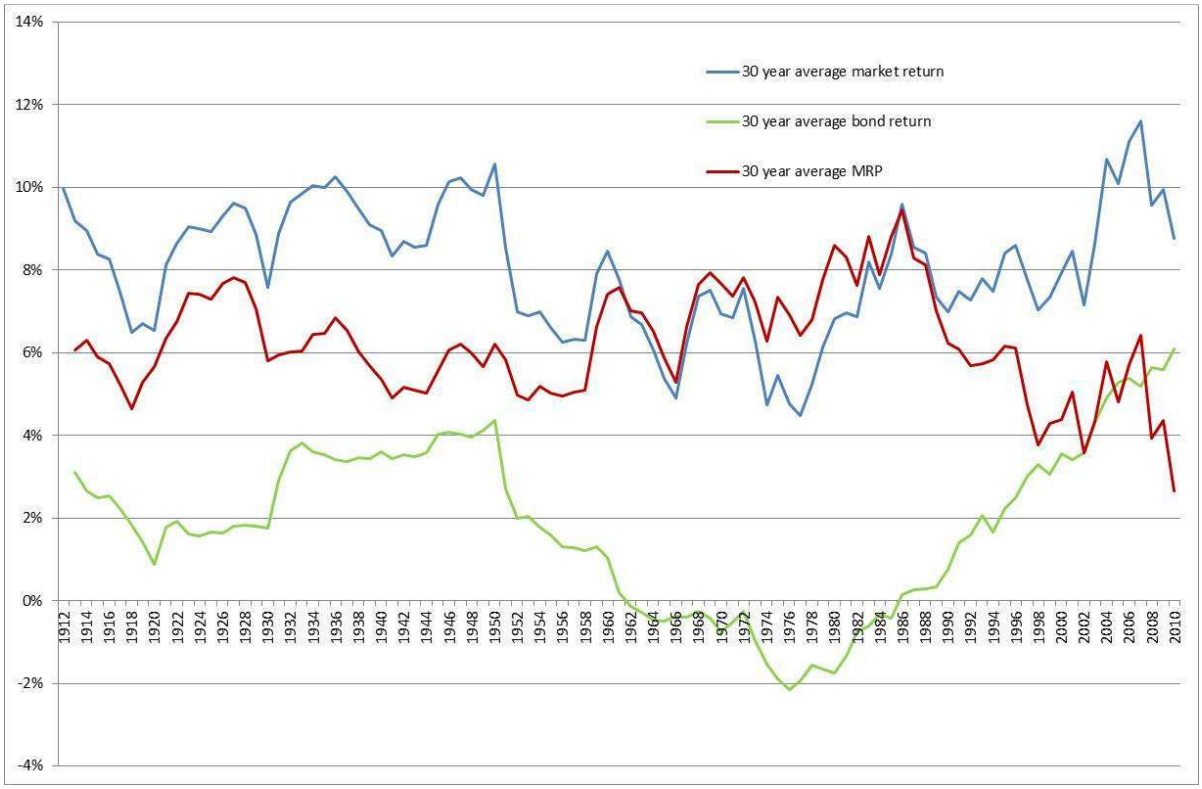
180. Now consider a situation where the yield on the bond halves from 4% to 2%. This is just another way of saying that the price of the bond doubled. Thus, a reduction in yield of 2% is associated with a capital gain on the bond of 100%. This illustrates how capital gains/losses and bond yields move in opposite directions and why capital gains/losses can dwarf yields. The relationship between bond prices to bond yields is more complex with non-perpetual bonds but the basic principle is the same. Higher/lower bond yields are brought about by lower/higher bond prices.

181. I have calculated a bond return series from the bond yield data supplied by Lally. In order to do so I have had to make an assumption about coupon payments because coupon payments are not supplied in the Lally data. I have assumed that the bond yield reported by Lally reflects a 10 year bond yield and that the bond is bought in year t at par with a coupon that is equal to the yield in year t. I then use this information along with the yield in year t+1 to calculate the percentage change in the price of the bond between year t and year t+1. When I make only this change to Lally's analysis (i.e., using bond returns rather than bond yields) I derive the following figure – which I note is much more similar to Wrights' figure in recent years.[99]

[99] For example both Wright and myself have a 30 year average bond return in 2010 of around 6% or higher - while Lally's yield estimate is around 4%.

Note that Wright includes 2011 data but Lally does not. The fall in yields in 2011, which have largely driven the need to address the issues that I and Lally are addressing, would have raised the bond return series (and depressed the MRP series) even further. This is evident in Wright's chart where the MRP series would have been negative in 2011. That is, over the 30 years to 2011 bond returns exceeded stock

Figure 16: 30 year rolling average of real total market return and real excess market return (measured relative to contemporaneous 30 year average real bond returns)



182. When a bond return series is used it is clear that the 30 year average MRP series is much less stable than when the Lally yield data is used. The standard deviation of the market return and MRP series are much more similar (1.5% vs 1.3%).

183. There is also a much stronger negative correlation between bond returns and MRP. The correlation coefficient is -0.65; more than five times the negative correlation noted by Lally when bond yields are used (and noting that perfect negative correlation is associated with a correlation coefficient of -1.0).

184. Moreover, the 30 year average figures derived following Wright have a clear and simple economic meaning. They describe the real return to an investor from investing in one asset class (stocks or 10 year bonds) and staying invested in that asset class for 30 years. The MRP series here describes the difference in the said returns over 30 years.

returns – an event that appears from Wright's chart to not have occurred in the preceding century (if ever).

185. This means that one can look at the lines in Wright's chart and can draw a meaningful conclusion about the return to bond holders and, also, the difference between the return to bond holders and the return to stock holders (the MRP) over long sweeps of time.

186. By contrast, Lally's 30 year real bond yield series does not describe the real return to an investor investing in 10 year bonds. This is because Lally's bond yield averages do not capture the change in the value of the bonds that are a direct corollary of changes in yields of bonds. Consequently, Lally's MRP series does not measure the difference between the returns to bonds and stocks – because it does not accurately measure the return to bonds. Moreover, it should be noted that there is a fundamental timing mismatch between Lally's use of 10 year yields and his use of 1 year stock market returns. This means, for example, that each of Lally's 30 year periods includes 9 observations for bond yields that are all based on the return for holding a bond to a maturity date that falls outside that 30 year period. The approach to using yields I propose in section B.1.2 immediately below is free of this problem.

187. For example, over the 30 year period to 2011 (the most recent period in Lally's data) the average bond return was a little over 6% while the average yield was a little over 4%. This is because yields were falling over this period – with the effect that bonds were appreciating in value by more than enough to offset the reduction in yield. Lally's series does not capture the impact of such appreciations and depreciations in value and, consequently, does not provide a measure of the return to bond investors that can meaningfully be compared to the return to stock investors.

188. There is a further problem with Lally's approach which is that he has converted a 10 year bond yield into a real yield using a single year of inflation. Presumably, Lally intends to derive an expected real return on CGS. However, Lally's actual series will only reflect expected real returns if investors: a) expected the level of inflation that was realised in that year; and b) expected that same level of inflation over the remainder of the bond's life. This is clearly not a reasonable assumption given the data set because in many years actual inflation materially exceeds bond yields – so the real yield on the bond as measured by Lally is unrealistically negative (-15% in one year). Equally, in many years inflation is materially negative such that Lally's estimate of the real expected return on CGS is unrealistically high (+25% in another year).

