Jemena Electricity Networks (Vic) Ltd

2016-20 Electricity Distribution Price Review Regulatory Proposal

Revocation and substitution submission

Attachment 6-9 CEG - Critique of the AER's approach to transition

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Critique of the AER's approach to transition

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1 Executive summary

1. Rule 87(3) of National Gas Rules (NGR), which is relevantly replicated in clause 6.5.2(c) of the National Electricity Rules (NER)[1] defines the allowed rate of return objective (ARORO) as:

> *The allowed rate of return objective is that the rate of return for a service provider is to be commensurate with the efficient financing costs of a benchmark efficient entity with a similar degree of risk as that which applies to the service provider in respect of the provision of reference services (the allowed rate of return objective).*

2. In order to compensate for "efficient financing costs" it is necessary to identify an efficient debt management strategy or strategies that a benchmark efficient entity (BEE) would adopt.

3. In recent regulatory decisions the AER has approached the identification of efficient debt management strategies by considering what strategies would be adopted in response to particular regulatory approaches to estimating the regulatory allowance for the return on debt. That is, in seeking to identify efficient financing costs for regulated entities over forthcoming regulatory periods, the AER has determined this by reference to the financing practices (and costs incurred pursuant to these practices) it considers a rational regulated entity would or should have adopted in response to the "on-the-day" approach to setting the allowance for the cost of debt.

4. This assumption is potentially problematic. The incentives created by the on-the-day regulatory regime may not necessarily result in financing practices that are efficient, and consequently, costs that are commensurate with "efficient financing costs" as that term is used in the ARORO. As such, the theoretically optimal (by reference to whatever it is considered the strategy should be designed to achieve) and/or actual financing practices adopted by regulated businesses in response to a particular regulatory policy may not be efficient because they may be distorted by incentives created by that policy. This creates a circularity problem in defining efficient debt management practices by reference to what regulated businesses may or may not have done under a particular regulatory policy. This is particularly the case with respect to the on-the-day approach that had no "matching" real world financing practice.

5. This report has been prepared on the basis of the AER's premise that the BEE, and its financing practices, should be assessed in the context of the (now extant) previous regulatory policy. This should not be taken as support for that premise.

[1] Throughout this report, references to the NGR and National Gas Law (NGL) can be read as also referring to the NER and the National Electricity Law (NEL).

6. In this report we provide an assessment of the "efficient" debt financing strategy of a benchmark efficient entity assuming that:

   - the entity is a regulated energy transport business;
   - that entity was regulated under the 'on-the-day' approach to setting the cost of debt allowance; and
   - the entity's response to being regulated under the 'on-the-day' approach is relevant to an assessment of efficient financing practices (even if the nature of that regulation was not efficient).

7. In assessing what is "efficient", we use the AER's assumption that "efficient" in this context involves a combination of minimising cost and risk. However, as will be seen, we take issue with the AER's approach to assessing risk and the value that is placed on that risk.

8. In this context it is our view that the efficient debt management practice would have been to manage a portfolio of long term, 10 year, fixed rate debt resulting in a 10 year trailing average of 10 year fixed rate debt. We also consider that it would have been "efficient" (in the relevant sense) to enter into interest rate swap contracts to convert a portion of that portfolio into floating rate exposure and to fix that floating rate exposure at the beginning of the regulatory period using 5 year interest rate swaps.[2] However, it is important not to presume that this portion was 100% without evidence to support it because what matters (under the assumptions in paragraph 6) is the efficient practice of a firm that operated under the on-the-day approach. In this regard we note that both theoretical and empirical evidence suggests that this portion would be less than 100%. This is also consistent with the actual average practice of regulated businesses in this environment.

9. Our best estimate of the proportion of the debt portfolio for which interest rate swaps would have been used in this manner is 1/3rd. This is based on the empirical analysis in our June 2015 report[3] which suggests that a hedging ratio around this level would have minimised interest rate risk – using appropriate data-series from both Australia and the US.

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[2] The conclusion that some positive use of interest rate swap contracts predicated on the amount of swap transaction not being so large as to 'move the market' and that the level of transaction costs for undertaking those swaps was not so heightened, such as may be the case in some market circumstances, as to cause the cost of hedging to outweigh any benefit.

[3] CEG. Efficient use of interest rate swaps to manage interest rate risk, June 2015. This was submitted to the AER by a number of businesses and is responded to in the AER's November/October draft/preliminary decisions for AGN/the Victorian electricity distribution businesses. This report provides a critique of that response.

10. Both Lally and Chairmont have provided advice to the AER that our recommendation is not sound and that the AER should assume 100% hedging of the base rate of the debt portfolio was efficient. This report considers the advice of Lally and Chairmont and finds that the basis upon which the advice rests is not sound. A summary of the reasons for this is set out below.

1.1 Key errors in Lally and Chairmont advice

11. In its explicit reasoning for rejecting our conclusion on the optimal hedging ratio the AER relies entirely on the advice of its consultants. The advice that the AER explicitly relies on is as follows:

    a. Chairmont's conclusion that less than 100% hedging "*added to overall volatility rather than reducing it*";

    b. Chairmont's statement that since December 2011 a 100% swap strategy has been lower cost than a 0% swap strategy;

    c. Lally's statement that private sector practice is to hedge at or close to 100% of the base rate using interest rate swaps;

    d. Lally's statement that minimising interest rate risk is not the only reason for using swaps and that, by implication, using swaps to take on interest rate risk with the expectation of lowering costs can be efficient practice for a BEE;

12. While the AER's experts make a number of other statements and claims that are examined in this report, the above list is, in our view, the key contentions relevant to the AER's decision making.

13. Critically, the AER's experts are at odds with each other. Lally concedes that *if* there is a negative correlation between swap rates and DRP the optimal hedging ratio will be less than one. In fact, Lally derives a mathematical proof that demonstrates that this is the case and concludes.[4]

> *So, if the correlation between the risk-free rate and DRP terms is negative, the optimal hedge ratio will be less than 1*

14. Nonetheless, Lally argues in favour of a 100% hedging ratio by denying the existence of a negative correlation.

15. By contrast, Chairmont agrees that there is a strong negative correlation both in the literature and in the Chairmont data set (-0.44) but argues that nonetheless no

[4] Lally, 21 October 2015, p. 16.

natural hedge exists (as per point a listed at paragraph 11 above) based on an empirical framework for assessing the existence of a natural hedge.[5]

> *The submissions reference a broad range of literature that argue there is a negative correlation over time between DRPs and base rates, and the data set used here produced a negative correlation of -0.44. However, it does not automatically follow that a negative correlation between two variables means that a successful trading (arbitrage) strategy can be generated from that relationship.*

16. Clearly, both of these positions cannot be correct. We resolve this tension between the AER's experts by:

    - demonstrating that Lally is in error to claim the lack of any reliable negative correlation in the data (see section 4.1.3 below); and
    - demonstrating that Chairmont has relied on an incorrect (and mathematically so) empirical assessment of the existence of a natural hedge. This is discussed in section 4.2.2 and Appendix C below – which demonstrate that the Chairmont assessment fails to identify a natural hedge even if it is a perfect hedge. We also reference the text-book hedging analysis that confirms Lally derivation of the role of negative correlation in providing a natural hedge.

17. When these errors are corrected the only credible factual understanding is as follows:

    - If there is a negative correlation between the DRP and base interest rates then the optimal hedging ratio (for the purpose of minimising risk) will be less than 100% (CEG and Lally's position);
    - There is a strong negative correlation between the DRP and base interest rates (CEG and Chairmont's position); and
    - Therefore, the optimal hedging ratio is less than 100%.

18. Of course, this is not a surprising result in the context of CEG's June 2015 report. That report directly measured the quality of the hedge to the regulatory allowance of different usage of interest rate swaps – following an approach first set out by Lally. The report does this following exactly Lally's method and with modifications to it that we propose. In doing so, we measured over repeated hypothetical regulatory cycles of 5 years the quality of the match between costs and allowance that a firm would have achieved following a specific swap strategy under an 'on the day' regulatory regime. This analysis was based on all possible combinations of averaging periods which provided hundreds of hypothetical averaging/regulatory

5 Chairmont, October 2015, p. 34.

periods over which to compare costs with allowances. We found optimal hedging ratios of less than 50% in both Australia and the US.

19. It would be very surprising and perplexing if any robust analysis of the same data came to a different conclusion - certainly a reconciliation would be required. Neither Lally nor Chairmont attempted such a reconciliation. However, we have done so by correcting errors in their analysis that, once corrected, return the same conclusion as our June 2015 report.

20. In relation to Chairmont's analysis of relative costs (point b listed at paragraph 11 above), it is factually correct that, by reference to the period examined, a 100% swap strategy (of which Chairmont presents a number of variants) leads to lower costs from December 2011 onwards. This is because in this period prevailing interest rates are below 10 year trailing average rates. The opposite would be the case if interest rates were higher – the 100% swap strategy would lead to higher cost. The analysis is not relevant because it is conducted by reference to only one type of market environment (falling interest rates), whereas the debt financing strategy needs to be appropriate for other market environments (which includes when interest rates are rising). What is relevant is which strategy provides the best hedge to the allowance. Chairmont's own key exhibit (Graph 1) shows that a 50% hedge does this better than a 100% hedge. This is even clearer when the analysis is extended back before late 2011 – which also shows that the 100% hedge strategy has been higher cost in periods where interest rates were rising;[6]

21. In relation to business hedging practice (point c listed at paragraph 11 above), Lally provides no evidence that private sector practice is to adopt 100% hedging. In fact, there is clear evidence in the Chairmont report that the average practice is less than 100% hedging;[7]

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6 Properly understood in its context, Chairmont is implicitly establishing a criterion for efficiency that requires a network service provider to accurately predict future movements in interest rates. This is against Chairmont's own advice that hedging policies should be assessed in terms of the quality of the hedge – not the successful gambling on interest rate movements

7 Based on evidence to date, it appears that any reliable or probative evidence on actual practice will point to an industry average of less than 100% use of interest rate swaps – with Chairmont reporting AGN as having a 66% hedging ratio and other businesses stating that they hedge less than 100% (although not providing precise estimates of this ratio). While some businesses state that they hedge 100% there is clearly substantial variety in practice and the average is also clearly less than 100%. It is also the case that evidence on actual business practice is not simple to interpret and the average need not be assumed to be uniquely efficient. Indeed, the variation in practice amongst businesses that is already apparent from a very small sample demonstrates that business practice cannot define a uniquely efficient strategy; such that actual business practice, even if clearly and comprehensively surveyed by the AER, will not be determinative. In this context, the empirically derived estimates in our June 2015 report should, in our view, still play a key role in informing an assessment of efficient practice of a BEE (under the assumption that a BEE was an entity regulated under the on-the-day regime).

22. Lally is correct that minimising interest rate risk does not necessarily minimise costs (point d at paragraph 11 above). Lally is also correct that some small cost reduction (3.5/7.5bp based on CEG/Lally estimates)[8] may be expected (but not with anything like certainty) from the 100% swap strategy. However, if this comes with risk then Lally is implicitly arguing for a business to speculate on the term premium in order to make a profit. If this is justified then there is no reason to stop at the AER's proposed policy – leaving all debt floating and not entering into any fixed rate swaps will reduce expected costs by more than the AER strategy - at the cost of higher risk. Notably, Chairmont rules out such a '100% floating' strategy for precisely this reason.

23. The following table provides a more extensive summary of the key contentions of the AER and its experts and our response.

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[8] Relative to a 50% hedging ratio.

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Table 1: Summary of key arguments and responses

#	Claim	Response
1	**Lally** focuses on a comparison of whether 100% swap strategy is superior to 0% swap strategy	A. This involves an incorrect definition of the problem. The correct definition of the problem to be addressed is: what is the most efficient swap strategy? B. Even addressing his own question, Lally arrives at an incorrect answer, and makes incorrect empirical estimates (see #3 below). Correct answer to Lally's problem is that 0% better than 100%.
2	**Lally** states that the fundamental point is that "private-sector firms do hedge this risk (apparently at or close to the 100% level)"	Lally provides no evidence in support of this contention. The available evidence suggests that average practice of regulated energy businesses is to hedge less than 100% of their base rate exposure using interest rate swaps.
3	**Lally** argues that the best data set to assess the hedging ratio that minimises interest rate risk is US data that includes the 1970s and early 1980s	A. Even if (contrary to our advice) this is correct, and all other elements of Lally assessment methodology are retained, the optimal hedging ratio is 81% (not 100%); B. Clear evidence that the inclusion of this data distorts the assessment by including a high and unstable inflation period that is: • not representative of the low and stable inflation targeting period under which the BEE would have designed its strategy if the assumptions in paragraph 6 hold. This is consistent with past AER reflection on the use of the same data in a different process; • not internally consistent with the assumptions underpinning the assessment methodology. Namely, that businesses reliably receive nominal compensation equal to the on-the-day nominal rate at the beginning of the regulatory period (an assumption that only holds if inflation forecast errors are low)
4	**Lally** argues that CEG incorrectly characterises the treatment of inflation under the on-the-day regulatory regime. As a consequence, the impact of inflation forecast errors are overstated by a factor of around 6.	Lally's understanding of the operation of the regulatory regime is factually incorrect. CEG's characterisation which Lally criticises was correct as were conclusions that the full amount of inflation forecast error flows through into lower/higher nominal compensation. Lally's calculations underestimate the impact of inflation forecast error by a factor of about 6 (Appendix 2 of his 21 October 2015 report). This is because, contrary to Lally's assessment, compensation for actual inflation is provided only partly via inflation escalation of revenues and primarily via inflation escalation of the regulatory asset base (RAB). Lally provides no references to the operation of the PTRM or the RAB roll forward model in setting out his understanding.
5	**Lally** derives a formula that shows that negative correlation between base rates and DRP implies an optimal hedging ratio of less than 1.	The derivation is correct as is the basic premise shown. However, the formula presented by Lally at page 16 is based on a number of simplifications to his original approach to estimating relative risk of different hedging ratios (Appendix 2 of Lally April 2015), which is superior.

#	Claim	Response
6	**Lally** finds that negative correlation is not a common feature in the data and one cannot conclude that the 1970s and early 1980s are different from the periods before and after.	This report explains that Lally's analysis is based on a 'decomposition' of the data, which results in an incorrect characterisation of the data. The correct analysis demonstrates the opposite of Lally's claim – and is consistent with Chairmont's conclusion that negative correlation is the norm and is -0.44 in the Chairmont dataset
7	**Lally** argues that there is insufficient Australian data upon which to perform a robust analysis of the interest rate risk management properties of hedging.	This is incorrect. CEG modified Lally's methodology to examine the quality of the hedge across 60 regulatory cycles (one starting in every month of the first five years of data) rather than just 5 (one in each year of the first five years of data). Using the longest available Australian data, following Chairmont's selection of sources, this allows us to examine the quality of the hedge to the regulatory allowance in 148 hypothetical regulatory periods (each with its own distinct averaging period of one month, the first of which is July 1997). Of these 148 regulatory periods, 89 are complete regulatory periods of 5 years and 91 are incomplete (i.e., where the quality of the hedge was only able to be measured over less than 5 years of the regulatory period). We consider that 148 hypothetical regulatory periods is sufficient to provide a robust analysis of the quality of the hedge. We also consider that it is relevant that the US and Australian results are similar – even though the US data is for a longer period.
8	**Lally** argues CEG proposed an 'alternative' definition of interest rate risk that is not 'clearly superior'	CEG adopted the AER's definition of interest rate risk which is the same definition found in the terms of reference for Lally's April 2015 report to the AER.
9	**Lally** states that CEG is in error when arguing that the differential between 5 and 10 year swap rates was unstable and this reduces the effectiveness of a swap strategy as a hedge.	Lally's analysis incorrectly proceeds as if the regulator sets compensation based on a 5 year term which is not correct and is the source of the problem with Lally's analysis identified by CEG. We agree that if a 5 year term had been used under the on-the-day approach to set compensation then this differential would not have existed. But CEG's analysis was based on the correct premise that the regulator used a 10 year term under the on-the-day approach. (Note that this is also one of the simplifying assumptions that underpins Lally's theoretically derived optimal hedging ratio (page 16 of his 21 October 2105 report) and is one of the reasons it is at best an approximation.)
10	**Lally** states CEG provides no explanation for why inflation forecasting error would be higher in the 1970s.	This is incorrect. Explanation and empirical data were provided.

#	Claim	Response
11	**Chairmont** presents its key exhibit in Graph 1. On the basis of this figure Chairmont concludes that 100% swap strategies are more efficient because they have lower costs over the period from December 2011 to early 2015.	It is factually correct that, by reference to the period examined, a 100% swap strategy (of which Chairmont presents a number of variants) leads to lower costs from December 2011 onwards. This is because in this period prevailing interest rates are below 10 year trailing average rates. The opposite would be the case if interest rates were higher – the 100% sap strategy would lead to higher cost. The analysis is not relevant because it is conducted by reference to only one type of market environment (falling interest rates), whereas the debt financing strategy needs to be appropriate for other market environments (which includes when interest rates are rising). What is relevant is which strategy provides the best hedge to the allowance. Chairmont's own key exhibit (Graph 1) shows that a 50% hedge does this better than a 100% hedge. This is even clearer when the analysis is extended back before late 2011 – which also shows that the 100% hedge strategy has been higher cost in periods where interest rates were rising.
12	**Chairmont** presents a graphical analysis (Graph 2 and Graph 3) which they interpret as demonstrating that less than 100% hedging generally worsens interest rate risk rather than reduces it.	Chairmont have made a mathematical error in their reasoning. Chairmont's reasoning would find that even where a perfect natural hedge was assumed (i.e., where the DRP *always* moves by the same proportion but in the opposite direction to swap rates) there is no hedge effect by opening a swap rate risk. Chairmont's conclusion is demonstrably wrong.
13	**Chairmont** present, in Graph 4, an example of two regulatory periods in the same cycle (i.e., 5 years apart) where, in the first period 0% hedging provides a moderately better match to the allowance but in the second period 100% hedging provides a much better match. Chairmont conclude that this is evidence in support of 100% hedging.	We agree that this is the correct way to measure the relative quality of different strategies in hedging the regulatory allowance. However, Chairmont has only examined two regulatory periods (one complete period and one period that is not complete). As noted at point 7 above, our analysis using the Chairmont data series is essentially the same as Chairmont's analysis of Graph 4 – with the exception that we examine 148 separate regulatory periods (and more for the US dataset). Our result is statistically robust while Chairmont's is not.