189. In summary, by using bond yields instead of bond returns, Lally has under-stated the inverse relationship between the return on bonds and the return on equity over the long run (30 year periods). If Lally's approach is adopted there is less of an inverse relationship between the risk free rate and MRP, principally because the bond yield is not as negatively correlated to MRP as bond returns are.

190. A faithful and meaningful reproduction of Wright's analysis with Australian data gives rise to conclusions entirely consistent with those Wright drew by reference to US data.

B.1.2 Correct adjustment to reflect regulatory precedent

191. Lally states that he has amended the analysis of Wright to be consistent with Australian regulatory precedent in that excess returns are measured relative to bond yields and not bond returns. Lally states:

> *Secondly, the definition of the MRP used by Australian regulators (and more generally) is the excess of the expected market return over the bond yield rather than the bond return and the time-series behaviours of the latter two series is quite different.*

192. However, regulatory precedent properly and fully described is for the AER to set allowed returns equal to:

- the spot bond yield measured in a relatively short window; plus
- an estimate of the MRP which the AER characterises in the current decisions as a 10 year MRP to match the maturity of the spot 10 year bond rate.

193. Lally focusses only on the use of the bond yield by the AER but ignores the other aspects of regulatory precedent, namely:

- That the bond yield used is a spot yield not a long term average of 30 years *(indeed it is precisely the proposition that the AER adopt a long term average bond yield that is being resisted); and*
- That the relevant horizon for assessing the relationship between the *spot* bond yield and the market return on equity is 10 years (not 30 years).

194. Lally himself describes regulatory precedent in precisely this fashion in the last paragraph on page 27 of his report.

> *"The AER's current approach involves using the current ten-year risk free rate and an estimate of the MRP for the next ten years of 6%."*

195. By focussing his analysis of Australian data on contemporaneous 30 year rolling averages, the question Lally has implicitly asked himself is:

> *"What is the relationship between the excess return over a 30 year period and the average level of interest rates over that period"?*

196. He concludes that there is some negative (inverse) relationship between 30 year average bond yields and 30 year average excess returns (-0.12 correlation) but that this is not sufficiently large to make 30 year average total returns less stable than 30 year average excess returns.

197. This is not the right question nor is it relevant. Regulatory precedent does not involve measuring interest rates over a 30 year period and then allowing a contemporaneous risk premium on that 30 year average.

198. It may well be that, over a 30 year period, average interest rates and average market returns move broadly together – such that the difference between these (Lally's MRP proxy) is stable and potentially more stable than the total return on the market.

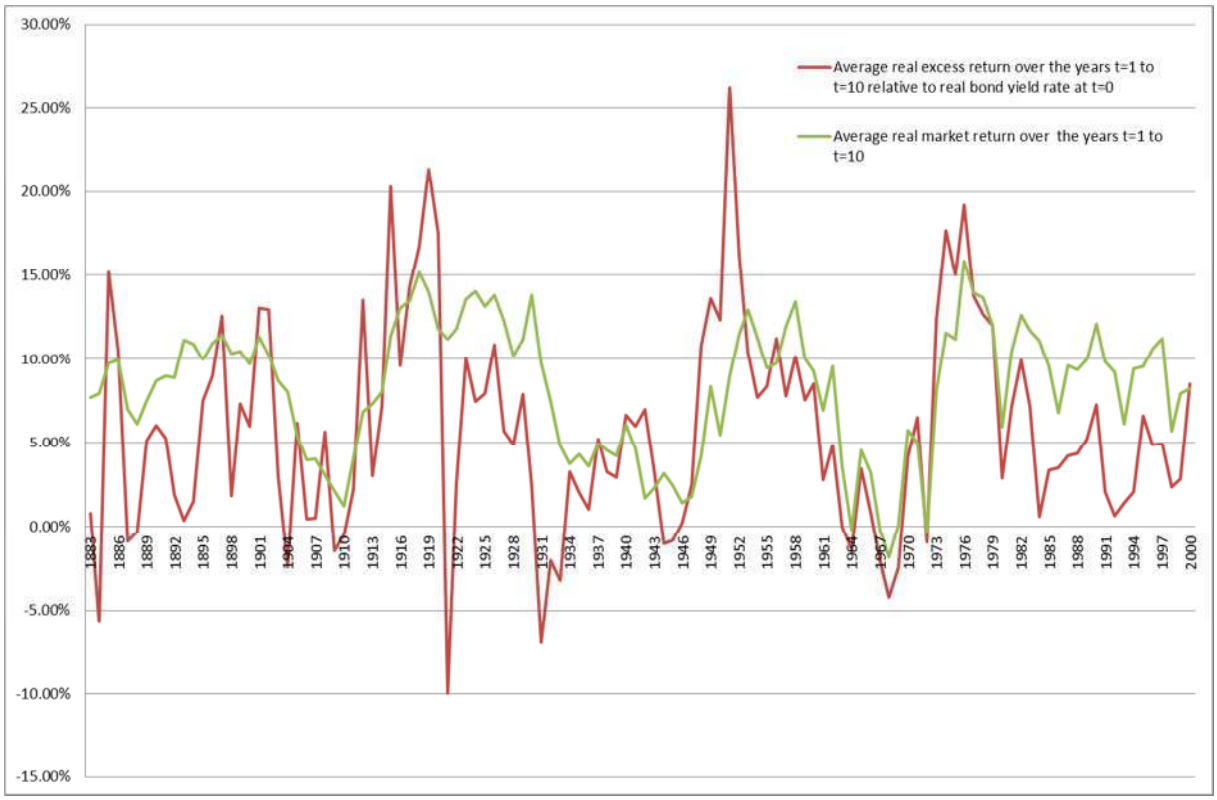
199. I had not claimed a contrary result and Lally's result, rather than being inconsistent with my claims, is actually supportive. What I have claimed is that the MRP defined as the excess return over years t=1 to t=10 and *measured relative to the spot interest rate at t=0* is:

    - inversely related to the spot interest rate at t=0; and
    - sufficiently inversely related such that there would be a material bias if a historical average MRP was applied to historically low risk free rates.

200. As set out above, in order to develop a series that is relevant to testing whether what the AER actually does is reasonable, the total return and MRP series need to be defined as: 10 year average excess returns over years t=1 to t=10 *measured relative to the spot interest rate at t=0*.

201. When this is done I derive the following chart. It should be noted that this data is the same data Lally used to construct his Figure 1. As such, it is still subject to the problem identified above that the real CGS return calculated by Lally is not a reliable proxy for the truly expected real CGS yields. Unfortunately, there is no solution to this problem because there does not exist a reliable estimate of 10 year expected inflation going back more than a few decades (and certainly not back to 1883).