#	Claim	Response
14	**AER** criticises CEG for focusing on a single criteria (optimal hedge) and fails to have regard to other relevant criteria. Specifically, • the expectation that a fully hedged base rate would reduce cost; and • the financing practices of private firms (which it, along with Lally, describes as fundamental).	It is correct that our focus is on the hedging policy that minimises interest rate risk. This is the only reasonable basis to assess an interest rate hedging policy. Chairmont has, as per point **11** above, confused efficient hedging with successful gambling in financial markets on the movement of interest rates (contrary to its own previous advice). In relying on this advice the AER makes the same error. Lally correctly identifies the only relevant source of possible cost reduction from hedging – which is the difference between the 10 and 5 year risk free rates on average or in expectation. (As noted above, this is not the source of the current lower costs of a 100% hedging strategy.) However, Lally significantly overestimates the value of this expectation – putting it at 25bp. This is inconsistent with his advice to the NZ Commerce Commission that the historical average difference is 8bp. Following Lally's methodology in NZ and applying it to Australia we estimate the value of this premium is 17bp. Subtracting Lally's own estimate of transaction costs (10bp) this leaves an expectation of only 7bp. Moreover, we illustrate that the actual premium is highly volatile – often being negative. Any expected monetary benefit therefore comes with additional risk – such that it is far from obvious that it has positive risk adjusted value. Our conclusion is that such a low, and unreliable, expected benefit cannot justify taking on more interest rate risk. Therefore, the primary emphasis must be on efficient interest rate risk management. Moreover, if this view is rejected then there is no reason for the AER to conclude that a 100% use of 5 year swaps is efficient. Leaving debt completely floating will be expected to lower costs further (as would more than 100% 5 year swap coverage)[9]. However, as Chairmont notes (p.29), this involves taking on interest rate risk and therefore is not justified. The same logic implies that, if 100% use of 5 year swap rates takes on interest rate risk relative to the optimal hedging ratio, then that is also not justified (even if a 7bp expected, but unreliable, cost reduction results). The AER does not actually present any reliable evidence that 100% hedging best describes the actual practices of private firms.

[9] This would involve 100% swap rate hedging of the base rate in every regulatory period **plus** the following transactions (for which there is no underlying debt contract being hedged):

- Maintain a portfolio of receive fixed and pay floating long term (10 year) swap contracts.
- Maintain a portfolio of equal value 5 year pay fixed and receive floating swap contracts.

#	Claim	Response
15	**AER** argues for a transition that is not based on its assumed efficient practice. The AER argues that it is no longer justifying this position on clawing back (alleged) past gains under the 'on-the-day' regime.	While the AER states that it has not relied on the historical balance of over or under recoveries in making its decision, the AER must still conclude that a windfall gain has arisen in order to impose a transition on the DRP component. This must logically follow given that the AER accepts that the regulatory return on debt under its transition will be below the cost of debt incurred by its benchmark efficient entity yet finds that its transition provides the benchmark efficient entity with a reasonable opportunity to recover efficient financing costs over the life of its assets (whatever that life may be).

In this combination the floating legs of the contracts cancel and the business effectively lends long (the first portfolio) and borrows short (the second portfolio). Consequently, the expected return is the difference between 10 and 5 year rates. This is precisely the source of the 'benefit' from hedging that Lally claims. Of course, as shown in this example, you don't have to be regulated to undertake this strategy – it is open to anyone. The reason that we do not observe all businesses/individuals pursing such a strategy is that it is risky (short term rates can rise above long term rates). There is no reason to believe that a regulated utility should expose itself to this risk/reward combination anymore than another business. However, this is in effect Lally's advice as to what a BEE should be assumed to do.

2 Introduction

24. CEG has been engaged by Jemena Electricity Networks, ActewAGL, AusNet Services, Australian Gas Networks, CitiPower, Powercor and United Energy to prepare an expert report[10] which provides an assessment of the AER's October and November 2015 preliminary and draft decisions[11] in relation to the appropriate transition to a trailing average. We are instructed to perform that assessment on the assumption that the efficient debt financing strategy of a benchmark efficient entity reflects the following:

    - the entity is a regulated energy transport business;
    - that entity was regulated under the 'on-the-day' regime to setting the cost of debt allowance; and
    - the entity's response to being regulated under the 'on-the-day' regime is relevant to an assessment of efficient financing practices (even if the nature of that regulation was such that it did not necessarily result in a cost of debt allowance that was commensurate with efficient costs, being the costs that would be incurred in a workably competitive market).

25. The AER sets out its views on the efficient debt financing costs of a benchmark efficient entity as follows: [12]

> *We consider the efficient debt financing costs of a benchmark efficient entity as those which are expected to minimise its debt financing costs over the life of its assets, while managing refinancing risk and interest rate risk:*

26. There is no dispute as to refinancing risk being relevant and that this is managed by the issuance of long term debt (10 years) at staggered intervals.

27. The AER defines interest rate risk as follows:[13]

> *Interest rate risk—the risk associated with a mismatch between the allowed return on debt and a benchmark efficient entity's actual return on debt.*

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10 Terms of reference are provided at Appendix D.

11 For electricity and gas transport companies.

12 AER, Jemena preliminary decision, October 2015, p. 3-166.

13 AER, Jemena preliminary decision, October 2015, p. 3-166.

28. We agree that this is the relevant definition of interest rate risk in the context of this report as set out above. We note that this particular definition is specific to the context of the regulated business. The term 'interest rate risk' is more commonly used to refer to the risk to wealth or cash-flows from changes in market interest rates and different portfolios of assets/liabilities will have different properties in this regard. (For an unregulated business whose revenues were not reset every 5 years, a strategy of resetting 100% of base rate interest rate exposure every five years would be the antithesis of interest rate risk management.)

29. We also agree with the AER that, in the context set out above, the benchmark efficient strategy involves a trade-off between expected debt financing costs and minimisation and risk. However, we do not believe that the AER's phrasing best reflects this. The AER's phrasing could be interpreted as setting minimising debt financing costs as the primary objective subject to some hurdle level of 'risk management' being achieved. We consider that a better description of the benchmark efficient strategy is one that minimises the risk adjusted cost of financing (both debt and equity financing costs).

30. In this regard we note that there are a range of strategies that minimise debt financing costs (especially at a point in time) but do so at the expense of higher risk borne by equity providers (and potential debt providers in the future). For example, borrowing at short term rates may lower debt financing costs at a given point in time (and may be *expected* to do so over the long run) but will expose a business (including the equity financiers) to rapid increases in interest rate costs and potentially to the costs of financial distress.

31. It follows that, as with all financing decisions, the efficient practice involves optimising a trade-off between risk and return/costs. Lally appears to acknowledge this distinction in the following passage.[14]

> *Firstly, in respect of the efficient financing practices of the benchmark efficient entity (BEE), this would be to maximize shareholder wealth, which is potentially different to the AER's goal of minimizing expected financing costs whilst managing the interest rate and refinancing risks. However, since there is no direct means of assessing which financing policy would achieve either of these subtly different objectives, managers must use judgement and regulators will only be able to rule out some practices as inefficient, leaving a set of policies that it cannot differentiate between unless they are willing to use the observed practices of firms as a guide to what is efficient.*

32. The remainder of this report is structured as follows:

[14] Lally, Review of submissions on the cost of debt, 21 April 2015.

- **Section 3** provides an overview of the AER decision and previous expert reports that are relevant;
- **Section 4** addresses the optimal hedging strategy that minimises interest rate risk;
- **Section 5** addresses the issue of cost minimisation;
- **Section 6** considers the relevant information on actual business practice;
- **Section 7** critiques the AER's rationale for not basing its transition on the costs that it believes a benchmark efficient entity would incur over the transition period.

33. 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.

34. I have been assisted in the preparation of this report by Yanjun Liu and Johnathan Wongsosaputro in CEG's Sydney office, and for that reason the report refers to "we" and "our". However, the opinions set out in this report are my own.

Thomas Nicholas Hird

3 Overview of AER reasoning

3.1 Debt transition issues in prior regulatory decisions

35. In the AER's 2014 draft decisions for NSW and ACT electricity and gas businesses the AER first expressed the view, repeated in its most recent decisions,[15] that the efficient use of interest rate swaps, given that a business was subject to regulation whereby the compensation for the cost of debt was reset at the beginning of each 5 year regulatory period based on the then prevailing 10 year cost of corporate debt (base rate plus debt risk premium (DRP)), was as follows:[16]

> *We consider an efficient financing practice of the benchmark efficient entity under the on-the-day approach would have been to borrow long term and stagger the borrowing so that only a small proportion of the debt matured each year. We consider the benchmark efficient entity would have combined this practice with interest rate swap contracts to match the risk free rate component of its return on debt to the on-the-day rate. Specifically, we consider an efficient financing practice would have been:*
>
> - *to borrow long term (10 year) debt and stagger the borrowing so that only a small proportion (around 10 per cent) of the debt matured each year*
> - *to borrow using floating rate debt (or to borrow fixed rate debt and convert this to floating rate debt using fixed-to-floating interest rate swaps at the time of issuing the debt and which extended for the term of the debt, being 10 years), and*
> - *to enter into floating-to-fixed interest rate swaps at, or around, the time of the service provider's averaging period and which extended for the term of the regulatory control period, being typically 5 years).*
>
> *We consider this would have been an efficient financing practice of the benchmark efficient entity under the on-the-day [sic] because:*
>
> - *Compared with the alternative possible debt financing strategies, this strategy would have more effectively* ***managed refinancing risk*** *and* ***interest rate risk****, and also resulted in* ***a lower expected actual return on debt****, and*

[15] AER, Jemena preliminary decision, October 205, p. 3-581.

[16] AER, ActewAGL draft decision, November 2014, Attachment 3: Rate of return, p. 3-115-116.

- *It is the financing strategy that was **generally adopted by most private service providers** under the on-the-day approach.*

*This financing strategy would have resulted in the risk free rate component of the benchmark efficient entity's actual return on debt matching the on-the-day rate, **while the debt risk premium component each year would reflect the historical average of the debt risk premiums over the previous 10 years**.*

The staggering of debt under this strategy would have lowered refinancing risk, compared to if the benchmark efficient entity attempted to issue all its debt during the averaging period.

Adopting the strategy of a staggered debt portfolio with interest rate swaps, compared with a staggered debt portfolio without interest rate swaps, would have led to the same degree of refinancing risk. However, compared to the later strategy, adopting a staggered debt portfolio with interest rate swaps would have resulted in:

- *lower interest rate risk—as interest rate risk would only have been borne on the debt risk premium component of the return on debt, rather than bearing interest rate risk on the total return on debt, and*
- *lower actual return on debt—as hedging using interest rate swaps has the impact of reducing the effective term of the debt. As longer term debt is typically more expensive than otherwise equivalent shorter term debt, due to the greater risks faced by the holders of long term debt, **reducing the effective term would be expected to reduce the lower actual return on debt, on average.***

*[**Emphasis** added.]*

36. In this quote the AER sets out four criteria against which it considers an efficient debt management strategy can be assessed. These are:

    i. managing refinancing risk;

    ii. managing interest rate risk;

    iii. lowering the expected actual cost of debt by reducing the effective term; and

    iv. consistency with the actual practice of "*most private service providers*".

37. The first criterion establishes the case for maintaining a staggered debt portfolio under a 10 year trailing average. We understand that this is common ground with all stakeholders. The second criterion, the AER considers, establishes the case for using interest rate swaps in the manner described in the quote.

38. The third criterion appears to be subordinated to the second criterion. That is, minimising interest rate risk, by matching the term of the swap to the term of the regulatory period, is the primary objective for the efficient use of swaps. The AER

appears to consider that an indirect benefit arises from the use of such swaps, being to reduce the effective term of the 10 year debt to five year debt, which the AER considers would be expected to reduce the lower actual cost of debt, on average.

39. The fourth criterion appears to be based on the assumption that private service providers will manage their debt in a manner consistent with the first three criteria. Therefore, the observed practice of private service providers will provide evidence in terms of the practice most likely to be consistent with achieving the first three criteria.

40. CEG prepared a report in response to the AER's conclusions in the above quote in a report for Networks NSW.[17] In that report we explained that it could not be presumed that using interest rate swaps to hedge 100% of the base rate of interest in the regulatory allowance would minimise interest rate risk. This is because:

- the on-the-day allowance was based on a 10 year term (reset every 5 years) and, consequently, 5 year swaps reset every five years did not provide a perfect hedge to the base rate embedded in the on-the-day allowance; and
- the prevailing 5 year swap rate was negatively correlated with the prevailing 10 year DRP and, therefore, a natural hedge existed such that movements in the 5 year swap rate would tend to be offset by movements in the DRP, at least in part. The existence of this natural hedge meant that interest rate risk would be minimised by hedging less than 100% of the base rate using interest rate swaps.

41. The report noted:[18]

> *These inconsistencies between how the AER proposed to compensate for the cost of debt, and the actual cost of debt that would be incurred under the hybrid, mean that it is quite possible that pursuing a swap hedging strategy could actually make the total cost of debt for a business less well hedged to the regulatory allowance than simply adopting a trailing average. For example, if the prevailing DRP (which the 'on the day' method uses to set compensation for the full five years) tends to move inversely with the 5 year swap rate then locking in a low/high 5 year swap rate could cause a business' actual cost of debt to move in the opposite direction to the overall regulatory allowance.*

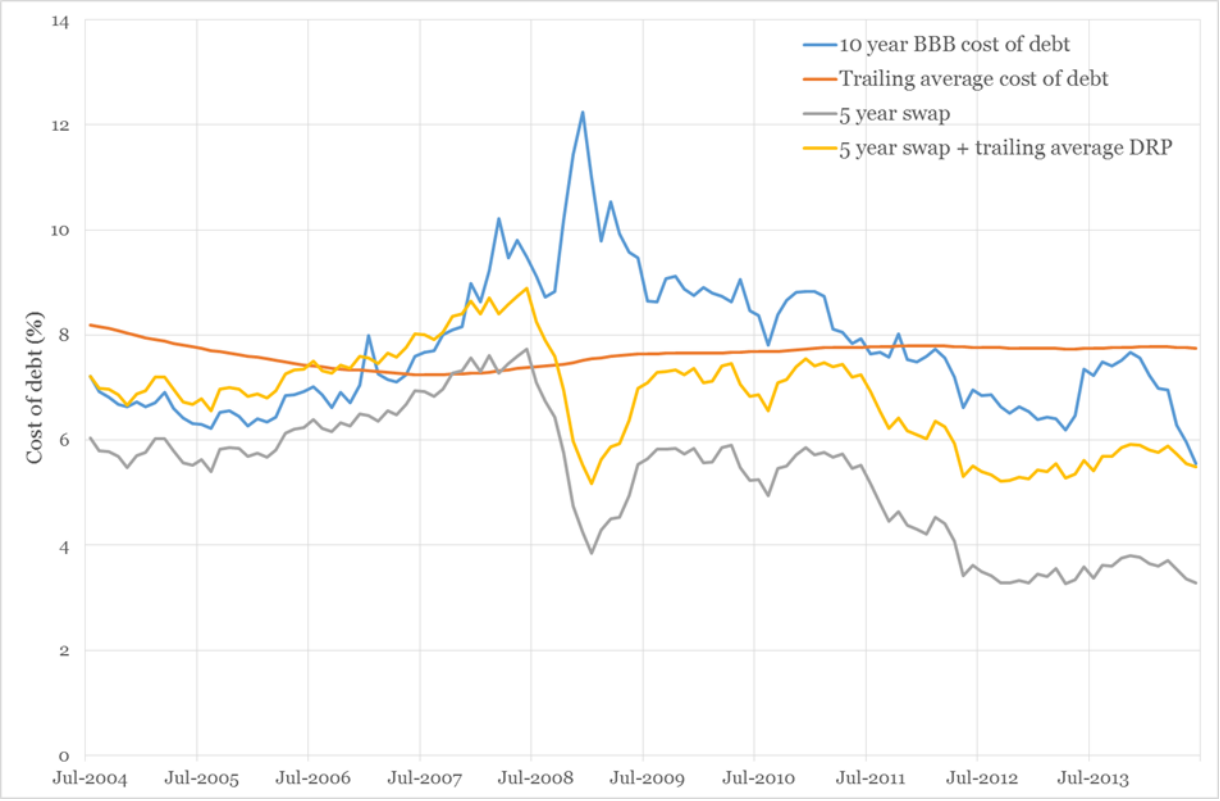
42. Consistent with this conclusion the following chart was set out in the report, which showed the negative correlation between the 5 year swap rate and the prevailing 10 year cost of debt. It also demonstrated that, for a regulatory period starting at any date along the horizontal axis, a 0% swap strategy (a trailing average with no swap

[17] CEG, Efficient Debt Financing Costs, January 2015, section 4.5.

[18] CEG, Efficient Debt Financing Costs, January 2015, p.22.

overlay) resulted in a cost of debt that was more stable and closer to the regulatory allowance than a 100% swap strategy.

Figure 1: Reproduction of Figure 4 from CEG January 2015 - trailing average vs. hybrid vs. 'on the day' cost of debt



Source: Bloomberg, RBA and CBASpectrum month-end data, CEG analysis

43. We noted that the sum of squared differences between the 10 year BBB prevailing cost of debt and the trailing average cost of debt was 215.7, whereas the sum of squared differences between the 10 year BBB prevailing cost of debt and the hedged cost of debt was 317.8. The lower value signifies that the trailing average cost of debt was typically closer to the allowance than the 100% swap strategy.

44. In its final decisions for the NSW and ACT electricity businesses, the AER did not accept the relevance of CEG's conclusions as set out above. The AER sought advice from Lally on the measurement of interest rate risk and Lally advised the AER:[19]

> *CEG (2015, section 4.5) also argue that using swaps was undesirable because it would eliminate a natural hedge between the DRP and the base rate component of the cost of debt. CEG analyse this issue by comparing*

[19] Lally, Review of Submissions, April 2015, p. 51

> *the risk from swapping with not swapping over the 2004-2014 period using Australian data, and conclude that swapping [sic: not swapping] would have yielded more risk over the 2004-2013 period than swapping. However this analysis has two limitations. Firstly, the data period used spanned only two regulatory cycles and is therefore inferior to the analysis carried out by me in Appendix 2, spanning ten regulatory cycles. Secondly, the analysis carried out by CEG is incorrect because it examines variations between allowed and incurred costs every month as if the allowed rate was reset monthly instead of five yearly.*

45. The AER relied on Lally's advice to dismiss the relevance of the CEG analysis.[20]

> *CEG's analysis is flawed and its assumptions are incorrect. CEG assumed that the allowed return on debt under the on-the-day approach is reset monthly.*

46. In fact, we did not assume that the cost of debt was reset monthly. Rather, we simply compared the actual cost of debt to the regulatory allowance assuming that the regulatory allowance could have been reset in any one of the 240 months examined. This was clearly explained in our January 2015 report.[21]

> *The horizontal axis of Figure 4 should be interpreted as illustrating different potential averaging periods. That is, it shows what the actual cost of debt would have been under the hybrid and simple trailing average approach compared to the allowed cost of debt, if the averaging period were set at a particular date.*

47. However, it is correct that the approach in our January 2015 report only compared the cost of debt and the regulatory allowance *at the beginning of each regulatory period* and *not over the entire 5 years of the regulatory period*. That said, given that the regulatory allowance is fixed for five years and the components of the cost of debt are slow to change[22] the quality of the hedge at the beginning of the regulatory period can be expected to be a good indicator of the quality of the hedge over the period.

48. Nonetheless we accepted, in our June 2015 report,[23] that a better measure of the quality of the hedge provided by different strategies is to measure the match between costs and allowance over the full five years of the regulatory period. We

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20 AER, Ausgrid Final Decision, p. 3-503.

21 CEG, Efficient debt financing costs, January 2015, p. 24.

22 The 5 year swap rate is fixed for five years at the beginning of the regulatory period and the trailing averages (for both the full cost of debt and/or the DRP) are, by their construction, slow to change.

23 CEG, Efficient use of interest rate swaps to manage interest rate risk, June 2015.

also accepted that the mathematical approach set out by Lally in Appendix 2 of his April 2015 report for the AER provides the correct framework for quantifying interest rate risk under the 'on-the-day' regime – capturing the deviation between cost and allowance over the full course of the regulatory period.

49. However, several of the choices made by Lally in implementing this framework were, in our view, problematic and invalidate his conclusions (although even without correcting these problems the optimal hedging ratio is less than 100%). These included using only US data rather than Australian data and, also, using interest rate data from the 1970s and early 1980s when US inflation was very high and unstable. We regarded the use of this data as inappropriate for two reasons:

- First, Lally's framework assumes that there is a one-for-one correspondence between movements in nominal interest rates and nominal regulatory compensation for the cost of debt. This is a reasonable assumption when inflation is low and stable but was not a reasonable assumption over the 1970s and early 1980s;
- Second, even putting aside the above criticism, the monetary policy environment in the high inflation 1970s and 1980s is simply not comparable to the environment in which a BEE is determining efficient financing practice in the 21st century.

50. Nonetheless, our June 2015 report showed that, even if we put aside these criticisms, Lally's results do not support his and the AER's assumption that a 100% swap strategy minimised interest rate risk. This is because the analysis conducted by Lally did not examine the quantum of swaps (that is, the percentage of the debt portfolio that was the subject of hedges) that minimised interest rate risk – only whether a 100% swap strategy results in lower interest rate risk than a 0% swap strategy.

51. Our June 2015 report showed that, leaving every other aspect of Lally's analysis and dataset unchanged, the percentage use of swaps that minimises interest rate risk is 81%. This is consistent with the existence of a material natural hedge – even in Lally's full dataset including the 1970s and early 1980s. [24]

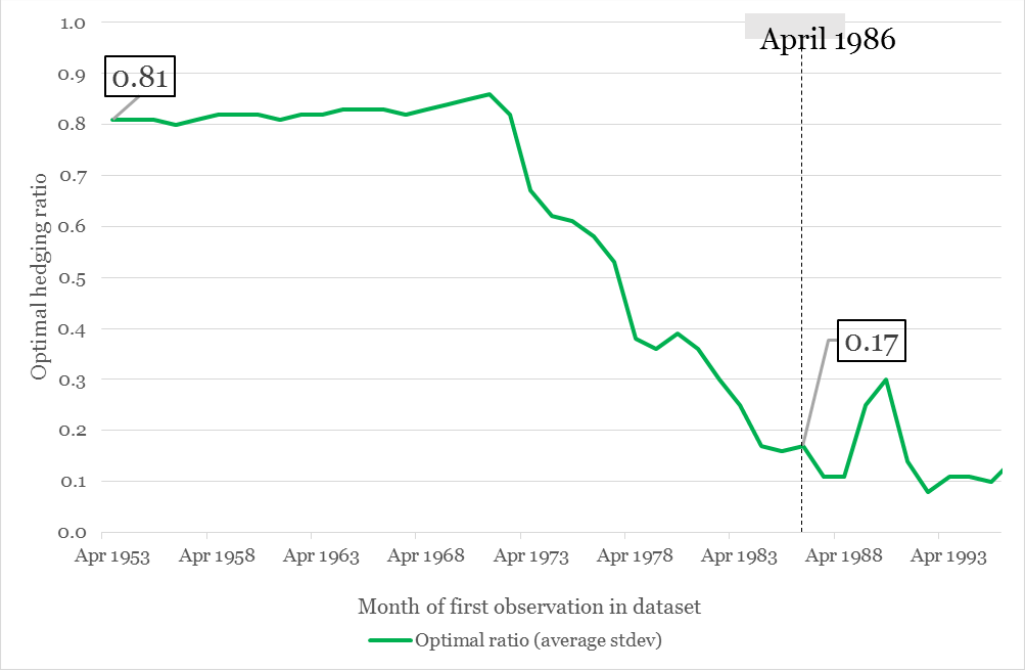
> *However, even if Lally's full dataset is used, a 100% interest rate swap hedging strategy is not the strategy that minimises the standard deviation measured using Lally's methodology. Rather, the hedging ratio that minimises standard deviation is 81%. That is, using Lally's methodology without any changes, using interest rate swaps to reset 81% of a business's base rate exposure at the beginning of each regulatory period delivers a lower standard deviation than either a 0% or a 100% hedging strategy.*

[24] CEG, Efficient use of interest rate swaps to manage interest rate risk, June 2015, pp. 19-20.

This is relevant because the logic of both Lally and the AER's position is that the benchmark efficient debt management strategy is the one that minimised interest rate risk. However, Lally does not report results that address this question; he only reports data that addresses the separate question of whether a 100% strategy was lower risk than a 0% strategy. When, unconstrained by prior assumptions about the strategy undertaken, the question considered is what hedging strategy will minimise interest rate risk. The answer is less than 100% hedging.

This is shown in Figure 6 for different initial starting months of Lally's US dataset. The very first point on the left hand side of the chart indicates that the hedging ratio which minimises interest rate risk for Lally's full dataset starting in April 1953 is 81%. However, had the analysis excluded the high and unstable inflationary environments in the 1970s and early 1980s, and considered only the data from 1986 onwards, the optimal hedging ratio would have been a substantially lower (17%). The relevant hedging ratio is below 50% if the dataset begins in 1978 or later. In any case, it is clear from Figure 6 that Lally's analysis does not support an assumption that 100% hedging minimises risk – over all possible start dates standard deviation is minimised using less than 100% interest rate swap hedging.

Figure 6: Optimal hedging ratios for different starting observations



Source: CEG analysis

52. In addition, our June 2015 report demonstrated that if Australian data was used rather than US data Lally's framework resulted in an estimate of the optimal hedging ratio of around 1/3rd.[25]

53. The AER's October and November preliminary and draft decisions for the Victorian electricity businesses and ACT and South Australian gas businesses and further reports from Lally and Chairmont provide a response to the analysis we presented in our June 2015 report.

3.2 Overview of AER October and November 2015 position

54. The AER's position in its October and November preliminary and draft decisions is largely unchanged on the efficient use of swaps under the old regime[26]:

> *We are satisfied that holding a staggered long term (10 years) debt portfolio and using interest rate swaps to hedge the base rate over the regulatory control period was an efficient financing practice for a benchmark efficient entity subject to the on-the-day approach.*
>
> *We do not expect all service providers would have adopted precisely this strategy. However, we consider it represents a reasonable approximation of the range of efficient financing practices that a benchmark efficient entity would have adopted under the on-the-day approach.*

55. This is supported by Chairmont:[27]

> *AER's current assumption may be the most appropriate neutral benchmark which leaves room for NSPs to seek further efficiencies in their financing programs.*
>
> *AER's Basic Approach to EFP* [100% swap strategy] *appears to produce a reasonable approximation of the range of the outcomes from various EFPs going into the transition in market circumstances. This still allows firms to outperform slightly by efficient use of flexibility.*

56. And Lally[28]:

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25 CEG, Efficient use of interest rate swaps to manage interest rate risk, June 2015, pp. 62-65.

26 AER, Preliminary decision for Jemena, October 2015, p. 3-555

27 Chairmont, *Cost of debt: Transitional analysis*, April 2015, p. 26; Chairmont, *Financial practices under regulation: past and transitional*, October 2015, p. 13.

28 Lally, Review of the submissions on transition issues for the cost of debt, October 2015, p.52

> *Secondly, under the previous regime, it seems to have been the general practice of private sector firms to use interest rate swaps to hedge the base rate component of the cost of debt and this creates a strong presumption that this was efficient behavior. Furthermore, this conclusion is strengthened by the fact that using these swaps seemed to reduce expected interest costs and also reduced risk (in the sense of reducing mismatches between the allowed base rate for the cost of debt and that incurred). CEG denies that it was the general practice of private sector firms to use these swaps and that they reduced expected interest costs, under the previous regime. CEG also argues that, using a different definition of risk (that associated with mismatches between the allowed and incurred cost of debt rather than just the base rate) and using US data back to only 1986 rather than 1953 or using Australian data back to 1998, risk appears to have been increased moderately by engaging in these swap contracts. However, CEG do not present any persuasive evidence on either the question of the general practice of businesses or the effect of swaps on expected interest costs. Furthermore, CEG's alternative definition of risk is not clearly superior and there is no clear rationale for rejecting data prior to 1986. Consequently, the presumption that using swaps was efficient under the previous regime is still warranted. This supports the use of a transitional regime for the base rate, because firms could not instantaneously adapt their behaviour to the new regime in which use of these swaps is no longer warranted.*

57. The following three sections of this report critically examine the analysis of Lally and Chairmont that the AER relies on in relation to the efficient use of swaps concerning each of:

    i. managing interest rate risk;

    ii. lowering the expected actual cost of debt by reducing the effective term; and

    iii. consistency with the actual practice of "*most private service providers*".

4 Minimising interest rate risk

58. The core conclusion of our June 2015 report is that less than 100% swap hedging minimises interest rate risk. On that basis we concluded that the efficient use of interest rate swaps was less than 100%. The AER summarises its rejection of our findings that the AER was wrong to presume that 100% swap hedging was efficient because it minimised interest rate risk as follows:

> *In summary we are not persuaded by CEG's analysis because it:*
>
> - *ignored the financing practices of private firms.*
> - *focused only on one reason for which a benchmark efficient entity would completely or largely hedge the base rate.*

59. In this summary the AER does not disagree with our finding that 100% hedging did not minimise interest rate risk based on the available historical data. Instead, it focusses on other reasons to conclude that 100% hedging was efficient.

60. The AER's full response on CEG's finding that less than 100% swap hedging minimises interest rate risk is detailed below:[29]

> *Some of these submissions referred to analysis undertaken by CEG in support of these arguments.[2107] CEG submitted that it adapted an empirical approach used by Lally in a previous paper in order to test which portion of hedging the base rate will minimise interest rate risk. CEG concluded that:[2108]*
>
> > *Based on the analysis in this report, I consider that the use of interest rate swaps that would have minimised interest rate risk for the benchmark efficient entity under the 'on the day' regulatory regime would have involved hedging around 1/3 of base interest rate exposure at the beginning of the regulatory period. The remaining 2/3 of the debt portfolio would not be affected by the use of interest rate swaps and would be best modelled based on a trailing average of past debt costs.*
>
> *We engaged both Chairmont and Lally to review CEG's analysis and the related commentary in the proposals currently before us on hedging less than 100 per cent of the base rate. Overall, we are not persuaded by CEG's analysis for the reasons set out in the following paragraphs.*
>
> *As indicated by Chairmont, whether or not there is a negative correlation between the DRP and base rate is a secondary consideration. Chairmont's*

[29] AER, Preliminary decision for Jemena, October 2015, pp. 3-558-560.

analysis suggested that a financing strategy of partial hedging (which is labelled 'Strategy 1' in Chairmont's report) nearly always resulted in substantially higher starting portfolio costs than all strategies that involved a fully hedged base rate for the period December 2011 to June 2015. Chairmont concluded that:

> *At this point in time the evidence does not support the notion that Strategy 1 is efficient. It creates an additional and avoidable interest rate risk in the base component which has an unstable and unreliable relationship to changes in the DRP. There is no dispute about there being a negative correlation over time between DRPs and base rates, as the data set used here also has a negative correlation. However, it does not automatically follow that a negative correlation between two variables means that a successful trading (arbitrage) strategy can be generated from that relationship.*
>
> *Even in the early 2000's Graphs 2 and 3 showed that including fixed rate risk with DRP risk added to overall volatility rather than reducing it. At that time, even with limited data, there were early warning signals on the efficiency of this strategy.*

Further, in undertaking quantitative analysis on this strategy, Chairmont concluded that:

> *As shown in Graph 1, for all the starting points from 2011 until now the results show for a hedge ratio of 50% Strategy 1 was:*
>
> *– Always more expensive than AER's Basic Approach (the hybrid approach), ranging from 75bp to 180bp higher.*
>
> *– Always the highest cost of all of the strategies considered here*
>
> *– Most of the time above the Guideline allowance.*

Lally was not also persuaded by CEG's proposition that a negative correlation between the base rate and the debt risk premium entails a natural hedge between these two variables; such that it would be efficient to hedge only a portion of the base rate. In particular, Lally noted that CEG's analysis does not undercut the fundamental point that private sector service providers hedge the interest rate risk. This is a fundamental point because:

- *Private firms need to raise capital directly from capital markets. To do so require [sic: requires] discipline given that private firms face higher refinancing and bankruptcy risk (relative to their government-owned counterpart).*[2112]

- *As set out in this decision, we rely on industry norms among the privately owned firms in estimating aspects of the debt methodology, including debt term, credit rating, the use of staggered debt and hedging practices.*
- *CEG analysis did not rely on the practices of the privately owned firms in Australia.*

Lally agreed with this view. Lally stated:

> *…in order to prefer CEG's conclusion, one would have to ignore the fact that private-sector firms do use swaps, and ignore the fact that these swaps reduce expected interest costs, and define risk in relation to the entire cost of debt (rather than just the base rate), and to conclude that the best data to determine the optimal course of action is from 1986-2015.*

Furthermore, CEG's analysis focused only on one of the reasons for which a benchmark efficient firm would completely or largely hedge the base rate (reduction of interest rate risk). It does not address other reasons, including the expectation that a fully hedged base rate would reduce expected costs. This effect arises because, by fully hedging the base rate, the service provider's base rate costs reflect a 5 year term as opposed to a 10 year term. To the extent that the benchmark efficient entity hedges less than 100 per cent of the base rate, it dilutes the cost-reducing effect.

In summary we are not persuaded by CEG's analysis because it:

- *ignored the financing practices of private firms.*
- *focused only on one reason for which a benchmark efficient entity would completely or largely hedge the base rate.*

61. The specific advice of its consultants that the AER explicitly relies on is as follows:

- Chairmont - less than 100% hedging "*added to overall volatility rather than reducing it*";
- Chairmont - since December 2011 100% swap strategy has been lower cost than 0% swap strategy;
- Lally – private sector practice is to hedge at or close to 100% of the base rate using interest rate swaps;
- Lally – minimising interest rate risk is not the only reason for using swaps; swaps can also be used to take on interest rate risk with the expectation of lowering costs.

- Lally – one can also define interest rate risk to ignore the DRP (i.e., define interest rate risk in terms of the base rate only) and if one does this then 100% hedging minimises interest rate risk.

62. We discuss the Chairmont and Lally reports in detail below. While other matters are raised in these reports the above list contains the key conclusions of those reports. The summary response to each of these is as follows.

- Chairmont is incorrect about reducing the use of swaps 'adding to overall volatility'. Chairmont's statement is based on a demonstrable mathematical error such that Chairmont's assessment of the data would find that no (zero) natural hedge existed between DRP and base rates even if the true natural hedge was perfect.
- It is factually correct that, by reference to the period examined, a 100% swap strategy (of which Chairmont presents a number of variants) leads to lower costs from December 2011 onwards. This is because in this period prevailing interest rates are below 10 year trailing average rates. The opposite would be the case if interest rates were higher – the 100% swap strategy would lead to higher cost. The analysis is not relevant because it is conducted by reference to only one type of market environment (falling interest rates), whereas the debt financing strategy needs to be appropriate for other market environments (which includes when interest rates are rising). What is relevant is which strategy provides the best hedge to the allowance. Chairmont's own key exhibit (Graph 1) shows that a 50% hedge does this better than a 100% hedge. This is even clearer when the analysis is extended back before late 2011 – which also shows that the 100% hedge strategy has been higher cost in periods where interest rates were rising.[30]
- Lally provides no evidence that private sector practice is to adopt 100% hedging. In fact, there is clear evidence in the Chairmont report that the average practice is less than 100% hedging;
- Lally is correct that minimising interest rate risk does not necessarily minimise costs. Lally is also correct that some small (3.5/7.5bp based on CEG/Lally estimates)[31] cost reduction may be expected (but not with anything like certainty) from the 100% swap strategy. However, if this comes with risk then Lally is implicitly arguing for a business to speculate on the term premium in order to make a profit. If this is justified then there is no reason to stop at the

[30] Properly understood in its context, Chairmont is implicitly establishing a criterion for efficiency that requires a network service provider to accurately predict future movements in interest rates. This is against Chairmont's own advice that hedging policies should be assessed in terms of the quality of the hedge – not the successful gambling on interest rate movements

[31] Relative to a 50% hedging ratio.

AER's proposed policy – leaving all debt floating and not entering into any fixed rate swaps will reduce expected costs by more than the AER strategy (at the cost of higher risk). Notably, Chairmont rules out such a strategy for precisely this reason.

- Lally has no basis to define interest rate risk relative only to the base rate and, certainly, has no basis to implicitly define this as 'standard' and CEG's definition as 'alternative'. CEG's definition is the same as the AER's and, indeed, is the same definition as was set out in Lally's terms of reference from the AER.

63. We also note that the AER's experts appear to be at odds with each other. Lally concedes that if there is a negative correlation between swap rates and the DRP the optimal hedging ratio will be less than 1. In fact, Lally derives a mathematical proof that demonstrates that this is the case and concludes:[32]

> *So, if the correlation between the risk-free rate and DRP terms is negative, the optimal hedge ratio will be less than 1.*

64. Nonetheless, Lally argues in favour of a 100% hedging ratio by denying the existence of a negative correlation.

65. By contrast, Chairmont agrees that there is a strong negative correlation both in the literature and in the Chairmont data set (-0.44) but argues that nonetheless no natural hedge exists based on an empirical framework for assessing the existence of a natural hedge.[33]

> *The submissions reference a broad range of literature that argue there is a negative correlation over time between DRPs and base rates, and the data set used here produced a negative correlation of -0.44. However, it does not automatically follow that a negative correlation between two variables means that a successful trading (arbitrage) strategy can be generated from that relationship.*

66. Clearly, both of these positions cannot be correct. We resolve this tension between the AER's experts by:

- demonstrating that it is incorrect for Lally to claim the lack of any reliable negative correlation in the data (see section 4.1.3 below); and
- demonstrating Chairmont has relied on a demonstrably incorrect (and mathematically so) empirical assessment of the existence of a natural hedge. This is discussed in section 4.2.2 below – which demonstrates that the

[32] Lally, 21 October 2015, p. 16.

[33] Chairmont, October 2015, p. 34.

Chairmont assessment fails to identify a natural hedge even if it is a perfect hedge.

67. When these errors are corrected the only correct position is that:

- If there is a negative correlation between the DRP and base interest rates then the optimal hedging ratio (for the purpose of minimising risk) will be less than 100%;
- There is a strong negative correlation between the DRP and base interest rates; and
- Therefore, the optimal hedging ratio is less than 100%.