Figure 17: 10 year rolling average of real total market return and real excess market return (measured relative to real spot rate at beginning of each 10 year period)



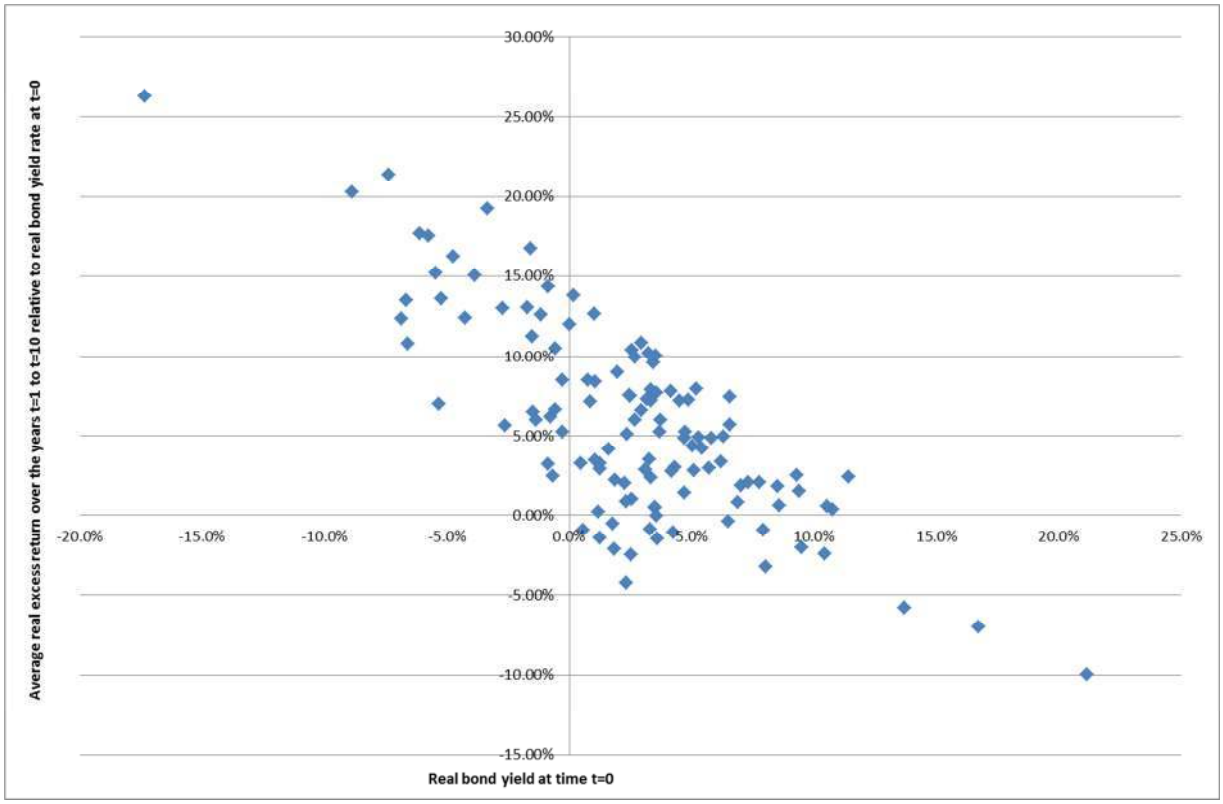
202. It can be seen that excess returns are much more volatile than total returns and this is confirmed by comparisons of standard deviation (6.2% and 3.9% respectively). Moreover, the series are strongly inversely correlated (correlation coefficient of -0.77; recall that the coefficient must lie between -1.0 and +1.0).

203. Scatter plots can also be used to tease out the strength of any relationship between real bond yields and 10 year subsequent excess returns (MRP). As already noted, the figures below use precisely the same data as relied on by Lally. As such, the below relationships are only as good as the quality of the data relied on by Lally. For this reason I do not put a great deal of weight on this analysis – except to show that using Lally's data to test the accuracy the AER's methodology provides no support at all for that methodology.

    - The first figure plots real bond yields in year t=0 and the subsequent 10 year MRP. A strong negative relationship can be observed between the two series.
    - The second figure plots real bond yields in year t=0 and the subsequent 10 year total real stock returns. No relationship is discernible – consistent with the conclusion that low real bond yields at time t=0 are not a predictor of low

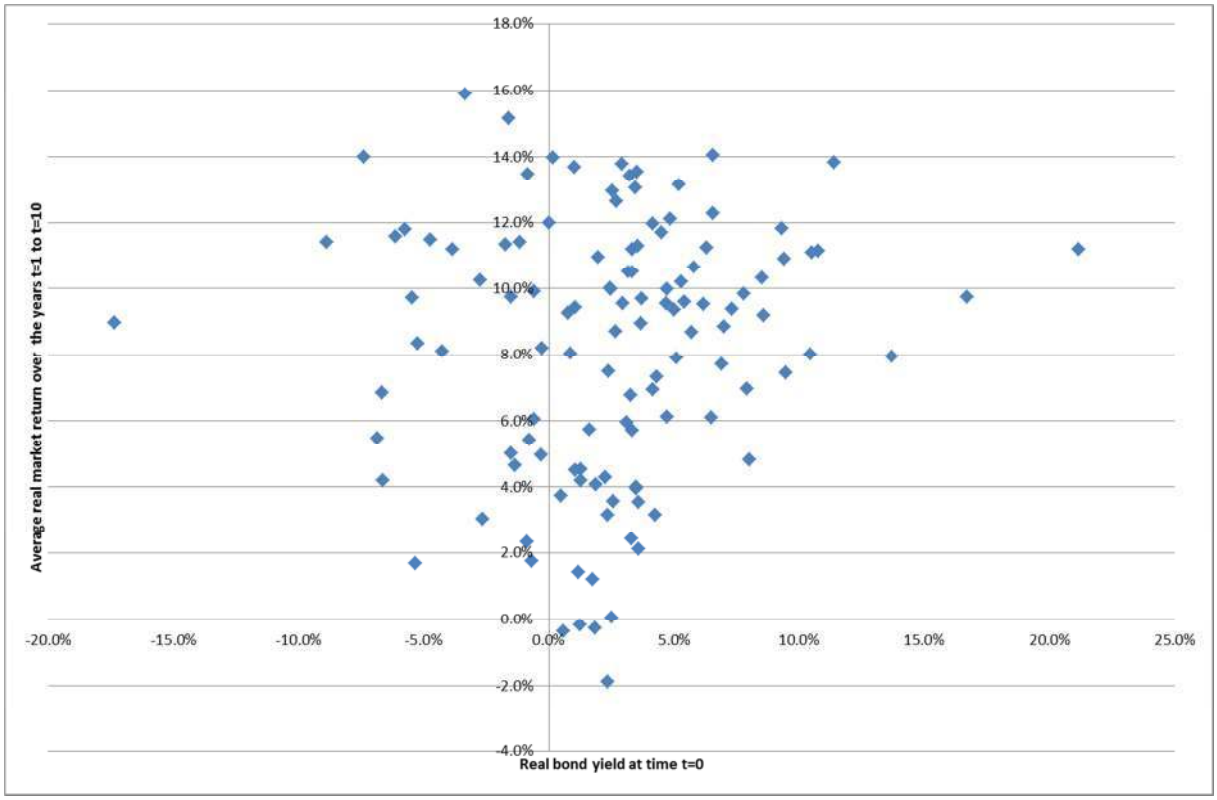
required real equity returns over the next 10 years (and *vice versa*). If the justification of the AER methodology (to add a fixed MRP to a variable spot bond yield) was true then we would expect to see a strong positive relationship between bond yields and total returns. That is, the lack of a relationship in the second figure confirms the existence of a relationship in the first figure.