68. Of course, this is not a surprising result in the context of CEG's June 2015 report. That report directly measured the quality of the hedge to the regulatory allowance of different usages of interest rate swaps – largely following an approach first set out by Lally. It did so measuring directly the costs over time that a firm would have following a specific strategy and comparing these to the allowances that it would receive – based on all possible combinations of averaging periods. This gave us hundreds of hypothetical averaging/regulatory periods on the basis of which to compare costs with allowances. It found optimal hedging ratios of less than 50% in both Australia and the US.

69. It would be very surprising and perplexing if any robust analysis of the same data came to a different conclusion - certainly a reconciliation would be required. Neither Lally nor Chairmont attempted such a reconciliation. However, we have done so by correcting errors in their analysis that, once corrected, return the same conclusion as our June 2015 report.

4.1 Lally

70. Lally does not challenge our conclusion that, even with his own dataset and methodology, the optimal hedging ratio was 81%.[34] The only passage where Lally addresses our conclusions that the optimal use of interest rate swaps is less than 100% is in this paragraph:[35]

> *CEG (2015b, section 3.4) also determines the optimal hedging proportion for each point from which data is used, i.e., the proportion hedged that minimizes the standard deviation of the difference between the allowed and incurred cost. Thus, if data is used from 1953, the optimal proportion*

[34] Of course, we consider that this is a drastic overestimate of the optimal hedging ratio because, as already described, it relies on the use of data from the high inflation 1970s and 1980s

[35] Lally, 21 October 2015, p.21.

> *is 81% rather than 100% and, if data is used from 1986, the optimal proportion is 17% rather than zero. Presumably the point of this is to suggest that, even if data from 1953 were preferred, it would still be wrong to conclude that the efficient behaviour was to fully hedge (as the AER does). However, the fundamental point still remains that private-sector firms do hedge this risk (apparently at or close to the 100% level), and this gives rise to the reasonable presumption that this is efficient behavior. Nothing in CEG's analysis that leads to the figure of 81% undercuts that presumption, because firms might define risk differently to CEG, or use a different historical period for determining the optimal course of action, or simply judge that the optimal hedging ratio could not be estimated any more reliably than allowing one to choose between 100% and zero.*

71. Here Lally does not dispute the fact that even with his dataset and his methodology, the hedging ratio that minimises interest rate risk, as defined by Lally, is 81%. However, Lally does reject the relevance of this conclusion on the basis that notwithstanding this finding:[36]

> *…the fundamental point still remains that private-sector firms do hedge this risk (apparently at or close to the 100% level), and this gives rise to the reasonable presumption that this is efficient behavior.*

72. We address this issue in section 6. However, we note that no source is cited in support of the statement that private-sector firms hedge at or close to the 100% level. In fact, average business practice by private-sector firms is to swap less than 100% (as is average business practice by publicly owned businesses)[37].

4.1.1 Inclusion of US data from the 1970s and early 1980s

73. Lally states that the high and variable inflation of the 1970s and early 1980s is not the cause of a higher (although still less than 100%) optimal hedging ratio using pre 1986 data. This is despite the conceptual and empirical arguments that we presented otherwise – the same arguments that the AER has in other regulatory rate of return processes used to reject the validity of findings from this data as set out in Appendix B.

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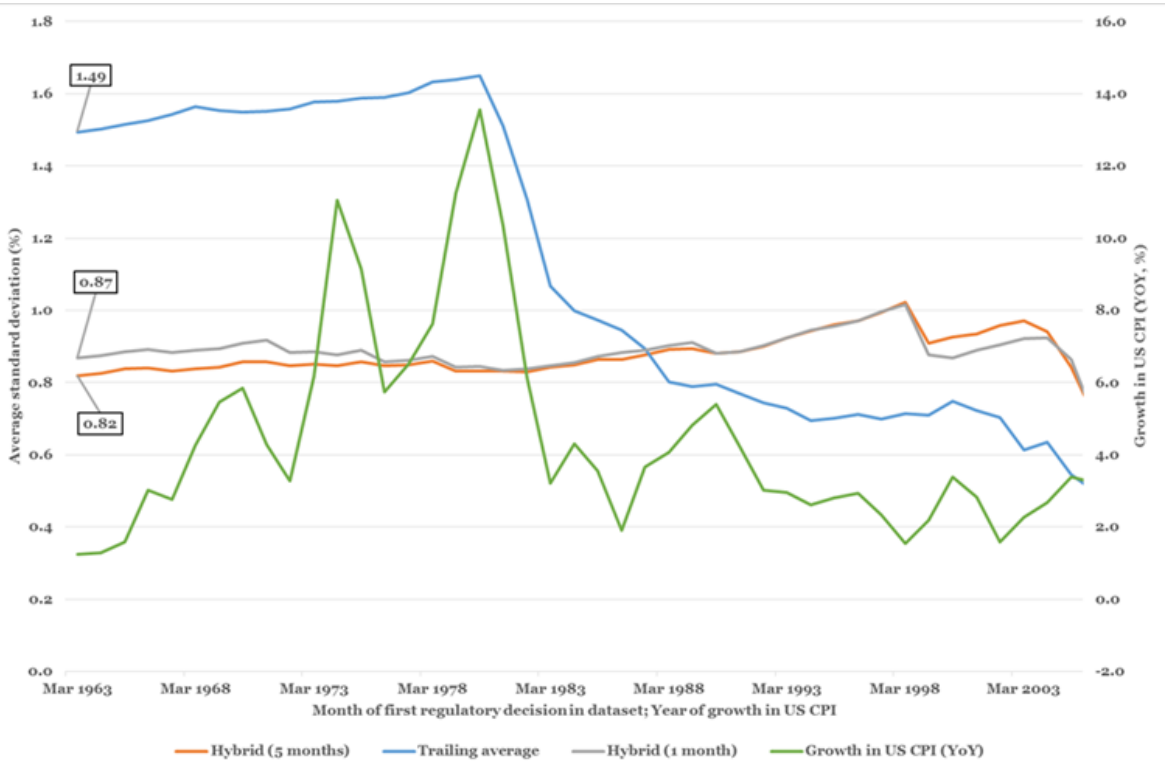
[36] Lally, 21 October 2015, p.22.

[37] The AER states on page 3-164 of its final decision for Transgrid (AER, Final decision, Transgrid transmission determination, April 2015) that "We consider a benchmark efficient entity would have hedged the base rate component of its debt to the allowed return on debt. This position is supported by advice from Chairmont and Lally. However, alternatively, a service provider might have chosen to not hedge the base rate component. **The NSW service providers adopted this approach**." (Emphasis added.)

74. To illustrate the sensitivity of Lally's original findings to the inclusion of data from the 1970s and early 1980s we provide a slightly amended version of Figure 12 from our June 2015 report. Figure 2 is the same as Figure 12 with the two exceptions that: the x-axis is the month at which the first regulatory period analysed under the Lally methodology begins (which is 10 years after the data begins); and Figure 2 superimposes US annual inflation in the same figure.

Figure 2: US inflation vs standard deviation for 0% and 100% hedging strategies



75. The blue line is the standard deviation of the mismatch between cost and allowance associated with the trailing average (0% swaps). The grey and orange lines are the standard deviations associated with the 100% swap strategy.[38] It can be seen that Lally's result[39] (higher standard deviation for the trailing average) is dependent on

[38] The orange line "Hybrid (5 months)" corresponds to a strategy where the interest rate swaps are spread over a 5 month period around a one month averaging period. The grey line "Hybrid (1 month)" corresponds to a strategy where the interest rate swaps are all undertaken within the one month averaging period.

[39] If the full dataset is used the first regulatory period of the analysis starts in March 1963 then the standard deviations that are estimated are given by the left most points on the lines (the numbers reported there correspond to those reported by Lally's). These values are calculated as the average of five standard deviations from regulatory cycles beginning in March of 1963, 1964, 1965, 1966 and 1967

the analysis including the high inflation period of the 1970s and early 1980s. The peak in inflation (1978) is also coincident with the peak in the standard deviation associated with the trailing average approach. Once that peak is passed the standard deviation of the trailing average approach falls dramatically. By the time that peak fully disappears from the analysis (which it does 10 years later in 1988) the trailing average standard deviation is below the standard deviation of the swap based strategies; and remains so for all later starting dates. That is, a trailing average approach has lower mismatch than a 100% swap strategy. Of course, as we note in our June 2015 report – the optimal use of swaps is between these two extremes. Precisely the same pattern is seen in the optimal hedging ratio (rather than standard deviations) in Figure 6 of our June 2015 report (which is the same as Figure 11 of that report) and which is reproduced above at paragraph 51 of this report).

76. It is clear that the 81% optimal hedging ratio (derived without amending any aspect of the Lally methodology) is entirely dependent on the inclusion of the high inflation 1970s and early 1980s. Unless there is a basis for believing a BEE would design its hedging strategy *as if* a return to 6-14% inflation was likely then there is no basis for including that data. (Moreover, even if a BEE did expect that, the methodology would need to be adapted to take account of material differences between expected and actual inflation in the 1970s and 1980s before it could be reliably used).

4.1.2 Lally's analysis of natural hedge accords with text book treatment

77. Lally correctly notes that an optimal hedging ratio of less than 100% relies on the existence of some negative correlation between DRP and base rates of interest. However, Lally disputes the existence of this negative correlation.

78. According to Lally's equation (8), the optimal hedging ratio ('H') can be derived from the following equation:

$$H = \frac{\sigma^2(\tilde{R}_f) + \sigma(\tilde{R}_f)\sigma(\widetilde{DRP})corr(\tilde{R}_f, \widetilde{DRP})}{\sigma^2(\tilde{R}_f)}$$ Lally's equation 8[40]

79. This equation simplifies to the following (using ρ to signify correlation as is standard in the literature):

$$H = 1 + \rho \frac{\sigma(\widetilde{DRP})}{\sigma(\tilde{R}_f)}$$

(cycles that repeat every 5 years). The figure also shows the impact of starting the first regulatory period at a later date. For example, the point that corresponds to March 1964 is calculated as the average of five standard deviations for the 5 regulatory cycles beginning in March of 1964, 1965, 1966, 1967 and 1968.

40 Lally, Review of submissions on transition issues for cost of debt, October 2015, p. 16

80. Given that the ratio of the standard deviation for DRP and R_f must be positive, whether the optimal H should be below or equal to 100% depends on the sign of the correlation between the debt risk premium and the risk free rate. As noted by Lally[41]:

> *So, if the correlation between the risk-free rate and DRP terms is negative, the optimal hedge ratio will be less than 1.*

81. We agree that this formula has been correctly derived and that, while it rests on some simplifying assumptions discussed at paragraphs 85 to 87 below, it does capture the key relationship driving the optimal hedging ratio. Indeed, the same derivation can be found in text books dealing with futures hedging in the circumstance where the futures contract is not a perfect hedge for the product being purchased. As explained in Hull (2009):[42]

> *In the examples considered to now, the asset underlying the futures contract has been the same as the asset whose price is being hedged. Cross hedging occurs when the two assets are different. Consider, for example, an airline that is concerned about the future price of jet fuel. Because there is no futures contract on jet fuel, it might choose to use heating oil futures contrast to hedge its exposure.*
>
> *The hedge ratio is the ratio of the size of the position taken in futures contracts to the size of the exposure. When the asset underling the futures contract is the same as the asset being hedged, it is natural to use a hedge ratio of 1.0….*
>
> *When cross hedging is used, setting the hedge ratio equal to 1.0 is not always optimal. The hedger should choose a value for the hedge ratio that minimises the variance of the value of the hedged position.*

82. Hull then goes onto derive the same relationship as Lally – with the optimal hedge ratio (h^*) depending on the correlation (ρ) between the hedging instrument ("F" for futures contract price) and the product being hedged ("S" for spot price of the product in question) as well as the ratio of their standard deviations.

$$h^* = \rho \frac{\sigma(S)}{\sigma(F)}$$ Hull's equation 3.1[43]

41 Lally, Review of submissions on transition issues for cost of debt, October 2015, p. 16

42 Hull, Options, futures, and other derivatives, 2009, 7th edition, Pearson Education International pp. 54-55.

43 Hull, Options, futures, and other derivatives, 2009, 7th edition, Pearson Education International p. 55

83. In Hull's formula, because F is an imperfect hedge for S the optimal hedging ratio depends on the correlation between the hedging instrument (F) and the product that must be purchased at a future date (S). The weaker the correlation the less hedging that is efficient. In Lally's formula, the same logic applies. The hedge instrument (swap rate) is an imperfect hedge for the thing being hedged (the cost of debt which is equal to swap rate plus DRP). Consequently, the optimal hedging ratio depends on the correlation between the hedge instrument and the target value being hedged. The only difference is that in Lally's set up the hedge instrument is a perfect hedge for one component of the target value being hedged. Thus, the optimal hedge ratio is equal to one plus Hull's formula – where Hull's formula is applied to capture the value of the natural hedge with the DRP component.

84. Lally's formula (and Hull's text-book exposition of the same concept) show that with negative correlation the best expected match to the regulatory allowance will be achieved with a value of H less than 100% - even if the DRP and risk free rates only mostly, but not always, move in opposite directions. (In this regard we note that Chairmont's claims to the contrary are inconsistent with both Lally and standard text-book analysis (see section 4.2.2 below).

85. That said, we note that there are some simplifying assumptions made by Lally to derive the Hull formula. These include the following:

    - That the five year swap rate (which is the hedging instrument) and the 10 year swap rate (which is the base rate in the allowance) are the same;[44] and
    - That only the mismatch between the allowance and costs at the beginning of the regulatory period is relevant.

86. Lally does not make the second assumption explicitly in words but it is clear from the derivation of equation 8 that Lally's formula only applies to the difference between the allowance and the businesses cost in the averaging period at the beginning of the regulatory period. It does not capture the impact of an evolving DRP cost over the regulatory period as new debt is issued and old debt matures.

87. For these reasons we consider that Lally's equation (8) is a correct exposition of the fundamental reason why an inverse correlation between the base rate and the DRP means the optimal hedging ratio is less than one. However, the most accurate way to quantify the optimal hedging ratio is to use the methodology developed by Lally in Appendix 2 to his April 2015 report (and deployed by us in our June 2015 report). This approach captures both differences between 5 and 10 year swap rates and the mismatch over the regulatory period. Indeed, Lally developed that analysis

44 Lally, Review of submissions on transition issues for cost of debt, October 2015, p. 16 (immediately above equation 7).

precisely in response to an analysis by CEG that he criticised as not taking account of the evolution of actual debt costs over the regulatory period. [45]

4.1.3 Historical correlation between DRP and risk free rate in US

88. Having (correctly) concluded that the existence of a negative correlation implies an optimal use of swaps for the purpose of hedging (hedge ratio) of less than 100% Lally can only reach a conclusion that the optimal hedge ratio is 100% if he can conclude that the BEE designing a hedge policy under the on the day regime would conclude that there was no negative correlation.

89. Lally[46] does indeed argue that there is no compelling evidence that there is negative correlation in the US data – even when the 1970s and early 1980s are excluded. (This argument is also key to Lally's conclusion that the 1970s and early 1980s should not be excluded from the US data when using the method he set out in Appendix 2 of his April 2015 report and used in our June 2015 report).

90. Lally notes that it is true that the correlation is strongly negative post 1986 (-0.57). While it is strongly positive in the earlier period, Lally does not report a single value for the pre 1986 period but it is +0.65.[47]

---

45 Lally, Review of submissions on the cost of debt, April 2015, pp. 51 to 52 where Lally states:

> *"…the analysis carried out by **CEG is incorrect because it examines variations between allowed and incurred costs every month as if the allowed rate was reset monthly instead of five yearly**. To illustrate this, suppose that the reset dates are mid 2004, mid 2009 and mid 2014. If swaps are not used, the appropriate comparisons are between the allowed rate in mid 2004 (the prevailing rate at that time of 7%) and the incurred rates over the following five years (the trailing averages shown in CEG's orange line) and between the allowed rate in mid 2009 (the prevailing rate at that time of 9%) and the incurred rates over the following five years… The process could be repeated for other reset dates, and averages taken over the resulting standard deviations. **However, CEG do not act in this way and their calculations therefore fail to reflect the actual situation faced by a firm following each of the two possible strategies. By contrast, the analysis carried out by me in Appendix 2 does reflect this**." (Emphasis added).*

In fact, the analysis presented by CEG did not assume that the "*the allowed rate was reset monthly instead of five yearly" – rather it examined the mismatch in each month assuming that each month was the start of a different hypothetical regulatory period. However, Lally is correct that this did not capture the fact that the DRP component of costs can vary over the regulatory period (albeit slowly given it is a trailing average). For this reason we consider that the framework established by Lally is superior.*

46 Lally, Review of submissions on transition issues for cost of debt, October 2015, pp. 18-19

47 Note that this is much higher than the two negative correlation numbers reported by Lally in his Table 1 for pre March 1986. The way Lally 'decomposes' the data in Table 1 disguises the effect of measured correlation when the 1970s and early 1980s are included with other periods an issue that is discussed in detail below.

91. Lally then confronts a potential criticism of his inclusion of the earlier period. The inclusion of the data from the earlier period is only reasonable if the strong positive correlation over that older 30 year period is just as likely to occur again today (30 to 60 years later) as is the strong negative correlation over the last 30 years. This is a valid question to ask even if there was no obvious reason to believe that the earlier period was likely to be different. Of course, there is such a reason, namely, the high and unstable inflation environment in the 1970s and early 1980s.

92. Lally provides a reason for including the data from the earlier period based on his decomposition of the time series data in his Table 1. On this basis he concludes:[48]

> *The high and volatile inflation in the 1970-86 period is not obviously the cause of the markedly higher correlation coefficient in that period relative to 1986-2015, because a similar estimate to that of 1970-86 is obtained in the low inflation period 1953-69.*

93. Essentially, Lally is saying that the correlation was positive for the period 1953-69 and 1970-86, even if it has become negative for the period thereafter (1986-2015). Therefore, it cannot be the period of the 1970s and early 1980s that is driving the higher correlation pre 1986.

94. Accepting, for now, the reasonableness of the data 'decomposition' in his Table 1, Lally's answer is inconsistent with the numbers he presents. The data in his Table 1 (reproduced below) shows correlation for the 1970s and 1980s (+0.18) that is higher than any other sub-period he examines – notwithstanding the fact that, as we shall see, his chosen periods (all of which have different lengths) have the effect of artificially veiling differences between the correlation in the 1970s and early 1980s and other periods. Put simply, the evidence that Lally presents does suggest that the high inflation period of the 1970s and early 1980s had materially more positive correlation between the base rate and DRP than other periods. That said, the presentation is still highly inaccurate as we shall show.

48 Lally, Review of submissions on transition issues for cost of debt, October 2015, p. 19

Table 2: Reproduction of Lally Table 1[49]

Table1: Estimated Correlation Coefficients From Various Periods

Period	Full Period	Subperiods	Subperiods
April 1953 – January 2015	.05		
April 1953 – December 1969		.07	
January 1970 – March 1986		.18	
April 1986 – January 2015		-.57	
April 1986 – December 2000			-.18
January 2001 – December 2005			.11
January 2006 – December 2007			-.74
January 2008 – January 2015			.07

95. Based on Table 1 in his report, Lally considers that there is no reason to believe that the 'true' correlation has become negative post 1986. This is allegedly because "a decomposition of the 1986-2015 period into four subperiods reveals that the correlation was positive for almost half of the period and only mildly negative for most of the rest of it".[50] However, in footnote 7 to this statement Lally discloses that "the subperiods were chosen to identify the two periods in which the estimated correlation is positive".[51]

96. In our view, this approach to interrogating the data invalidates any conclusions that can be reached based on Table 1. The method for 'decomposition' that Lally discloses results in the following lengths of sampling periods post 1986:

- 2 years (2006-2007);
- 5 years (2001-2005);
- 7 years and 1 month (7.08 years from January 2008- January 2015); and
- 15 years and 9 months (14.75 years from April 1986 – December 2000).

97. Lally has 'decomposed' the data by choosing four different window lengths and applying each of them to a separate part of the data series in a manner that is, as disclosed in Lally's footnote 7, predetermined to decompose the data in a way so as to portray the post 1986 period as having positive correlation. It is more revealing

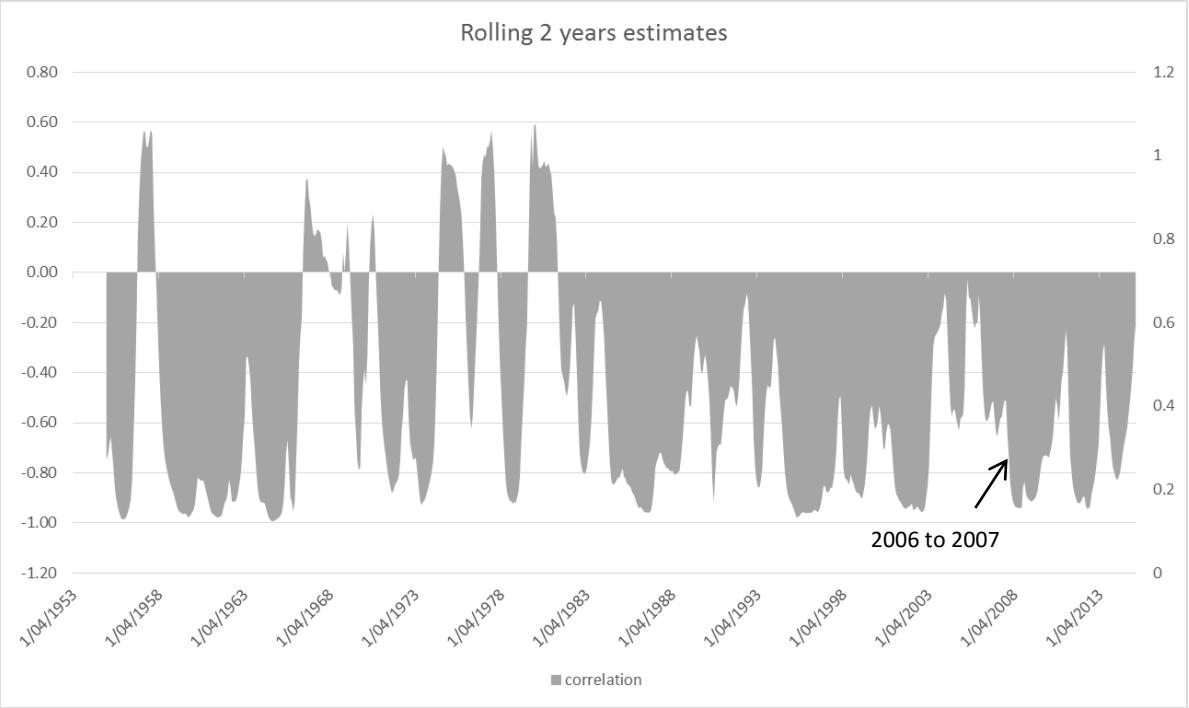
49 Lally, Review of submissions on transition issues for cost of debt, October 2015, Table 1

50 Lally, Review of submissions on transition issues for cost of debt, October 2015, p.19

51 Lally, Review of submissions on transition issues for cost of debt, October 2015, p.19

of the true properties of the data to present the correlation over the entire dataset using the same window lengths. We do this in the following four rolling correlation charts using Lally's four window sizes (moving from shortest to largest): Figure 3 to Figure 6. Each (very thin) bar in the charts correspond to a different month and represents the correlation between DRP and risk free rates over the 2.00/5.00/7.08/15.75 years ending at that month.

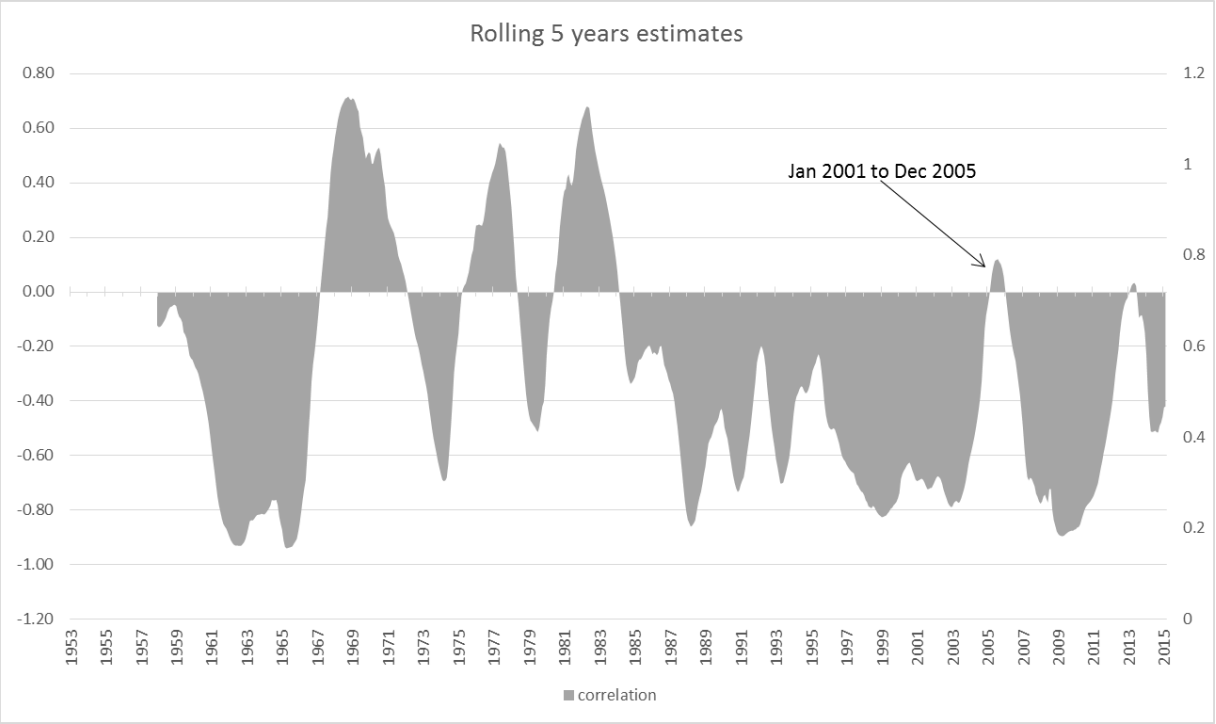
Figure 3: Rolling 2 year window



98. Looking at Figure 3 first, contrary to the impression that one might draws from Lally's Table 1 there is nothing special about the 2 year period 2006 to 2007 that sets it apart from the rest of the 2 year periods as having an exceptionally negative correlation. Indeed the following two years have more negative correlation. In fact, all of the post 1981 2 year periods have negative correlation. The subperiod where this is not typically true is the mid-1970s to mid-1980s

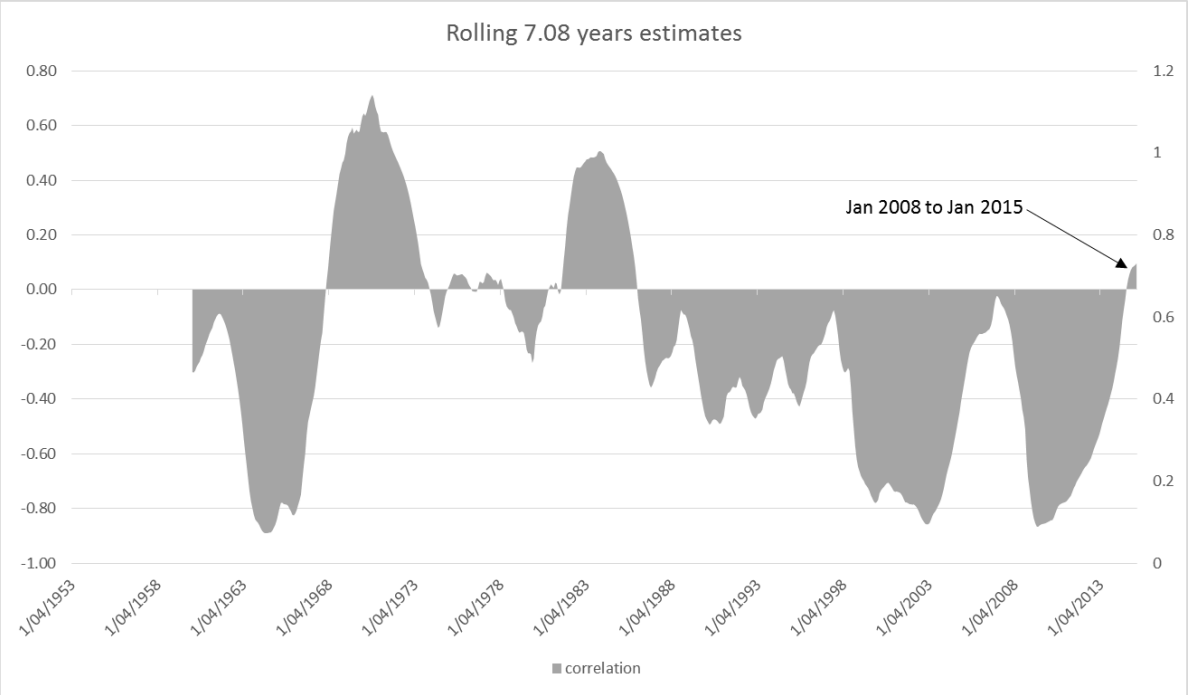
99. It is also relevant to note that, despite the vast majority of 2 year periods having a negative correlation, the overall correlation across the entire dataset is positive. This is because the very high and volatile nominal interest rates in the 1970s and early 1980s has an outsized (and outlier) effect when it is included with the other data from lower and more stable nominal interest rate periods. That is, this chart demonstrates precisely the opposite of the claim that Lally attempts to make with his 'decomposition' in Table 1.

Figure 4: Rolling 5 year window



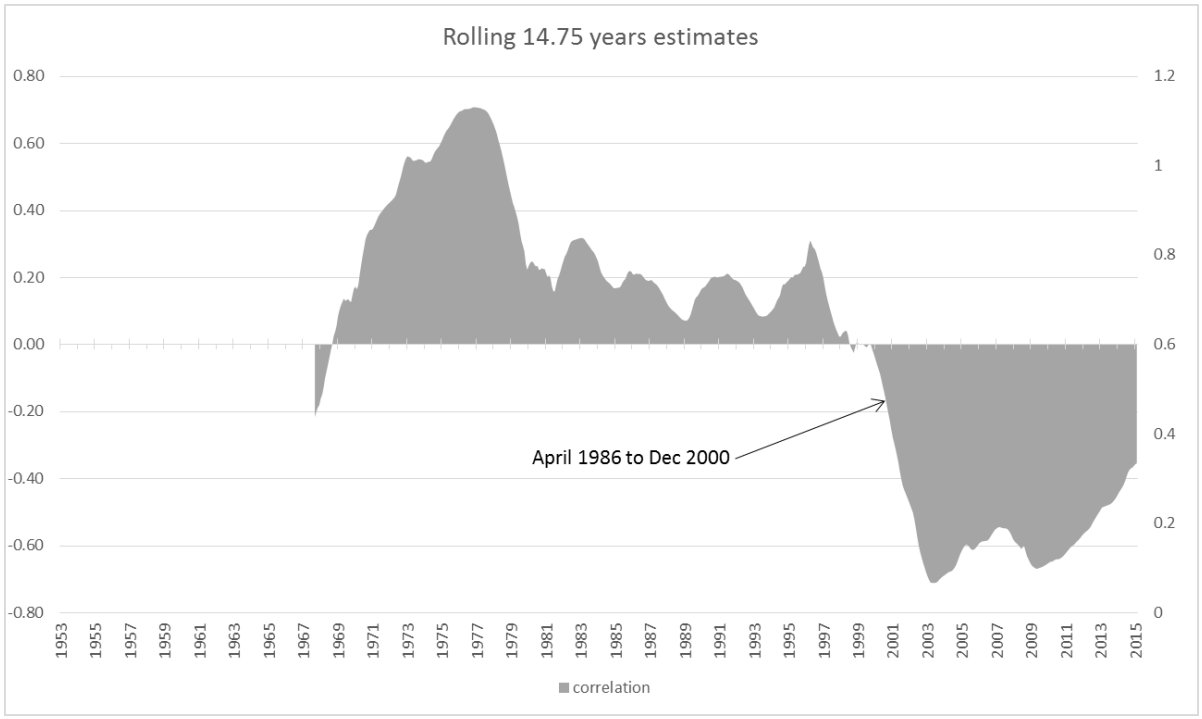
100. While there is nothing exceptional about the negative correlation over the 2 year period to 2007 that Lally presents, there *is* something exceptional about the 5 year period (January 2001 to December 2005) chosen by Lally for 'decomposition' (see Figure 4). That period is very unusual in having a positive correlation. The vast majority of 5 year periods have negative correlation. The only subperiod where this is not typically true is the late 1960s to mid-1980s.

Figure 5: Rolling 7 year and 1 month window



101. Again, there is something exceptional about the 7 year and 1 month period chosen by Lally for 'decomposition' in that it is very unusual in having a positive correlation (see Figure 5). The vast majority of 7 year and 1 month periods have negative correlation. The only subperiod where this is not true is the late 1960s to mid-1980s.

Figure 6: Rolling 14 year and 9 month window



102. Lally's chosen 14 year and 9 month window is unusual in the sense that the negative correlation is materially less than for other windows of the same length that begin after 1986. Again, the only 14 year and 9 month periods with positive correlation are periods that include data from 1983 and before (i.e., that end October 1998 or before)(see Figure 6). Notably, the few 14 year and 9 month periods ending before 1969 also have negative correlation.

103. These charts clearly illustrate precisely the opposite of the point that Lally set out to make with his 'decomposition' of the data. On any reasonable systematic and symmetrical interpretation of the full dataset, the 1970s and the early 1980s do have unusually positive correlation – relative to periods both before and after.

104. In the light of the above analysis we note Lally's statement to the effect that:[52]

> *Even if the correlation were consistently negative from 1986, one cannot* ***simply choose the historical period for estimating a parameter*** *in order to produce the most desirable results; one must* ***present a credible argument for the true correlation*** *coefficient changing from 1986.*

[52] Lally, Review of submissions on transition issues for cost of debt, October 2015, p. 19

> *The high and volatile inflation in the 1970-86 period is not obviously the **cause** of the markedly higher correlation coefficient in that period relative to 1986-2015, because a similar estimate to that of 1970-86 is obtained in the low inflation period 1953-69, and this period is of the same length as that for 1970-1986. [Emphasis added]*

105. We agree with the first sentence. We consider that we had previously, in our June 2015 report, presented this evidence and do so here.[53] However, we believe that the second sentence in the above quote, along with the rest of Lally's 'decomposition' of the data, is inconsistent with the principle contained within the first sentence of the above quote.

4.1.4 Lally's rejection of the use of Australian data

106. Lally rejects the use of Australian data on the following grounds:

> *CEG's fourth proposed correction is to use Australian data, which favours not hedging over 100% hedging consistent with results from the use of US data from 1986 (see CEG, Figure 18, 19, 20 and 21).[9] However, the longer of the two available Australian series (constructed by CEG) only goes back to 1998.[10] Thus, with the first ten years of data required to form the ten-year trailing average, the differences between the allowed and incurred costs of debt are only available for seven years (2008-2015), which is barely more than one regulatory cycle. This is far too short a period to draw reliable conclusions about the relative riskiness of alternative debt strategies. Furthermore, CEG's Australian series involves splicing together DRP data from different sources, and such splicing could contaminate the results. For example, suppose the base rate series drifts down during the period examined, DRP data series A yields lower results than B at each point in time, DRP data series A is used for the first half of the period examined, and DRP data series B is used for the second half. The effect will be that the spliced DRP series will have greater upward drift than has actually occurred, and therefore the estimated correlation between the DRP series and the base rate.*

107. There are a number of incorrect statements in the above passage. First, the Australian data used in our June 2015 report included an extension of the Chairmont methodology back to 1992 (not 1998).[54]

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53 Specifically, the fact that the standard deviation of the mismatch from not hedging fell dramatically after the peak in US inflation levels and volatility (see Figure 2). The above analysis simply supports that conclusion.

54 See section C.1.3.4.

108. Second, the methodology we used only waited 6 years rather than 10 years after the start of the data for the first hypothetical regulatory period to begin. This is because, by the last year of that regulatory period (four years later) we will have sufficient data (10 years) for the first measurement of the mismatch between cost and allowance (as was explained in the first paragraph of section 5.1 of our June 2015 report).

109. Third, we assumed that a regulatory period could start in any month of the year in order to maximise the use of the available data.[55] Consequently, the number of regulatory averaging periods against which actual costs of debt were compared over the subsequent periods was 148 (not 'barely more than one' regulatory cycle). Our revisions to Lally's methodology allowed the best use of the available data and this is precisely why those changes in methodology were implemented.

110. Fourth, we used our own best estimate of the BBB cost of debt time series and we also used Chairmont's time series. Both had the same properties – with the optimal hedging ratio well below 50%. While it is possible that assumptions made in developing these time series could influence the final result, the fact that both Chairmont's and our own independent assumptions for 'splicing' historical time-series results in similar optimal hedging ratios (and similar to the US data over the same period) should address any concerns as to the results being driven by arbitrary assumptions about 'splicing' data series.

111. In summary, the Australian data does provide a robust alternative to the US data. The fact that the Australian and US data support the view that the optimal hedging ratio is materially below 100% (and, indeed, indeed in the order of 30%) is very strong evidence against a presumption that a 100% hedging ratio minimised interest rate risk under the 'on-the-day' approach.

4.1.5 Unstable differential between 5 and 10 year base rate

112. On pages 13 to 14 Lally concludes that CEG is in error when we concluded that the differential between 5 and 10 year swap rates was unstable and this reduced the efficacy of using swaps to hedge the cost of debt. We drew this conclusion based on the fact that the regulator set compensation using the prevailing 10 year rate – reset once every 5 years. Consequently, a firm attempting to hedge the base rate could not use 10 year swap rates because these reset every 10 years while the regulator resets the allowance every 5 years.