Figure 18: Plot of real excess returns over a 10 year period* against the real bond yield prevailing at the beginning of that period



**Excess returns over each 10 year period are measured relative to the real bond yield prevailing at the beginning of that 10 year period.*

Figure 19: Plot of real market returns over a 10 year period against the real bond yield prevailing at the beginning of that period



B.1.3 Lally's definition of the 'crucial question'

204. Lally also assesses views by Wright about why the expected MRP is inversely related to the risk free rate. He finds the arguments either plausible or uncontroversial. However, he argues that the finding of an inverse relationship is not sufficient because:

> *"...the **crucial question** is not whether the correlation is negative but whether it is sufficiently negative, because a negative correlation is not a sufficient condition for the real market cost of equity to be more stable than the MRP, i.e., it is not a sufficient condition for the time-series variance in the real market cost of equity to be less than that for the MRP."*

205. Putting aside Lally's use of 30 year averages, Lally's description of the 'crucial question' is also wrong.

206. The crucial question is whether the MRP and risk free rate have a negative correlation. If such a relationship exists then an adjustment to the AER's methodology is warranted on this basis alone. The magnitude of any such adjustment will be informed by the magnitude of the inverse relationship.

However, there is nothing crucial about the point at which the inverse relationship becomes sufficiently strong as to make total returns comparatively more stable than the MRP.

207. Lally finds such a negative correlation exists (even on his own data that serves to hide the truly relevant extent of this negative correlation). Lally should, but did not, advise that this provided support for an adjustment to the AER approach.

Appendix C Lally DGM analysis

C.1 Background

208. My March 2012 CEG report[100] used the DGM to arrive at an estimate of the forward looking long run MRP of 8.52%. In response, Lally argued in his 25 July 2012 report:

> *"The third question is whether CEG's MRP estimate of 8.52% from the AMP variant on the DGM approach is a reasonable estimate. I identify two significant errors in this approach and the net effect of them is to overestimate the MRP by about 1%."*

209. This form of words referring to overestimation by CEG of 'about 1%' was repeated by Lally throughout his report.[101]

210. My November 2012 CEG report[102] showed that, even if one accepted the adjustments used by Lally to arrive at a 1% reduction in the DGM cost of equity, the implied DGM MRP in the draft decision was nonetheless 8.39% given the market conditions (namely the CGS yields used as a proxy for the required return on a zero beta asset and the market's dividend yield) in the period on which the draft decision was based.

211. In his March 2013 report[103] Lally appears to have retracted his previously expressed view that the net effect of the "two significant errors is about 1%". Lally now argues that:

> *"However, the figure of 13.38% is based upon a deduction of only 1% from expected GDP growth and this deduction of 1% is presumably drawn from Lally (2012, page 20). However the only definitive statement offered by Lally was that the "correct adjustment is less than 2%" and the figure of 1% (along with a further figure of 1.5%)* ***was merely an example****. Suppose the correct deduction was instead 1.5%, and therefore the expected growth rate in dividends was 5.1%." (p. 8, emphasis added)*

212. Lally's above description of his July 2012 report is difficult to reconcile with his clear conclusion in that report that the CEG methodology overestimated the cost of

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100 CEG, *Internal consistency of risk free rate and MRP in the CAPM, a report prepared for APA Group, Envestra, Multinet, SP AusNet, March 2012.*

101 See pages 4, 20, 23 and 33.

102 CEG, *Response to AER Vic gas draft decisions: Internal consistency of MRP and risk free rate.*

103 Lally, *The dividend growth model, March 2013.*

equity by about 1% - which was clearly associated with a less than 1.5% reduction to dividend growth forecasts.

213. The reasoning for this conclusion is based on Lally's repeated reference to a 1% adjustment to the CEG report's DGM estimate and the analysis that underpinned this in section 3.3 (pp. 18 to 20) of Lally's 25 July 2012 report.[104] In that section Lally made two adjustments to the CEG report's DGM analysis to arrive at lower DGM cost of equity estimates. This involved reducing the CEG report's dividend growth forecast by 1.0% and 1.5% respectively. These adjustments resulted in 1.07% and 1.59% reduction in the estimated DGM MRP respectively. However, Lally's conclusion that the correct adjustment results in an "about 1%" reduction clearly suggests that Lally used the 1.0% reduction in dividend forecasts to arrive at this conclusion not the 1.5% reduction (or at best used an average of these that still led to the total adjustment rounding to 1% and not 2%).

214. In addition to this apparent change in approach, Lally has also introduced an additional adjustment to the CEG report's DGM model being a further 1.0% reduction in long run dividend growth to reflect Lally's view that long run GDP growth is 1% lower than the CEG report had assumed.[105] In the other direction, Lally has incorporated evidence that the CEG report pointed to that expected near term dividend growth (around 7.5%) was higher than long term GDP growth.[106]

C.2 Unreasonableness of Lally's estimates of long run growth

215. Lally ultimately adopts three scenarios for dividend growth of 4.1%, 4.6% and 5.1% in nominal terms. Based on a long run inflation rate of 2.5% these translate into real dividend growth rates of 1.6%, 2.0% and 2.5% (using the Fisher equation). Lally does not attempt to compare these to the historical rates of dividend growth that can be extracted from the data upon which he relies in his companion report[107,108] for the AER.

216. It is possible to derive an historical series of dividend growth rates from that data as is explained below in section C.2.1. This yields an estimate of the average real rate of dividend growth from 1884 to 2010 of 2.8% (or 5.3% converted to nominal terms

104 Lally, *The cost of equity and the market risk premium* dated 4 March 2013

105 See first paragraph on page 17.

106 See second paragraph on page 17.

107 Lally, *Review of the AER's methodology for the risk free rate and the market risk premium*, March 2013.

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

with a 2.5% inflation rate). Updating the data relied upon by Lally to include 2011 data[109], then the mean dividend growth rate falls to 2.7% (or 5.2% in nominal terms).

217. These historical estimates are above the top end of the range used by Lally. Using these values instead of Lally's range would give rise to estimates of the DGM market cost of equity/MRP that are above the range reported by Lally.

C.2.1 Explanation of the calculations used to produce an historical average rate of growth in dividends per share

218. A mean dividend growth rate of 2.76% is calculated for the period 1884 to 2010 using the historical data series that Lally used in his companion report. [110]

219. Specifically, annual returns on the Stock Accumulation Index and the Stock Price Index as well as annual inflation rate data for the period of 1883 to 2010 were sourced from Brailsford, Handley and Maheswaran, 2012 (BHM).[111]

220. If I update the BHM data to include 2011 data the mean dividend growth rate falls to 2.67%.[112] If I were to use the set of historical data from BHM as modified by NERA Economic Consulting, then the historical average real rate of growth in dividends per share would be 2.51%.

221. Let RA_t be the returns on the Stock Accumulation Index inclusive of imputation credits, these being stock returns attributable to dividends and capital gains/losses from time t-1 to time t. Also, let RP_t be the returns on the Stock Price Index (i.e., stock returns attributable only to capital gains/losses at time t) and let π_t be the rate of inflation from $t-1$ to t. The real dividend growth rate was calculated as follows:

$$Dividend\ yield_t = \frac{(RA_t - RP_t)}{(1 + RP_t)}$$

109 The 2011 data is sourced from Handley, *An Estimate of the Historical Equity Risk Premium for the Period 1883 to 2011,* April 2012. 2011 inflation data (3.0%) is sourced from the RBA http://www.rba.gov.au/inflation/measures-cpi.html#year_ended.

110 Lally, Review of the AER's methodology for the risk free rate and the market risk premium, March 2013. This is itself based on Brailsford, T., J. Handley, and K. Maheswaran. "The historical equity risk premium in Australia: Post-GFC and 128 years of data", *Accounting and Finance*, 2012, pages 237-247.

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

112 The 2011 data is sourced from Handley, *An Estimate of the Historical Equity Risk Premium for the Period 1883 to 2011,* April 2012. 2011 inflation data (3.0%) is sourced from the RBA http://www.rba.gov.au/inflation/measures-cpi.html#year_ended.

$$Real\ dividend\ growth\ rate = \left(\frac{Dividend\ yield_t}{Dividend\ yield_{t-1}}\right) \times \left(\frac{(1+RP_t)}{(1+\pi_t)}\right) - 1$$

222. The mean of the annual dividend growth rate was calculated for the period 1884 to 2010, giving a result of 2.76%.

223. The following describes why the right hand side of the above equation is equal to the dividend growth rate. Let P_t be the value of the Stock Price Index at time t and D_t be the value of dividends paid at time t including the value of any imputation credits attached to those dividends.

$$RA_t = returns\ including\ dividend = \frac{(P_t + D_t)}{P_{t-1}} - 1$$

$$RP_t = returns\ excluding\ dividend = \frac{P_t}{P_{t-1}} - 1$$

$$Dividend\ yield_t = \frac{(RA_t - RP_t)}{(1+RP_t)} = \frac{(\frac{P_t + D_t}{P_{t-1}} - 1) - (\frac{P_t}{P_{t-1}} - 1)}{(1 + \frac{P_t}{P_{t-1}} - 1)} = \frac{\frac{(P_t + D_t - P_t)}{P_{t-1}}}{\frac{P_t}{P_{t-1}}} = \frac{D_t}{P_t}$$

$$Dividend\ growth\ rate = \left(\frac{Dividend\ yield_t}{Dividend\ yield_{t-1}}\right) \times \left(\frac{(1+RP_t)}{(1+\pi_t)}\right) - 1$$

$$= \left(\frac{\frac{D_t}{P_t}}{\frac{D_{t-1}}{P_{t-1}}}\right) \times \left(\frac{(1 + \frac{P_t}{P_{t-1}} - 1)}{(1+\pi_t)}\right) - 1 = \left(\frac{\frac{D_t}{D_{t-1}}}{\frac{P_t}{P_{t-1}}}\right) \times \left(\frac{\frac{P_t}{P_{t-1}}}{(1+\pi_t)}\right) - 1$$

$$= \frac{\frac{D_t}{D_{t-1}}}{(1+\pi_t)} - 1$$

224. The above algebra sets out the conceptually pure case whereby the calculation of real dividend growth includes growth in both cash dividends and the value attached to imputation credits.

225. However, the data series provided in the Appendix of Brailsford, Handley and Maheswaran, 2012 (and relied on by Lally) does not include the contribution to the dividend yield made by imputation credits. I have therefore performed my analysis on the basis of cash dividends only.

226. This would be a material problem if I was attempting to measure the *level* of dividend returns over time (because I would fail to capture an important component of dividend returns since 1988). However, I am interested in the historical *growth* rate of dividends. While the existence of imputation credits contributes to an increase in the level or value of dividends, franking credits cannot be expected to influence the growth rate of dividends in a material way – because, on average, over time, franking credits affect the numerator and the denominator (the value of

dividends in year t and the value of dividends in year t-1) by approximately equal amounts. The only obvious effect[113] of focussing on cash dividends alone will be the failure to include the one-off changes in the value of dividends associated with changes in the imputation regime. The most pertinent example is the introduction of the regime itself, which resulted in a once only increase in the value of dividends due to the introduction of imputation credits – and it is for this reason that my estimate will tend to underestimate growth (albeit by a small amount).

C.3 Calculation error in Lally's analysis

227. Lally describes his approach to calculating the dividend growth series in his DGM estimates as follows:

> "*In respect of the deduction from the expected GDP growth rate to account for new share issues and new companies, as discussed previously, I consider that this should be less than 2%. So, I consider deductions of 0.5%, 1% and 1.5%. In respect of the initial expected growth rates, I invoke the expected dividend growth rates of 7.4% and 7.5% for the first two years drawn from Bloomberg and referred to by CEG (2012b, section 3.3.1). Finally, in respect of the period over which this latter growth rate (linearly) converges on the long-run expected growth rate (the expected GDP growth rate less the deduction referred to), I consider convergence periods of 0, 10, and 20 years.*" (Page 17.)

228. In our view the only natural reading of this quote is that Lally has, in all scenarios, adopted the Bloomberg short term forecasts which then converge to his long term forecasts over a period of "N" years where:

- N=0 years: dividend growth jumps immediately at the end of the short term forecasts to the long term forecasts (i.e., dividends from the second to the third year and thereafter are assumed to grow at the long term growth rate);
- N=10 years: that is, over a period of 10 years after the end of the two years of short term forecasts; and
- N=20 years: that is, over a period of 20 years after the end of the two years of short term forecasts.

229. However, this is not what Lally did. I can only replicate Lally's results by:

- N=0 years: by jumping immediately to the long term forecasts in year 1 (i.e., not using the short term forecasts at all in the first two years);

[113] Other effects are possible but are likely to be minor in most years and over the long run. These effects will be associated with changes in the imputation regime (such as the introduction of the regime and changes in corporate tax rates) and changes in the proportion of dividends that are franked from one year to another.

- N=10 years: transitioning to the long term forecasts over a period of 7 years after the end of the short term forecasts (i.e., the long term growth rate is applied when escalating year 9 dividends and onwards); and
- N=20 years: transitioning to the long term forecasts over a period of 17 years after the end of the short term forecasts (i.e., the long term growth rate is applied when escalating year 19 dividends and onwards).

230. This appears to be a material error in Lally's calculations. In the alternative that Lally actually implemented what he intended to, there is an error in the description by Lally of what he was doing. Moreover, to the extent that Lally implemented what he intended to, it is not reasonable to include a scenario where Lally's long term forecast completely supplants analysts' forecasts of dividend growth over the next two years.