113. Lally constructs a proof that the conclusion drawn by CEG as to the instability in the differential between 5 and 10 year swap rates was incorrect using the assumption

[55] Again, as was explained in the first paragraph of section 5.1 of our June 2015 report.

that the regulator sets compensation for the cost of debt based on a 5 year term. [56] We agree that the conclusion we had previously drawn would be incorrect if this were true given that the logic of our argument relies on the existence of a difference between the term of the hedge instrument and the term of the allowance. However, the fact is that under the on-the-day approach during all relevant periods the AER has set the term of the cost of debt allowance at 10 years. Therefore, Lally is incorrect and the conclusion on this point in our previous report stands. We do not understand the basis for the assumption that the regulator sets compensation for the cost of debt based on a 5 year term in Lally's proof as elsewhere Lally clearly recognises that the term of the allowance is 10 years (see Appendix A.2 for more details).

4.1.6 Lally's characterisation of the way in which inflation is dealt with in the NER/NGR (including under the previous regime)

114. Lally describes CEG's characterisation of the way in which inflation is compensated under the NER as follows:

> *CEG also argues that, since the actual allowance granted by the AER for the cost of debt is the rate prevailing at the beginning of the cycle, less expected inflation to convert it to a real rate plus actual inflation (because revenues are escalated in accordance with it), these inflation forecasting errors would lead to the allowed cost of debt significantly diverging from that expected. By contrast, equation (1) implies that the allowed cost of debt is that prevailing at the beginning of the cycle. So, since equation (1) does not adequately reflect the situation in 1970-86, CEG argues that this period should be removed.*

115. This is an accurate description of our view. However, we would note that compensation for actual inflation is provided only partly via inflation escalation of revenues and primarily via inflation escalation of the regulatory asset value (RAB) in the application of the RAB roll forward model (RFM) at the beginning of the next regulatory period. Namely, forecast escalation of the RAB is a deduction to the building blocks in the PTRM, which means that effectively a real (inflation adjusted) WACC is used to determine the returns paid to investors in PTRM revenues. The

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[56] Lally, 21 October 2015, pp. 13-14. For example:

> *CEG (2015b, section 3.8) also notes that the differential between the five and ten-year base rates fluctuates significantly, and this reduces the utility of using swaps. However, volatility in this differential is an essential condition for the swaps having any utility rather than reducing their utility. To illustrate this point, consider a regulated business that has just commenced operations and* ***borrows for ten years at a base rate of 5%*** *whilst receiving a* ***base rate allowance for the first five years at the current five-year base rate followed by the five-year base rate prevailing in five years****.*

expectation is that the deduction will be compensated via escalation in the RFM – with the deduction to the building blocks an assumed capital gain that is replaced with an actual capital gain when the RAB is rolled forward. It is this aspect of the inflation compensation that Lally fails to understand when he asserts that we are in error: [57]

> ***CEG's characterization of the AER's former revenue setting process is not correct.*** *Under the old regime, the AER allowed a cost of debt based upon the nominal rate prevailing at the beginning of the regulatory cycle, consistent with equation (1). Along with other cost components, a revenue stream was then determined for the regulatory cycle in nominal terms. This was then replaced by a smoother revenue stream that had the same present value but would escalate from an initial revenue in accordance with actual inflation, with the initial revenue determined using expected inflation. Thus, if actual inflation diverged from expected inflation, the actual revenue stream would differ from that expected. However, such an error would be a consequence of the smoothing scheme used by the AER and would not imply that the allowed cost of debt differed from the nominal rate prevailing at the beginning of the cycle.*

116. This statement is factually incorrect as is the numerical example provided by Lally in Appendix 2 (of the same October 2015). Lally concludes that: [58]

> *So, even if inflation forecast errors were retrospectively assigned to the allowed cost of capital, the extent of the adjustment would be much less than claimed by CEG*

This conclusion is incorrect and Lally's reliance on this belief is an error (for more details see appendix A.1)

4.2 Chairmont

117. The vast majority of Chairmont's report addresses the question of which debt management strategy minimises the expected cost of debt. Chairmont is explicit about this being the focus of their report:[59]

> *As the focus of this report is primarily about carrying costs of different financing practices at the start of the transition…*

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57 Lally, 21 October 2015, p. 17

58 Lally, 21 October 2015, p. 61

59 Chairmont, October 2015, p. 30.

118. That is, the primary focus is to compare the costs of different strategies at the beginning of any transition to a trailing average. This is also clear from Chairmont's description of its approach to "Comparisons of EFPs" (efficient financing practice):[60]

> *The steps in undertaking a comparison are:*
>
> *1. Define possible EFPs which may have led to higher funding costs, including the partial trailing fixed rate and any other suggestions by NSPs.*
>
> *2. Define possible EFPs which may have led to lower funding costs, including the shorter term issuance suggested by AER.*
>
> *3. Examine the time variability of any EFPs.*
>
> *4. Quantify the current cost base for the basic and alternative EFPs.*

119. Chairmont's analysis of, and conclusions with respect to, the costs of different strategies is dealt with in section 5 below. That said, Chairmont regularly conflates, or, at least, blurs the lines, between the two distinct characteristics of a debt management strategy—interest rate risk management and cost minimisation.

120. Therefore, the remainder of this section is divided into two subsections:

- Highlights where, in CEG's view, it is unclear from Chairmont's report which concept (interest rate risk management or cost minimisation) the report is dealing with;
- Examines the analysis that Chairmont presents which does address the interest rate risk management properties (as opposed to cost minimisation properties) of a debt management strategy.

4.2.1 Potential confusion over interest rate risk minimisation and cost minimisation

121. Chairmont's October 2015 report states:[61]

> *While it can be considered efficient for the company to balance risk and return, outright speculation without a clear link to risk-reducing financial management cannot be considered efficient for a company that is not primarily in the business of trading financial markets.*

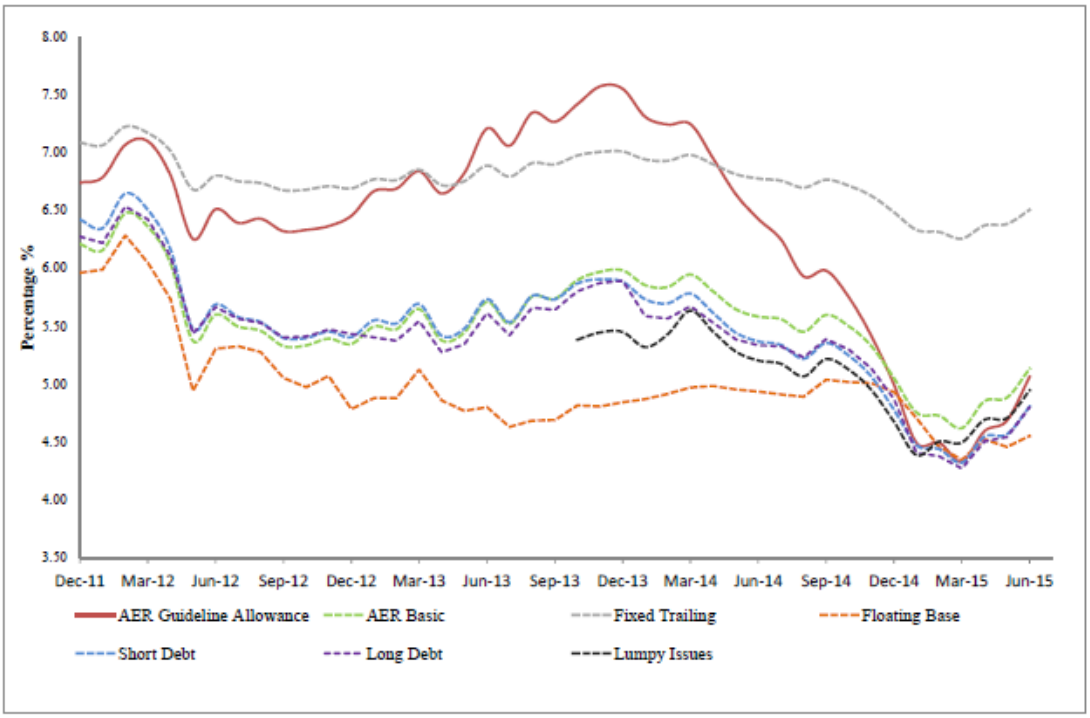
60 Chairmont, October 2015, p. 6.

61 Chairmont, Financing practice under regulation, October 2015, p. 17; Cost of debt transitional analysis, April 2015, p. 28

> *Interest rate risk management is not a cost-reduction exercise. It is intended to reduce future possible losses caused by a mismatched impact on revenue and expenses.*

122. Notwithstanding this statement, Chairmont's key conclusion is that using interest rate swaps in the manner envisioned by the AER has resulted in a lower cost of debt (over the period analysed by Chairmont) than not doing so. Chairmont's key piece of evidence in this regard is the following figure.

Figure 7: Graph 1 from Chairmont – Point in time analysis – cost of debt at transition commencement



Graph 1: Point in Time Analysis - Cost of Debt at Transition Commencement

123. The grey dotted line ("Fixed Trailing") is the cost of debt with a hedging ratio of 50%.[62] The green line (AER Basic) is the 100% swap hybrid and the red line (AER Guideline) is the 'on-the-day' cost of debt. All the other lines, except for the orange line, involve the use of interest rate swaps in the manner the AER believes is efficient. The orange line can be regarded as an extreme version of the AER's efficient strategy – which shares the assumption that the underlying portfolio is left floating but does not assume that this is fixed at the beginning of the transition to hedge the allowed rates.

62 Chairmont, October 2015, Section 5.4.1, p. 23

124. It can be seen that, over the period analysed by Chairmont, all of the variants of the AER's proposed benchmark have materially lower costs than the Fixed Trailing approach. The Fixed Trailing strategy appears to have a cost of debt that is, over the period analysed, typically around 1% or more higher cost than the variants of the AER approach. It is on the basis of the position of the Fixed Trailing (grey dotted) line in this chart that Chairmont states:[63]

> *In Section 5.5, the comparison of financing strategies* [Chairmont's Graph 1 – reproduced above] *showed that including a trailing fixed rate strategy* ***deviated the most from the cost of debt allowance methodology*** *and all other financing strategies.* ***A hedge strategy which performs so poorly for so long suggests it is not a robust strategy.*** *[Emphasis added.]*

125. The use of the phrase 'deviated the most from the cost of debt allowance methodology' suggests that interest rate risk management properties are being analysed (as does the use of the term 'hedge strategy'). However, a visual examination of the Chairmont chart shows that the dotted grey (Fixed Trailing) line is, on average, closest to the 'on-the-day' regulatory allowance. This is true from December 2011 until the second half of 2014 (i.e., more than 2.5 years). It is furthest from the regulatory allowance for less than one year (from late 2014 to June 2015).

126. This suggests that when Chairmont states that this strategy has performed 'so poorly for so long' it is the level of costs that is being referred to – not the match/hedge to the regulatory allowance.

127. Of course, if it was the case that the Fixed Trailing strategy was typically and reliably around 1% higher cost than the variants of the AER's proposed efficient strategy then it would not matter that it provided a better hedge to the allowance. In this case, matching the regulatory allowance (managing interest rate risk) would be a secondary consideration because there would exist strategies (the AER's proposed efficient strategy) that predictably result in a materially lower cost than the regulatory allowance. In this situation there is no trade-off between cost minimisation and interest rate risk management.

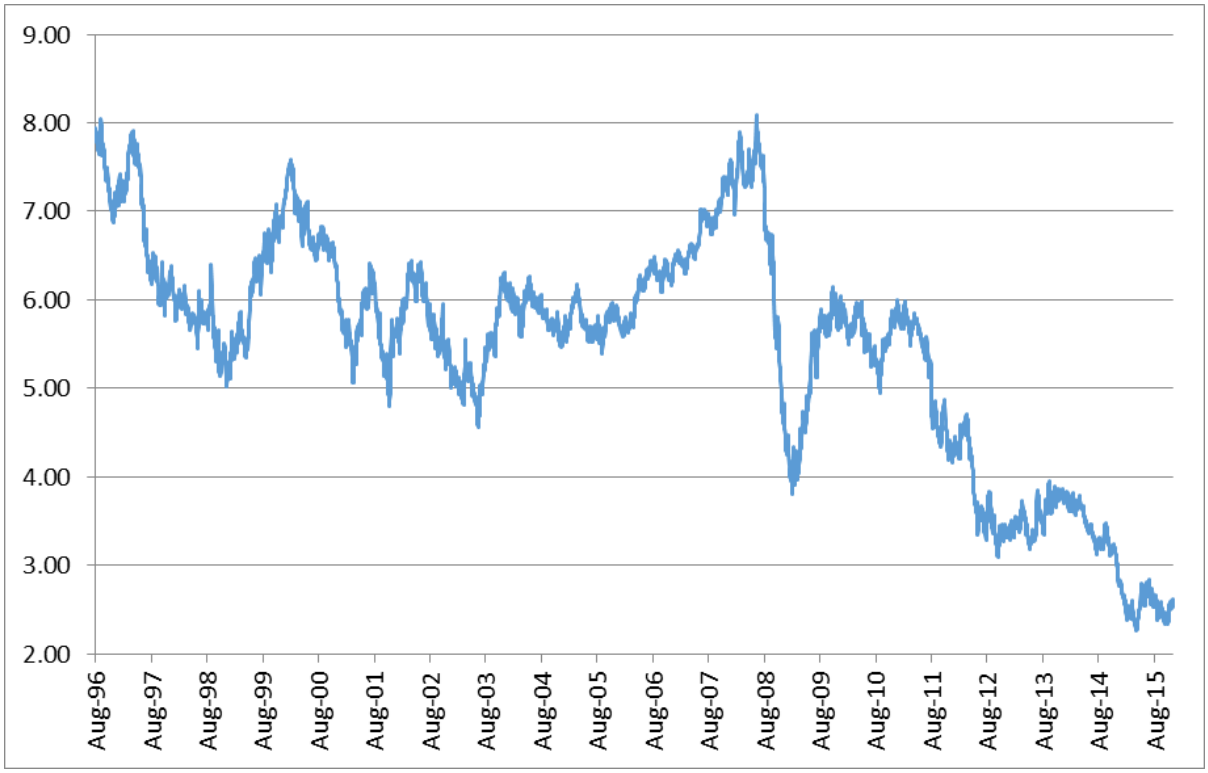
128. This is the conclusion that one might be tempted to draw from the Chairmont Graph 1. Certainly, Chairmont do not discuss the potential for the opposite circumstance to exist, namely, that the AER strategy results in a higher cost of debt than both the allowance and the Trailing Fixed costs.

129. However, such a conclusion would be a serious error. The reason that the variants of the AER's presumed efficient strategy have fallen and are so far below the Fixed

63 Chairmont, October 2015, p. 33.

Trailing strategy is because base interest rates have fallen over the last decade – as illustrated in Figure 8 below.

Figure 8: 5 year swap rates (time series)



Source: Bloomberg, CEG analysis

130. If a business knew in advance that base interest rates would fall dramatically in the manner described above then it would be irrational not to adopt the AER's proposed strategy. This is because under that strategy all base interest rates become floating at the beginning of each regulatory period – which means that the benefits of any base interest rate falls are fully passed through to the business's cost of debt.

131. In fact, with foreknowledge of falling interest rates the most rational strategy would be for a business to leave its debt floating the whole time (i.e., not fix the cost of debt at the beginning of each regulatory period using 5 year swaps but simply leave the debt on a floating rate reset every quarter). This strategy would mean that the benefits of interest rate falls are passed through into lower interest costs for the businesses immediately rather than having to wait until the end of the regulatory period to benefit from these lower interest rates. (This is Floating Base strategy in Chairmont's Graph 1).

132. Of course, all of these conclusions rest on an assumption that a business knew in advance that base interest rates would fall. However, such facts are not known in

advance.[64] While some speculators and financial intermediaries may form the view that they are better informed than the market and can predict movements in interest rates that are different to those implied by the prevailing yield curves, in our view the only reasonable assumption for a regulated business is that it cannot expect to make risk adjusted profits betting against the market on the future movements in interest rates. It is notable that, the AER acknowledges precisely this issue in a different context where it states:[65]

> *Prevailing interest rates are currently lower than the historical average of interest rates over the past 10 years. However, this is just a consequence of the particular timing of our decision.* ***Equally, prevailing interest rates could have been higher than the historical average.***

133. Indeed, the AER previously rejected precisely this type of selective presentation of relative cost data. In its final decision for Ausgrid the AER states:

> *As set out earlier, TransGrid and HoustonKemp used data from the Productivity Commission (PC) to show that network service providers that did not hedge have lower cost of debt relative to those that engaged in hedging.[1938]*
>
> *We consider it misleading to use data from the PC to support this view because:*
>
> - *The PC dataset only covers five years. To draw a meaningful conclusion on this matter such analysis should cover a longer period.*
>
> ...

134. We agree with the AER views as expressed above. However, by relying on the Chairmont comparisons of costs it is making precisely the same error that it pointed out here.

135. Put simply, Chairmont's conclusion that the AER swap strategy is more efficient is implicitly predicated on the following:

- it delivers lower (higher) costs more quickly in a falling (rising) base interest rate environment; and
- base interest rates have fallen recently.

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64 If the business really did know this in advance then they should not only have maintained a floating base rate – they should have bet all their capital (and raised more) in financial derivative markets to profit from their knowledge. That is, rather than having a 100% hedge of the base rate they should have had a 1,000% "hedge" of the base rate or more.

65 AER, Jemena Preliminary Decision, 3-181.

136. Had base interest rates risen recently Chairmont's logic would imply that the Fixed Trailing strategy was more efficient. This highlights the problem with Chairmont's conclusion. Ultimately, it is based on the BEE having correctly bet that interest rates would fall and not rise. Had Chairmont performed this analysis over a longer period, including periods when interest rates had risen as well as fallen (as we do below – see Figure 9) then the inherent problem with Chairmont's conclusion would have been clear.

137. The only way that a hedging strategy can reasonably be assessed is in the quality of the hedge – not whether it produces the lowest cost in one particular interest rate environment. As discussed below, this is precisely the point that Chairmont made in its April 2015 report. CEG's June 2015 report focuses on the strategy that provides the best quality hedge to the regulatory allowance. It did not focus on trading off the cost of hedging against the use of hedging instruments. If these costs were materially positive/negative it might 'push' a BEE to do less/more hedging than identified in that report. However, such actions would involve taking on risk. As we note in sections 4.1.5 above and 6.2 below this risk could be material and the magnitude of any expected net gains (which must be measured *ex ante* not *ex post*) associated with taking on that risk is unlikely to justify taking on material exposure.