231. The impact of adopting the more natural reading of Lally's convergence periods (as opposed to those used to derive his results) is described in section C.5 below. However, in summary, adopting this more natural reading in and of itself lifts Lally's market cost of equity for his core scenarios to a value above the ROE derived by applying the AER methodology in the same period (a 3.26% risk free rate proxy (using CGS yields as the proxy for required return on zero beta assets) plus a 6% MRP).

C.4 Conceptual error in Lally's empirical analysis

232. Lally's report on the dividend growth model involves an important error. In his earlier work Lally argued that even if application of the DGM shows that the prevailing long run cost of equity less the prevailing 10 year CGS yield is above 6% this might be because the long run cost of equity is comprised of an average of:

- A low cost of equity over the next 10 years (consistent with a 6% MRP relative to the 10 year CGS). Call this "$ROE_{t=0-10}$"; and
- A higher cost of equity beyond 10 years. Call this "$ROE_{t>10}$".

233. Put in simple mathematical terms:

$$DGM\ ROE_{t=0-\infty} = \text{time weighted average of } ROE_{t=0-10} \text{ and } ROE_{t>10}$$

234. That is, Lally argues that the DGM ROE is an average of all the discount rates that investors are currently applying to all future dividends. Lally argues that the AER only needs to estimate the ROE over the next 10 years ($ROE_{t=0-10}$) and, therefore, the DGM ROE is not measuring the relevant discount rate. This is because investors *might* be applying a lower discount rate to dividends over the next 10 years ($ROE_{t=0-10}$) than they are applying to dividends beyond 10 years ($ROE_{t>10}$). Therefore, the fact that the DGM ROE is materially above the AER's estimate of the

ROE $_{t=0-10}$ does not prove that the AER is wrong – it might just be that ROE $_{t>10}$ is much higher than both the DGM ROE and ROE $_{t=0-10}$.

235. An earlier CEG report has argued that this logic is speculative and not supported by any evidence. Lally's approach amounts to assuming the result desired rather than showing it. The earlier CEG report demonstrated that if one actually looked at empirical evidence it was not plausible that Lally's hypothetical result held.[114] This was done by taking what was thought to be Lally's preferred approach to implementing the DGM and demonstrating that, in order for investors to truly apply a 6% MRP to current and future 10 year CGS rates, then investors must expect the CGS yield in 10 years' time to be 7.4% (i.e., the cost of equity to jump from the 8.98% in the draft decision to 13.38% in 10 years' time). The earlier CEG Report argued that this was not plausible.[115]

236. The point made in my earlier CEG report can be illustrated with a graphic. Figure 20 below shows how, in order for Lally's argument to reconcile the DGM estimates of the cost of equity and the AER's estimate, investors must currently (at time t=0) be using two different discount rates to discount future dividends:

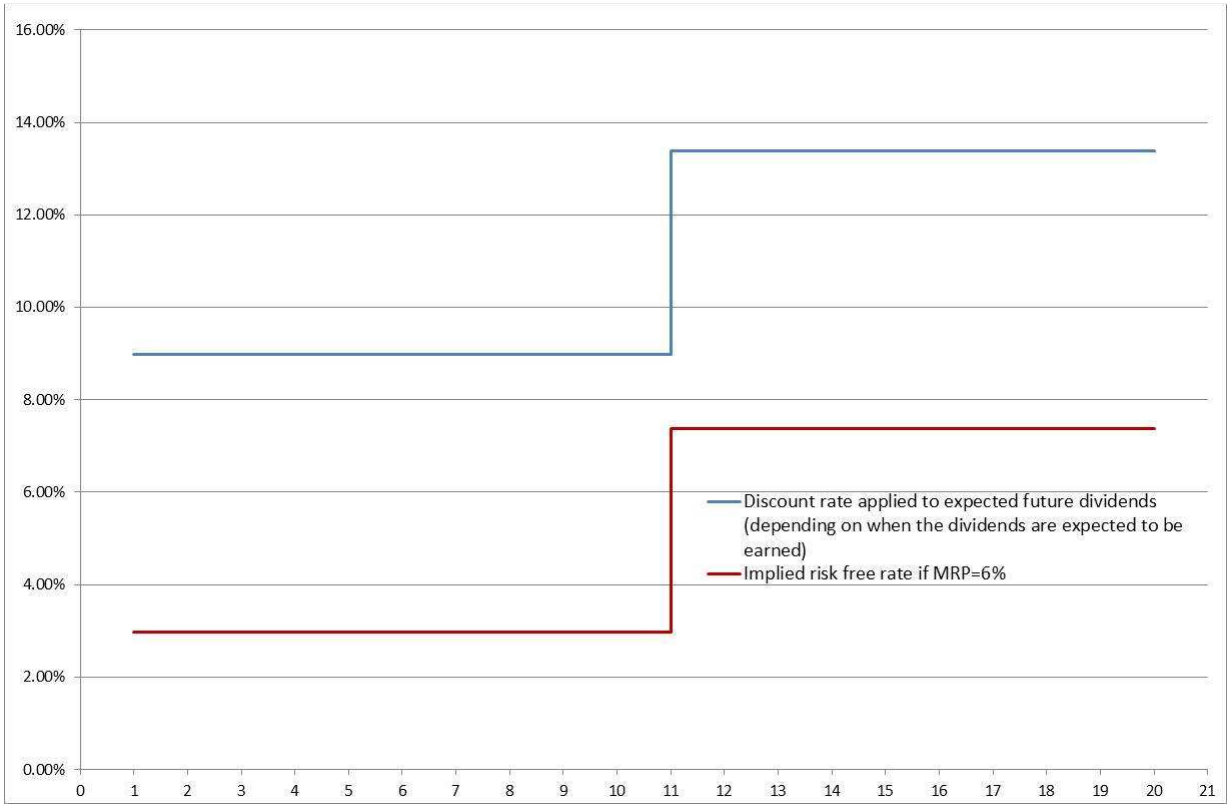
- one low "AER" discount rate applied to all dividends in the next 10 years; and
- one much higher discount rate to discount dividends beyond 10 years.

237. The graphic also shows what the implied 10 year CGS yield must be if investors are basing their post 10 year discount rate on a 6% MRP plus the expected 10 year CGS in 10 years' time. It is important to note that the discount rates in the below graphic are not predictions of the discount rates that investors will have in each future year when that year arrives in the present. Rather, the discount rates depicted are the discount rates that investors have "today" (at time t=0) and which they are assumed to apply "today" to arrive at a valuation "today" of all the future dividends (which fall in years t>0).

114 See pages 38 to 41 of CEG's November 2012 *Response to the AER Vic gas draft decisions, Internal Consistency of the MRP and the Risk-Free Rate.*

115 See paragraph 156 and footnote 71 of CEG's November 2012 *Response to the AER Vic gas draft decisions, Internal Consistency of the MRP and the Risk-Free Rate.*

Figure 20: Implied nature of discount rates investors use to value future dividends at time t=0



238. Lally has responded in his most recent report by revising down his estimate of DGM ROE (as described above). However, even with these adjustments he still arrives at an estimated DGM ROE that is 7.31% to 8.51% above the spot 10 year CGS yield.[116] This is still well above the AER's 6% MRP estimate. (This range would be 7.71% to 8.21% if Lally maintained aspects of his methodology that appeared settled in his previous report as discussed above.)[117]

239. Lally attempts to grapple with the CEG critique of his work by demonstrating that, if investors were using a discount rate of 11.86% (a value endorsed by the CEG critique) to all dividends beyond 10 years (i.e., ROE $_{t>10}$) then the internally consistent range for the MRP over the next 10 years would be 5.90% to 8.39%.[118]

116 See Table 1 of Lally, *The dividend growth model, March 2013.*

117 That is, if Lally applied an estimate of 1% for "d" in his Table 1 (the deduction from long term GDP growth to arrive at long term dividend growth).