138. In that report, unlike in the current report, Chairmont did clearly distinguish between interest rate risk management and cost minimisation:[66]

> *interest rate risk management is not a cost-reduction exercise. It is intended to reduce future possible losses caused by a mismatched impact on revenue and expenses.*

139. In that report Chairmont stated that, just because the trailing average strategy delivered lower costs than the AER 100% swap strategy over the Networks NSW 2009-2014 averaging period (which would have involved 'locking in' a high 5 year swap rate of 6.7%), that did not make it efficient. Chairmont noted that different strategies will have different costs in different parts of the interest rate cycle.[67]

> *Graph 4 starkly displays the divergence of the staggered fixed debt strategy versus the floating debt with fixed swap strategy. It highlights that these strategies have very different risk profiles.* ***The actual result by using fixed rate issues gave a lower cost of debt during most of the previous regulatory cycle, thus providing lower cost compared to the floating debt and swap strategy.***

66 Chairmont, April 2015, p. 28.

67 Chairmont, April 2015, pp. 44-45.

> ***The relativity will differ over time, where one method may be superior in a particular cycle and vice versa.*** *The 2009-2014 period was a falling base rate environment leading to the fixed issuance strategy producing lower costs, whereas a rising base rate environment will see the fixed issuance strategy cause higher costs than fixing with a swap at the beginning of the term.*
>
> ***Comparing graphs 3 and 4 shows that simply looking at the expense side without looking at the revenue side, i.e. allowance for the cost of debt, will give a misleading impression of 'cost minimisation' or 'lowest risk'****. The revenue-side, under the 'on-the-day' approach, including the transitional arrangements, shows 'jumps' due to the sudden rate reset. The dramatic divergence in the two rates post-June 2014 displays the degree of risk left open by this strategy. The revenue-side reduction from 8.82% to 6.51% starting in July 2014 is not offset by a corresponding drop in the cost side.* [Emphasis added.]

140. This is a clear enunciation of the fact that it is incorrect to determine the relative efficiency of different debt management strategies by comparing their costs (from these strategies) in a single phase of the interest rate cycle. In this passage Chairmont is clearly advising the AER not to assume that the trailing average (0% swap) strategy is most efficient because it resulted in lower costs over 2009-2014. Chairmont is, instead, counselling the AER to compare the quality of the hedge (match) to the regulatory allowance.

141. This advice is, however, almost completely absent from Chairmont's October 2015 report. In that report, the quality of the hedge to the regulatory allowance is not the focus and, as discussed above, it is the relative level of costs that informs Chairmont's conclusion, when referring to the Fixed Trailing strategy that a "*hedge strategy which performs so poorly for so long suggests it is not a robust strategy*".

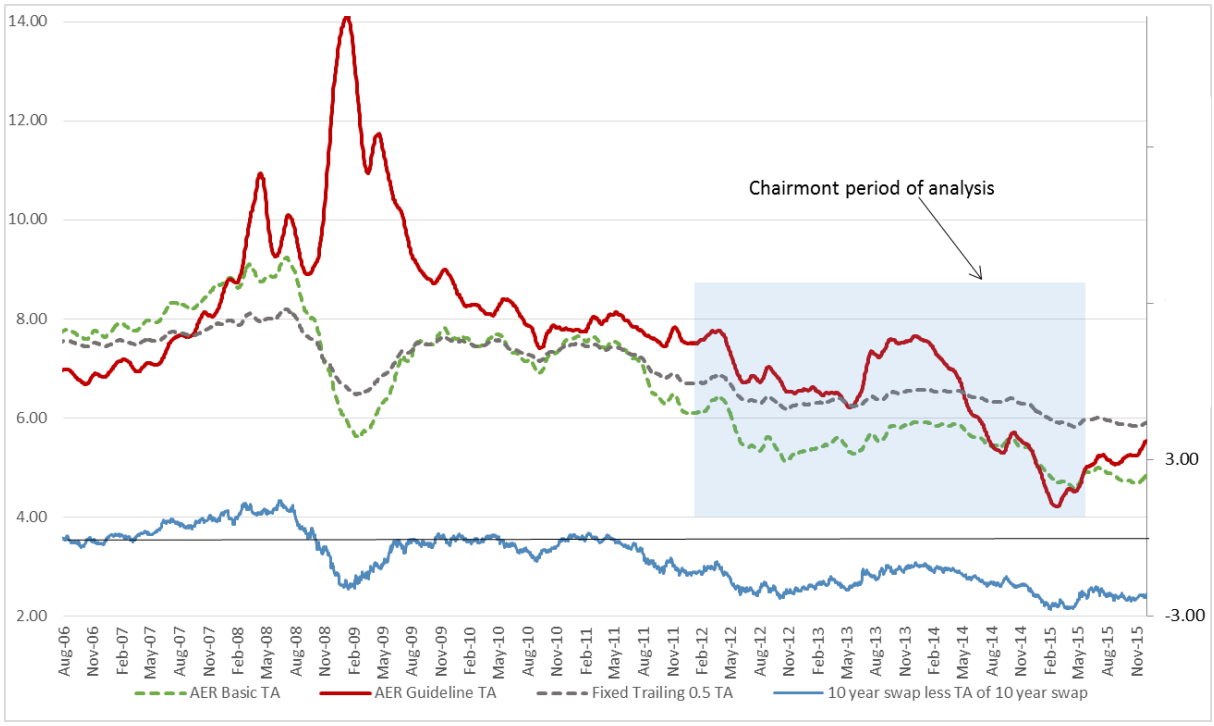
142. As already noted, even in Chairmont's Graph 1, it is clear that the Fixed Trailing average results in costs that are closest to the regulatory allowance throughout most of the time period analysed by Chairmont (it is just the fact that the swap based strategies are lower cost which leads Chairmont to conclude that they are superior).

143. However, it is important to extend the Chairmont analysis backwards (and, to the extent possible, forwards) in time to examine the quality of the hedge to the regulatory allowance in a greater variety of interest rate environments. We have done so in Figure 9. In this figure we have extended this dataseries backwards in time to August 2006, which is 10 years after the RBA formalised inflation targeting as the focus of monetary policy.[68] We have also extended the Chairmont data series

[68] We chose this date for the same reasons we discuss in respect of the selection of start dates for the US data set in sections **Error! Reference source not found.** and 4.1.6 above. The RBA formally entrenched inflation targeting in August 1996 in the form of a joint statement by then Treasurer Peter

forward in time to 30 November 2015. The sources we use are as set out in Table 4 of Chairmont's April 2015 report.[69]

Figure 9: Chairmont Graph 1 extended backwards (and forwards) in time



144. It is correct that through much of the time analysed, but far from all of it, the AER's 100% swap strategy has been lower cost. However, this is driven by the fact that base interest rates fell dramatically in the wake of the global financial crisis and these changes in base interest rates flow through more slowly into the Fixed Trailing strategy than they do into AER 100% swap strategy. Of course, had base interest rates risen (or when base interest rates do rise) the opposite will be true – the AER 100% swap strategy will have interest costs rise faster than the Fixed Trailing strategy.[70]

Costello and then RBA Governor Ian Macfarlane (http://www.rba.gov.au/monetary-policy/framework/stmt-conduct-mp-1-14081996.html).

69 Chairmont, April 2015, p. 41. In this table Chairmont states a methodology for estimating DRP from July 1999 to November 2001. We have extended this back to August 1996. Our results are not sensitive to this extension because these numbers only affect the trailing average DRP – which is an input into both the 'AER Basic' and 'Fixed Trailing' strategies (meaning that their relative position is not affected by DRPs in this period). The only values for DRP that affect the regulatory allowance (AER Guideline) are prevailing DRPs from August 2006 onwards.

70 It is notable when considering claims of 'gaming' by the AER that its proposal to transition to a trailing average at a point when interest rates are at historically low levels and in a manner that has the effect of

145. We have also included in this chart a time-series of the difference between prevailing 10 year swap rates and the trailing average of 10 year swap rates (blue line measured relative to the right hand axis). When this is positive it is an indication that base interest rates have risen over the last ten years (on average), and when it is negative it is an indication that they have fallen. It can be seen that this is the key determinant of the difference between the green and grey dotted lines – with the grey line above the green line when the blue line is positive and *vice versa*. It is because interest rates from 2011 onwards happen to be low relative to their 10 year trailing average that the green line is lower than the grey line in that period.

146. It can also be seen visually that the Fixed Trailing strategy provides a better hedge (is similar/closer) to the regulatory allowance in almost all periods (with the exception of 2008 and mid-2014 to mid-2015). Interestingly, in the most recent months the Fixed Trailing strategy is once again closest to the regulatory allowance.

147. Focusing on the level of the green and grey lines post global financial crisis is akin to arguing that regulated businesses should have taken a 'bet' that base interest rates would fall to historically unprecedented levels for the next 7 years. This is a bet that some businesses may well have made but it is not part of their core business operation and is not something that the AER should assume a benchmark efficient entity (BEE) would have done and would have done successfully. Rather, the AER's BEE is assumed to have adopted a debt management strategy with the goal of most closely matching the regulatory allowance, consistently with how the AER has defined the efficient financing practice of its BEE, in particular, managing interest rate risk.

148. In this regard we once again refer back to Chairmont's April 2015 report where, under the heading "No Speculating or Undue Risk Taking", Chairmont stated:[71]

> *An efficient company will remain focused on its business(es)* ***rather than taking on risks or costs in areas not necessary for the business strategy. For industrial companies this includes avoiding speculation in financial markets or taking risks which are not necessary.*** *Any risk which is required to be taken must have the expectation of being adequately rewarded.*
>
> *It can be critical to business survival to follow this principle. When a company speculates on financial events or business areas in which it does not specialise, it typically is not set up to manage the risks appropriately.*

---

locking in those historically low rates for the next ten years (without having any regard for higher rates over the previous 10 years) can be viewed as a form of gaming.

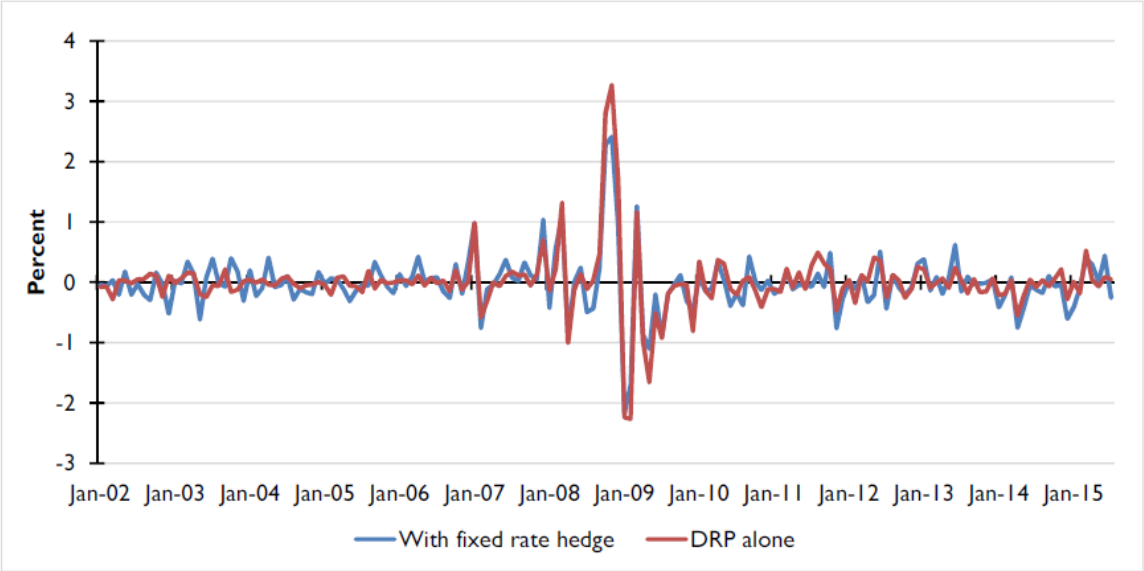
[71] Chairmont, April 2015, p. 17-18

> *There is a history of failed organisations, e.g. Pasminco and Sons of Gwalia that either did not understand that the corporate treasury function was to manage interest rate or foreign exchange exposures, or took speculative positions that brought the company down. It is recognised that there were other contributing factors to the demise of the companies quoted above, however the primary reason for their failures is as outlined.* [Emphasis added.]

4.2.2 Chairmont correlation analysis

149. In section 5.7 of its October 2015 report Chairmont does attempt to address the issue that has been raised as to the fact of the negative correlation between the base rate and the DRP meaning that it cannot be presumed that 100% hedging of the base rate creates a better hedge to the on-the-day allowance than leaving some portion of the base rate unhedged.

150. Chairmont's reasoning and conclusion is provided in the below extract from page 32.



Graph 2: Monthly Cost Changes of DRP versus Fixed Rate Hedge Strategy

Graph 2 indicates that there is no clear reduction in monthly volatility of costs by introducing a swap variability to a DRP variability. There is some volatility offset in the most extreme months of the GFC and the immediate aftermath, but in many periods, especially pre-GFC, combining swap risk with DRP risk increased overall volatility of cost rather than decreasing it. This analysis suggests there is no hedge effect by opening a swap rate risk.

151. The analysis that Chairmont presents simply does not support its conclusion. Chairmont do not follow the logic set out by Lally and the text book treatment of Hull (2009) as discussed in section 4.1.2 above. Rather, Chairmont establish an

idiosyncratic and incorrect test for assessing the optimal hedging ratio. Chairmont's proposed test is that the volatility of the prevailing (monthly average) cost of debt (base rate plus DRP – which Chairmont call 'with fixed rate hedge') be less than the volatility of the prevailing DRP (which Chairmont call 'DRP alone'). Chairmont find that while this was the case in the GFC and occasionally at other times it was not generally the case and, indeed, the prevailing cost of debt (swap rate plus DRP) was more volatile than just the DRP. Consequently, Chairmont conclude that: "This analysis suggests that there is no hedge effect by opening a swap rate risk".

152. This is simply not correct and a simple stylised example of a perfect natural hedge can be used to illustrate the error in Chairmont's proposed test (provided in Appendix C). That example demonstrates that Chairmont's test for a natural hedge would reach the same conclusion as above[72] even where, in reality, the optimal hedging ratio is not just 1/3rd but was actually perfect (i.e., swap hedging only 1/3rd resulted in a perfect hedge to the regulatory allowance because the other 1/3rd of the base rate was perfectly naturally hedged). (This is also the optimal hedging ratio that Lally's equation 8 (discussed in section 4.1.2 above) provides under that stylised example).

153. Chairmont's proposed test of the existence of a natural hedge is, simply, not suited or relevant to the task for which Chairmont attempts to use it. Chairmont's proposed test does not compare the cost of debt under any interest rate swap hedging strategy[73] – either 0% or 100% swap hedging or anything in between - to the prevailing rate upon which the allowance is set under the on the day approach. Both 0% and 100% swap hedging strategies have a trailing average DRP which is either combined with a trailing average swap rate (under 0% swap hedging) or a prevailing swap rate (under 100% swap hedging). Yet Chairmont's comparison does not include any trailing average component – either of the swap rate or DRP. It simply cannot be used to distinguish between how well these strategies hedge to the prevailing allowance.

154. We note that Chairmont relies entirely on this flawed test to reject the conclusions we arrived at in our June 2015 report (using the same data series as Chairmont) that a strong natural hedge existed. Chairmont does not attempt in any way to reconcile its conclusion to our conclusion in that report which, we reiterate, was based on the

72 *'…combining swap risk with DRP risk increased overall volatility of cost rather than decreasing it. This analysis suggests there is no hedge effect by opening a swap rate risk'.*

73 Both 0% and 100% swap hedging strategies have a trailing average DRP which is either combined with a trailing average swap rate (under 0% swap hedging) or a prevailing swap rate (under 100% swap hedging). Yet Chairmont's comparison does not include any trailing average component – either of the swap rate or DRP.

methodology that Lally set out in Appendix 2 of his April 2015 report. This is notwithstanding that Chairmont references both the Lally and CEG reports.[74]

155. It is also the case that immediately before Chairmont first proposed its test (in section 5.7.3), Chairmont sets out a set of formulae that are essentially the same[75] as set out by Lally in Appendix 2 to his April 2015 report and used by us in our June 2015 report.[76] However, inexplicably, Chairmont does not actually use these formulae to perform its tests. Had Chairmont done so it would have arrived at the same conclusion as we did in our June 2015 report - namely, that the optimal hedging ratio was materially less than 100% (around 1/3rd).

4.2.3 Chairmont section 5.7.4

156. In section 5.7.4, Chairmont do perform a correct comparison of the mismatch – in accordance with the methodology used in Lally's April 2015 report (Appendix 2) and CEG's June 2015 report. This is embodied in Chairmont's Graph 4, reproduced below.

74 Chairmont, Financing practices under regulation, October 2015, footnotes 33 and 13.

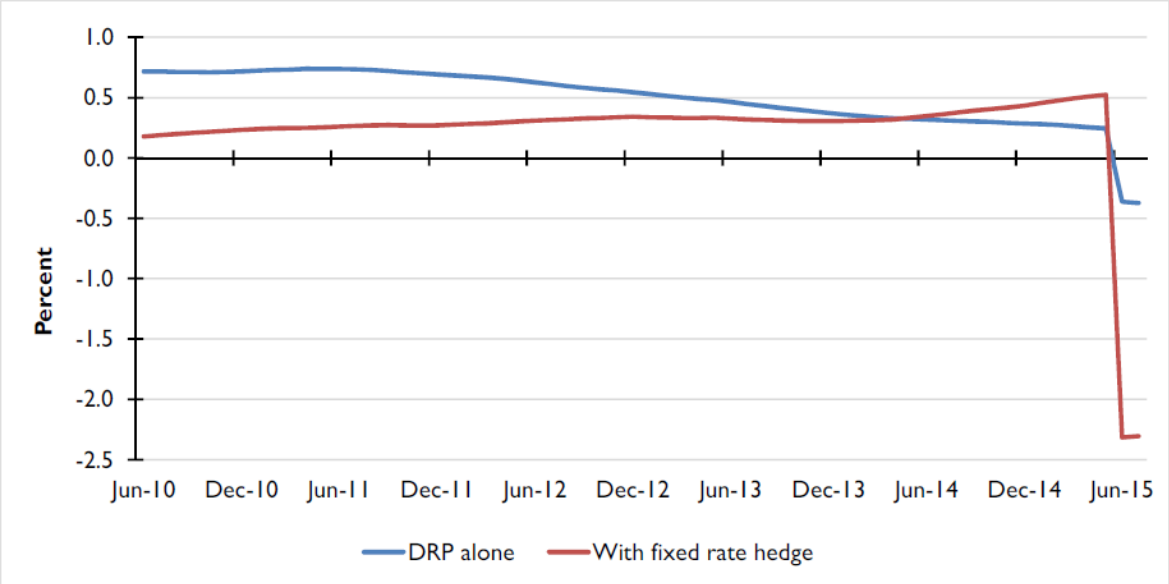
75 With the one exception that the formulae assume that the 10 and 5 year swap rates are the same.

76 Chairmont, Financing practices under regulation, October 2015, pp. 30 to 31. These formulae express the mismatch between the regulatory allowance and the cost of debt for a strategy that leaves x% of the base rate unhedged using swap rates. (Confusingly, in this section Chairmont refers to a 100% 'hedge ratio' to mean that x=100% (i.e., zero use of interest rate swaps). We continue to refer to a hedge ratio as the proportion of the base rate that is hedged using interest rate swaps.) The formulae do this in every year of a five year regulatory period but for the purpose of exposition the below formulae summarises the mismatch in the first year of the regulatory period – using Chairmont's formulae and nomenclature.

$$Mismatch = (DRP_{10}^{0} - \frac{\sum_{t-9}^{0} DRP_{10}^{t}}{10}) + x\% \times (S_{10}^{0} - \frac{\sum_{t-9}^{0} S_{10}^{t}}{10}) \qquad \textbf{(Eqn 1)}$$

These formulae are equivalent to the formulae used by Lally in Appendix 2 of his April 2015 report (with the exception that Lally did not assume the 5 and 10 year swap rates are the same) which in turn are the formulae that underpin the analysis in our June 2015 report.