118 See Table 2 of Lally, *The dividend growth model, March 2013.*

(This range would be 6.66% to 7.77% if Lally maintained aspects of his methodology that appeared settled in his previous report.[119])

240. Lally concludes that because this range includes 6% (albeit with an average much higher and is a range that would not include 6% but for an apparent change in methodology by Lally):

> *"... the DGM approach supports an MRP estimate of at least the 6% favoured by the AER."*

241. The flaw in Lally's logic is to assume that his use of a 11.86% estimate for ROE $_{t>10}$ is unobjectionable simply because it is a value that was proposed in the CEG critique. However, this estimate is endorsed in the CEG critique as *an alternative* to adopting the AER method of adding 6% to the 10 year CGS yield – *both for the next 10 years and for the period after that*. An 11.86% cost of equity estimate is not based on an assumption that investors believe that 10 year CGS yields will return to 5.86% (11.86% less 6% MRP) in 10 years' time. This is patently not the case. All of the evidence in the November 2012 CEG report (evidence from the RBA, Treasury/AOFN IMF and others) suggested a sustained reduction in the yields on CGS relative to other assets. Moreover, the December 2022 forward rate[120] for 10 year CGS was 4.88% - one per cent less than the 5.86% necessary to justify an 11.86% discount rate beyond 10 years based on the AER methodology.

242. What Lally has done is effectively to assume that beyond 10 years investors are applying an MRP in excess of 6% to expected future interest rates in order to show that it is conceivable (just) that the AER is right within a 10 year period (that investors are applying a 6% MRP to expected interest rates over the next 10 years).

243. This does not provide a validation of the AER's methodology. In order to validate the AER's methodology, Lally needs to demonstrate that his range for the DGM ROE is consistent with an average of:

- the AER's estimate of the ROE for the next 10 years; and
- an estimate of the ROE beyond 10 years that is derived using the same AER assumptions – namely that investors add a 6% MRP to expected interest rates.

244. Unless Lally does this all he is demonstrating is that you can justify an MRP of 6% over the next 10 years by assuming an MRP of above 6% beyond 10 years. Of course

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119 That is, if Lally applied an estimate of 1% for "d" in Table 2 (the deduction from long term GDP growth to arrive at long term dividend growth).

120 This is the (Bloomberg sourced) implied 10 year interest rate in 10 years' time that can be 'backed out' of the shape of the current CGS yield curve assuming that the shape of the current yield curve is purely determined by expected future interest rates (an assumption that Lally makes explicitly – see the footnote immediately below). I have sourced these using Bloomberg's FWCM function, obtaining forward rates for a tenor of 10 years across December 2022 using curve dates in December 2012.

this is mathematically possible but it is illogical to claim that an assumption might be true over one period by assuming a violation of that assumption over a subsequent period.

245. Accepting Lally's premise that investors might be applying a very low discount rate to dividends over the next 10 years and higher discount rate beyond that, the correct test of consistency between Lally's DGM ROE and the AER methodology is to set:

- ROE $_{t=0-10}$ = prevailing 10 year CGS yields + 6%; and
- ROE $_{t>10}$ = 10 year CGS expected to prevail in 10 years' time + 6%.

246. Had Lally done this he would have estimated that the expected 10 year CGS yield in 10 years' time was only 4.88%[121] - such that ROE $_{t>10}$ would only be 10.88%. Putting these values into his test[122] of the AER methodology, Lally would have been forced to conclude that the AER's 6% MRP was internally inconsistent with even the bottom end of his range for the DGM ROE.

247. That is, there is no way to reconcile discount rates that are based on a consistent application of AER methodology with Lally's own DGM ROE estimates – even his most aggressively low estimates.

C.5 Impact of correcting errors

248. The following tables show, in order:

- The results from Lally's Table 2: Estimated Ten-Year MRP with Time-Varying Costs of Equity. These are Lally's results showing the MRP over the next 10

[121] Sourced from Bloomberg forward rates for the 10 year CGS in December 2012 (the period of Lally's analysis). In this regard, it should be noted that Lally relies on the assumption that forward rates reflect investors' expected future interest rates in order to justify their view that the spot 10 year CGS yield can be combined with a fixed MRP. In a separate report Lally states:

"*...I do not think that there is any inconsistency here. Just as the prevailing ten-year MRP reflects the annual MRPs expected to prevail in each of the next ten years, and therefore reflects expected market conditions in the next ten years,* ***the prevailing ten-year risk free rate also reflects the one year risk free rates expected to prevail over each of the next ten years****, and therefore also reflects expected market conditions in the next ten years.*" (Lally, *Review of the AER's methodology for the risk free rate and the market risk premium*, March 2013, p.5. Emphasis added.)

Applying the same logic would imply that the 10 year CGS in 10 years' time expected by investors would be 4.88%. Therefore, if investors apply a fixed MRP of 6.0% the cost of equity would be 10.88% beyond 10 years.

[122] That is, using 10.88% for the discount rate beyond 10 years. Given that forward rates out 20 years are not available I have not attempted to put in place a different discount rate beyond 20 years. However, the results are not sensitive to this. Even using 10.88% for the discount rate from year 11 to year 20 and using 11.86% beyond year 20, the bottom end of Lally's range (based on N=10 and d=-1.5%) remains above 6% (at 6.41%).

years that is consistent with investors discounting all dividends beyond 10 years at 11.86%;

- Lally's Table 2 adjusted for the "convergence" calculation error only. For the sake of clarity, this is not adjusted for the error associated with using my rather than the AER's implied cost of equity beyond 10 years. Convergence has been implemented in the following manner:
  - N=0: long term forecast growth is achieved 0 years (i.e., immediately) after the end of the short term forecasts. Because we have two years of short term forecasts, this means dividend growth from year 2 to year 3 is at the long term growth rate;
  - N=10: long term forecast growth is achieved 10 years after the end of the short term forecasts. Because we have two years of short term forecasts, this means dividend growth from year 12 to year 13 is at the long term growth rate;
  - N=20: long term forecast growth is achieved 20 years after the end of the short term forecasts. Because we have two years of short term forecasts, this means dividend growth from year 22 to year 23 is at the long term growth rate.
- Lally's Table 2 adjusted only for the error in using 11.86% as the post 10 year discount rate rather than the discount rate that the AER methodology would estimate (10.88%). For the sake of clarity, there is no correction for the convergence error;
- Lally's Table 2 adjusted for both errors simultaneously.

249. Table 3 illustrates the impact of correcting Lally's long term growth forecast in two different ways. The top half of the table assumes that 10.88% is used as the discount rate in all years beyond year ten. This estimate is based on a 10 year forecast of CGS rates in 10 years and it is speculative to assume that investors expect interest rates to rise/fall relative to these levels beyond 20 years. However, as a sensitivity check the table also reports the results assuming that long term interest rates beyond 20 years are expected to rise to 5.86% (the level necessary for the AER methodology to arrive at an 11.86% discount rate beyond 20 years).

Table 2: Lally's Table 2 (reproduced – including implied RoE)

	N=0	N=10	N=20
		MRP estimates	
d = 0.5%	5.96%	7.45%	8.39%
d = 1.0%	4.86%	6.66%	7.77%
d = 1.5%	3.81%	5.90%	7.20%
		Market ROE estimates (MRP+3.26%*)	
d = 0.5%	9.22%	10.71%	11.65%
d = 1.0%	8.12%	9.92%	11.03%
d = 1.5%	7.07%	9.16%	10.46%

**3.26% is Lally's estimate of the risk free rate, using CGS yields as a proxy, in his estimation period (December 2012).*

Table 3: Lally's Table 2 (adjusted for convergence error only – including implied RoE)

Discount rate is 10.88% for all years after year 10			
	N=0	N=10	N=20
		MRP estimates	
d = 0.5%	6.56%	7.77%	8.60%
d = 1.0%	5.58%	7.04%	8.03%
d = 1.5%	4.66%	6.36%	7.50%
		Market ROE estimates (MRP+3.26%*)	
d = 0.5%	9.82%	11.03%	11.86%
d = 1.0%	8.84%	10.30%	11.29%
d = 1.5%	7.92%	9.62%	10.76%

**3.26% is Lally's estimate of the risk free rate, using CGS yields as a proxy, in his estimation period (December 2012).*

Table 4: Lally's Table 2 (adjusted for error in setting $ROE_{t>10}$ only– including implied RoE)

Discount rate is 10.88% from year 11 onwards			
	N=0	N=10	N=20
		MRP estimates	
d = 0.5%	7.20%	8.71%	9.68%
d = 1.0%	5.97%	7.79%	8.95%
d = 1.5%	4.81%	6.94%	8.27%
		Market ROE estimates (MRP+3.26%*)	
d = 0.5%	10.46%	11.97%	12.94%
d = 1.0%	9.23%	11.05%	12.21%
d = 1.5%	8.07%	10.20%	11.53%
Discount rate is 10.88% from year 11 to year 20 and 11.86% beyond			
		MRP estimates	
d = 0.5%	6.50%	7.99%	8.95%
d = 1.0%	5.37%	7.17%	8.31%
d = 1.5%	4.29%	6.41%	7.71%
		Market ROE estimates (MRP+3.26%*)	
d = 0.5%	9.76%	11.25%	12.21%
d = 1.0%	8.63%	10.43%	11.57%
d = 1.5%	7.55%	9.67%	10.97%

**3.26% is Lally's estimate of the risk free rate, using CGS yields as a proxy, in his estimation period (December 2012).*

Table 5: Lally's Table 2 (adjusted for both errors**– including implied RoE)

	N=0	**N=10**	**N=20**
		MRP estimates	
d = 0.5%	7.80%	9.03%	9.92%
d = 1.0%	6.70%	8.18%	9.23%
d = 1.5%	5.67%	7.39%	8.59%
		Market ROE estimates (MRP+3.26%*)	
d = 0.5%	11.07%	12.30%	13.19
d = 1.0%	9.97%	11.44%	12.49%
d = 1.5%	8.94%	10.65%	11.85%

**3.26% is Lally's estimate of the risk free rate, using CGS yields as a proxy, in his estimation period (December 2012). ** The long run growth rate error is corrected assuming 10.88% for all years beyond the 10th year.*

250. These tables show that if adjusting for both errors, the market return on equity over the next 10 years is above the 9.26% (3.26% plus 6%) estimate associated with applying the AER's method in Lally's period of analysis in 8 out of 9 scenarios. Moreover, noting that Lally believes that a convergence period of "at least 10 years"[123] is appropriate, 6 out of 6 of the Lally scenarios result in a market return on equity that is greater than 9.26%. Indeed, such an outcome is true even if only one of the Lally errors is corrected. (Obviously, equivalent results apply if one is to compare the implied MRP with the AER's 6% MRP).

123 Lally, *The Dividend Growth Model*, dated March 2013, p. 20.

Appendix D Curriculum vitae

COMPETITION ECONOMISTS GROUP

Economics of competition, regulation and damages

Curriculum Vitae

Dr Tom Hird / Director

Contact Details

T / +61 (3) 9095 7570

M / +61 422 720 929

E / tom.hird@ceg-ap.com

Key Practice Areas

Tom Hird is a founding Director of CEG's Australian operations. In the six years since its inception CEG has been recognised by Global Competition Review (GCR) as one of the top 20 worldwide economics consultancies with focus on competition law. Tom has a Ph.D. in Economics from Monash University. Tom is also an Honorary Fellow of the Faculty of Economics at Monash University and is named by GCR in its list of top individual competition economists.

Tom's clients include private businesses and government agencies. Tom has advised clients on matters pertaining to: cost modeling, valuation and cost of capital.

In terms of geographical coverage, Tom's clients have included businesses and government agencies in Australia, Japan, Korea, the UK, France, Belgium, the Netherlands, New Zealand, Macau, Singapore and the Philippines. Selected assignments include:

Selected Projects

- Advice to Chorus New Zealand on the estimation of the cost of capital;
- Advice to Wellington Airport on the estimation of the cost of capital;
- Advice to Vector on appeal of the New Zealand Commerce Commission decision on the cost of capital.
- Expert evidence in relation to the cost of capital for Victorian gas transport businesses.
- Advice to Everything Everywhere in relation to the cost of capital for UK mobile operators - including appearance before the UK Commerce Commission.
- Expert evidence to the Australian Competition Tribunal on the cost of debt for Jemena Electricity Networks.
- Advice to Integral Energy on optimal capital structure.
- Advice to ActewAGL on estimation of the cost of debt
- Advising NSW, ACT and Tasmanian electricity transmission and distribution businesses on the cost of capital generally and how to estimate it in the light of the global financial crisis.
- Advice in relation to the appeal by the above businesses of the Australian Energy Regulator (AER) determination.

- Expert testimony to the Federal Court of Australia on alleged errors made by the Australian Competition and Consumer Commission (ACCC) in estimating the cost of capital for Telstra.
- Advice to T-Mobile (Deutsche Telekom) on the cost of capital for mobile operators operating in Western Europe.
- Advising Vivendi on the correct cost of capital to use in a discounted cash flow analysis in a damages case being brought by Deutsche Telekom.
- Advising the AER on the cost capital issues in relation to the RBP pipeline access arrangement.
- Advising the ENA on the relative merits of CBASpectrum and Bloomberg's methodology for estimating the debt margin for long dated low rated corporate bonds.
- Advising the Australian Competition and Consumer Commission, Australia on the correct discount rate to use when valuing future expenditure streams on gas pipelines.