Figure 10: Reproduction of Chairmont Graph 4



Graph 4: Running Mismatch in Total Debt Cost

157. This figure represents the mismatch associated with a 100% swap strategy (DRP alone) and a 0% swap strategy (with fixed rate hedge). It also assumes that the business had a regulatory reset in June 2010 followed by another regulatory reset in June 2015. In the first regulatory period the mismatch is lower for the 0% hedge strategy in all but the final year of the regulatory period. However, the mismatch is much greater when rates are reset in June 2015.

158. Chairmont concludes:[77]

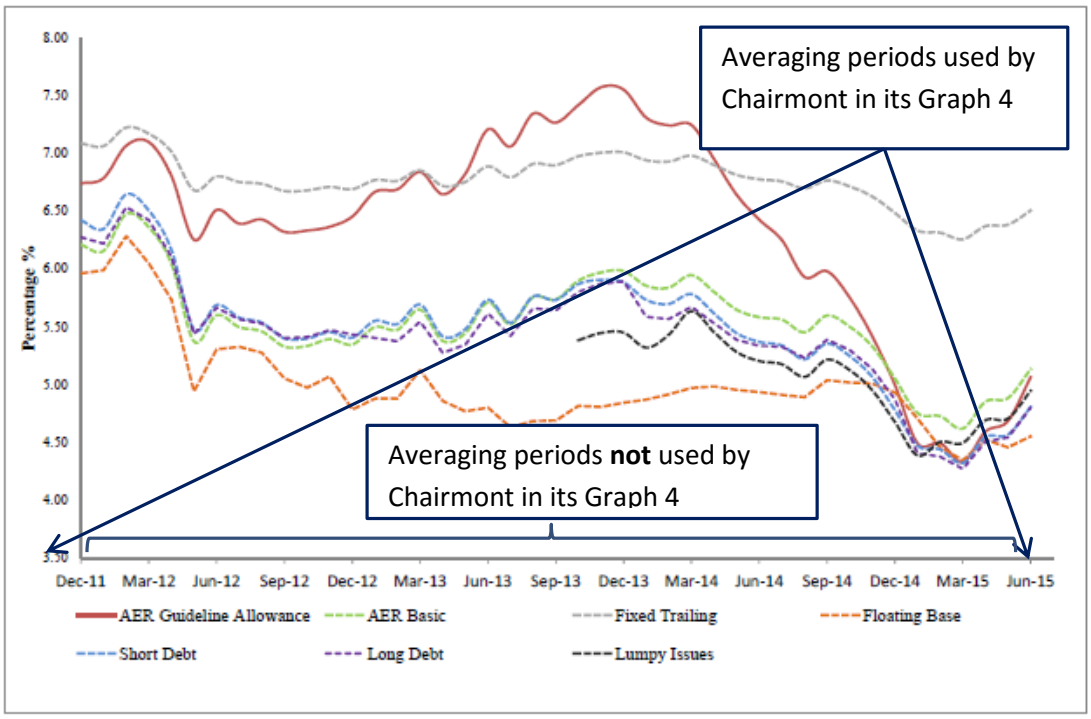
> *Graph 4 shows the difference between the allowed cost of debt and the actual cost of debt, either using the Basic Approach EFP or Strategy 1.*[21] *Leaving debt at trailing fixed rates allowed a lower mismatch at the beginning of the previous regulatory period, but that mismatch grew with the hedge; whereas without the hedge it reduced up until the new rate-set in June 2015. The dramatic change in the mismatch occurs when the new regulatory allowance is set in June 2015. The strong windfall loss beginning to be realised in June and July 2015 arises from the new swap rate-set being much lower than the trailing average swap rate.* ***A sharp move of this magnitude demonstrates the risk increasing nature of Strategy 1.***

77 Chairmont, October 2015, p. 33.

159. We do not agree with Chairmont's conclusion. We do agree that a 0% swap hedging strategy would have resulted in a business having a larger mismatch to the allowance if there was an on-the-day regulatory reset in June 2015. However, we do not agree that this '*demonstrates the risk increasing nature of Strategy 1*'.

160. In our view, it is not appropriate to generalise based on a single data point. Moreover, it is particularly inappropriate to do so when there are many other data points that could have been included in the analysis to make it more robust. Even if Chairmont had limited itself to the 45 odd months underpinning its Graph 1, there would have been 44 odd more hypothetical averaging periods than used in its analysis surrounding its Graph 4. This is illustrated in Figure 11.

Figure 11: Graph 1 from Chairmont annotated to show averaging periods used in Graph 4



Graph 1: Point in Time Analysis - Cost of Debt at Transition Commencement

161. We note that for most of the potential hypothetical averaging periods that Chairmont could have selected from Graph 1, the Fixed Trailing strategy had a better match to the regulatory allowance. The June 2015 averaging period actually shown in Chairmont's Graph 4 is not representative of the average outcome – even over the period for which Chairmont provides data in Graph 1. CEG's June 2015 report sets out why and how all of these hypothetical averaging periods should be used in any assessment of the quality of the hedge to the allowance associated with any given debt management strategy.

162. The use of the June 2015 averaging period in Chairmont's Graph 4 raises another peculiarity. The June 2015 averaging period is paired, of necessity, with a June 2010 averaging period from the previous regulatory period. Graph 4 shows that in that averaging period the 0% swap strategy is lower cost than the 100% swap strategy. However, that averaging period is absent from Chairmont's Graph 1.

163. In Chairmont's Graph 1 the horizontal axis is 'cut off' 19 months later (in December 2011). As a consequence, Graph 1 only shows potential averaging periods where the 100% swap strategy has lowest cost. Chairmont does not explain why it has only reported data from December 2011 in Graph 1 when it clearly believes that the same data series from 19 months earlier can be used in Graph 4.

164. In terms of its data series Chairmont does state:[78]

> *Based on our research and the papers of Lally, QTC and CEG it is concluded that there is insufficient history of relevant BBB bond data to measure over and under compensation for an adequate time period to come to any definitive conclusion about the net result over the life of energy assets.*
>
> *All authors including Chairmont use reliable data going back to 2001. Prior to this date, the data used incorporated different asset types which at best can provide a rough approximation. For example,* ***Chairmont's use of the spread between Government bonds and swaps as a proxy*** *was for illustrative purposes and* ***is not precise enough to be used to determine actual pricing enforceable on a firm***. [Emphasis added.]

165. In this passage Chairmont is referring to its approach set out in Table 4 of its April 2015 report (reproduced below).

Table 3: Chairmont data source

Date (from)	Date (to)	Data Source
July 1999	November 2001	Swap Rate + (swap-to-CGS spread) x 4
December 2001	December 2004	Bloomberg Fair Value (BFV)
January 2005	November 2007	Average BFV + RBA
December 2007	March 2010	RBA
April 2010	June 2014	Average RBA + Bloomberg BVAL

Table 4: Data Sources

166. It would appear that this might explain why Chairmont only begins Graph 1 from December 2011 – 10 years after December 2001 when the BFV values are first

[78] Chairmont, October 2015, p. 38.

published. However, this does not explain why Chairmont reports values for the trailing average cost of debt as at June 2010 in Graph 4. We presume that the Graph 4 values are still using the DRP estimates as described in Table 4 from its April 2015 report.

167. Our extension of Chairmont's time series back to August 1996 (the start of formal inflation targeting by the RBA) has used the assumption from the first row of Chairmont's Table 4. However, it is important to note that the results we present are not sensitive to this assumption. This is because the estimated DRPs from August 1996 to December 2001:

- are not used to estimate the 'on-the-day' allowance that would have prevailed in any given hypothetical averaging period. This is because we only begin our analysis of the mismatch between cost and allowance in August 2006 (ten years after August 1996); and
- affect the cost of all debt management strategies in the same way and with the same magnitude. This is because these values only affect the trailing average DRP and this is the same for both the 0% and 50% swap hedging strategy; and
- only form at most 50% of the weight in the 10 year trailing average DRP as at July 2006 and this falls by 10% every year thereafter.

168. However, it is valuable to extend the DRP series in this way because it allows us to use the historical base rate series which:

- is known with certainty; and
- does affect the 0% and 50% swap hedging strategies differently (not at all for the former and materially for the latter).

169. It also allows us to make the most use of the prevailing cost of debt data (both DRP and swap rates) that Chairmont regards as reliable. In doing so it allows us to examine the quality of the hedge across a variety of interest rate environments – not just the period post December 2011 which is not representative of the wider set of possible environments a debt management strategy must be designed to be robust to.

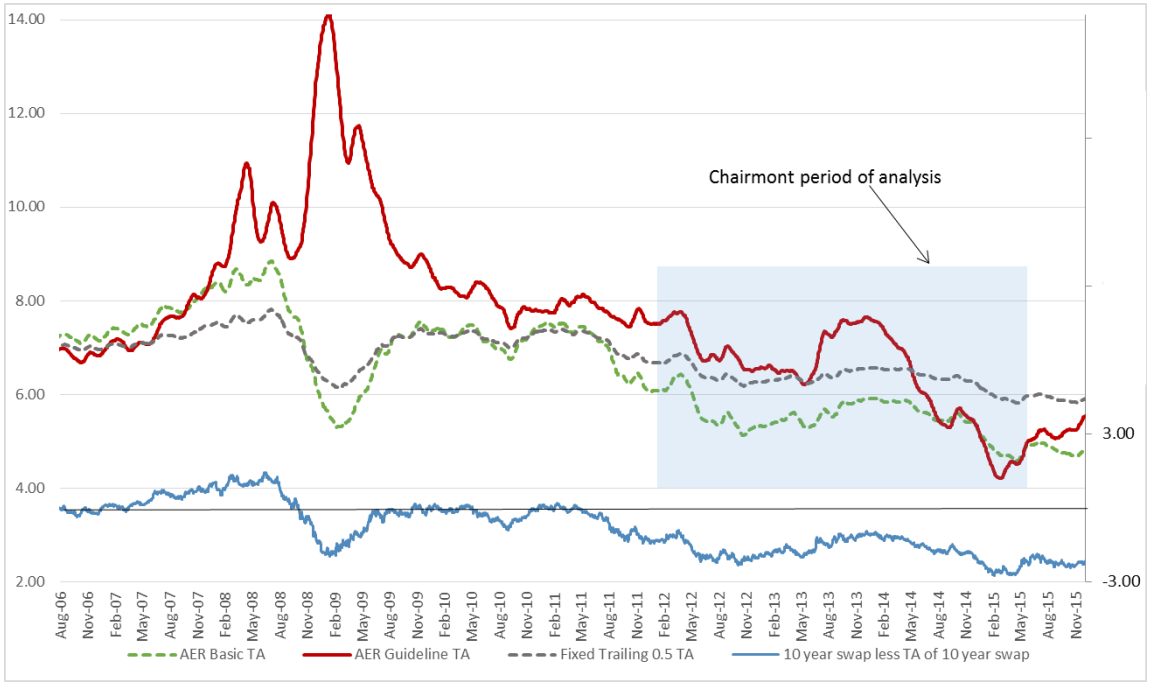
170. In order to illustrate that our results are not sensitive to the assumed calculation of DRP pre December 2011 we provide alternative versions of Figure 9 where the DRP series is between December 2001 and August 2006 is set equal to 2 and 6 times the swap to CGS spread. If the DRP is 2/4/6 times the swap spread to CGS then the average DRP (and it is only the average that has any influence) from August 1996 to November 2011 is 0.88%/1.77%/2.65%.

171. Notwithstanding these large differences in assumed DRP prior to December 2011 the basic conclusions from Figure 9 are the same as from Figure 12 and Figure 13 below (which deploy the different assumptions). It can be seen that the basic

pattern of the time series is unaffected. Essentially, all that occurs is that the grey and green lines at the left hand extremity of the figures shift up or down by the same amount and with that impact falling the further to the right one moves.

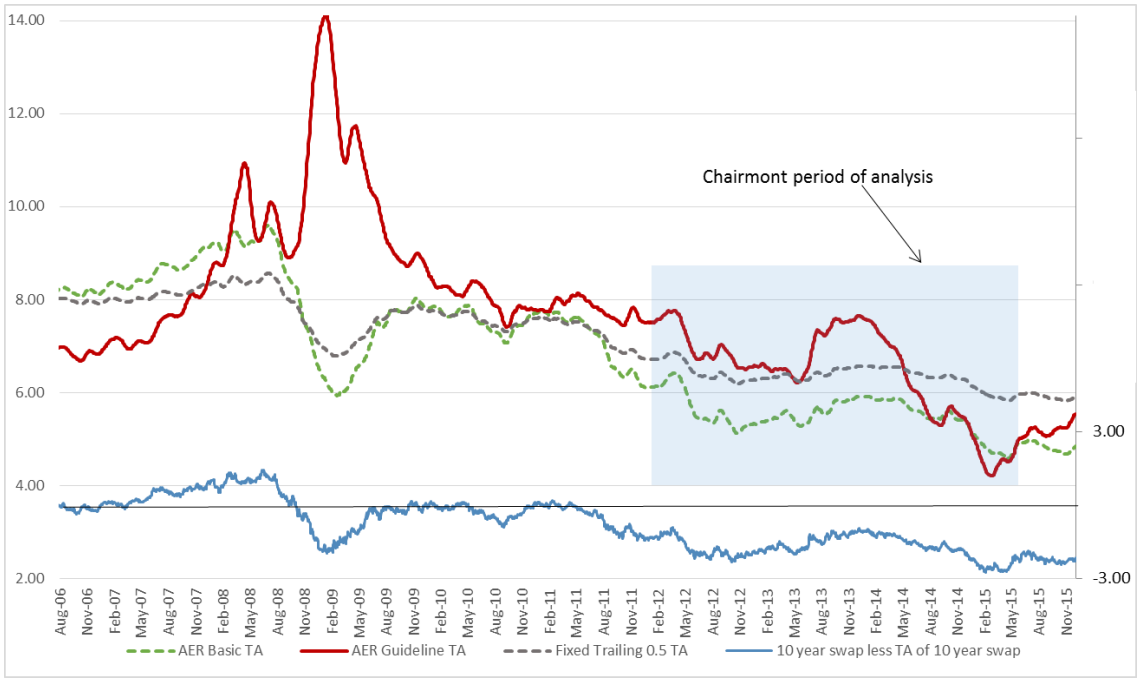
172. In particular, the pattern of the time series over the GFC is not discernibly different in all figures. In all versions of the analysis the green line falls below the grey line in the GFC and then rises to be more or less equal by August 2009 and stays that way until late 2011 (when assumptions about pre 2001 DRPs have no impact). While the assumed DRP pre 2001 does affect the measured mismatch for each strategy at the far left hand side of the figures – the *relative* mismatch is not materially affected because both cost time series are shifted by the same amount and this does not materially[79] change their position relative to the allowance line.

Figure 12: Figure 7 amended to assume DRP pre 2001 is 2 times swap spread to CGS



79 The point at which the green lines becomes closer to the allowance in 2007/08 is shifted by a few months in the extreme case of moving from an assumed DRP = 2*(swap to CGS spread) to an assumed DRP = 6*(swap to CGS spread).

Figure 13: Figure 7 amended to assume DRP pre 2001 is 6 times swap spread to CGS



5 Minimising costs

173. As noted in the previous section, the AER (and both its consultants) have stepped away from a focus on the strategy that minimises interest rate risk, and instead shifted focus to the effect of swaps in lowering the expected cost of debt. The prioritisation of "return" over "risk" is inconsistent with the prior statements from both its consultants (as discussed in previous sections). The AER states:[80]

> *As indicated by Chairmont, whether or not there is a negative correlation between the DRP and base rate is a **secondary** consideration.*
>
> *Chairmont's analysis suggested that a financing strategy of partial hedging (which is labelled 'Strategy 1' in Chairmont's report) **nearly always** resulted in substantially higher starting portfolio costs than all strategies that involved a fully hedged base rate for the period December 2011 to June 2015. [Emphasis added.]*

174. In criticising CEG, the AER stated[81]:

> *Furthermore, CEG's analysis focused only on one of the reasons for which a benchmark efficient firm would completely or largely hedge the base rate (reduction of interest rate risk). It does not address other reasons, including the **expectation** that a fully hedged base rate would reduce expected costs. This effect arises because, by fully hedging the base rate, the service provider's base rate costs reflect a 5 year term as opposed to a 10 year term. To the extent that the benchmark efficient entity hedges less than 100 per cent of the base rate, it dilutes the cost-reducing effect.*
>
> *In summary we are not persuaded by CEG's analysis because it:*
>
> - *ignored the financing practices of private firms.*
> - *focused only on one reason for which a benchmark efficient entity would completely or largely hedge the base rate.*
>
> [Emphasis added.]

175. It is important to note that the AER, in the second quote, correctly describes the source of any potential cost reduction associated with using interest rate swaps in the manner described and correctly describes this in expectational terms. An

80 AER, Jemena preliminary decision, October 2015, 3-557

81 AER, Jemena preliminary decision, October 2015, 3-558

expectation of a cost reduction exists if an action may increase costs or reduce costs in any given period but, on average over the long term, it is expected to reduce costs.

176. Specifically, if 5 year swap rates can be expected to be lower than 10 year swap rates then its proposed use of interest rate swaps can be expected to lower interest rate costs. (Although the AER does not make explicit that this will only lower total costs if this difference is greater than the transaction costs of entering the swaps.)

177. However, this is not the source of the lower costs that are referred to when the AER references Chairmont in the above quote. As described in the previous section, the fact that the swap strategy is lower cost in the current interest rate environment (as shown in Chairmont's Graph 1) is driven by the fact that interest rates have fallen over the last 10 years (indeed are at historically unprecedented lows). The 'lower cost' that Chairmont reports and relies on in its advice to the AER does not represent an expected long run benefit from using the swap strategy. Rather, the best interpretation of this is that it is a 'pay off' for a gamble that rates would fall – a gamble that could just as likely been lost as won. There is no expectational component of lower costs that derives from falling interest rates unless one expected interest rates to fall forever more – which is impossible.

178. Therefore, the correct assessment of a rational expectation of the relative costs of the two strategies must be focussed on the expected difference in 10 and 5 year base rates net of the transaction costs of entering into swap contracts.

179. Lally has previously argued that a business pursuing a 100% swap strategy would have: [82]

> *…reduced their costs from the ten-year swap rate embedded in their borrowing to the (usually) cheaper five-year* swap *rate, even after allowing for the transactions costs of the swaps.*[10]
>
> [10] *By contrast, the average differential between the five and ten year swap rates has been 0.28% from 1.1.1988 to 31.8.2014, 0.25% from 1.1.2000 to 31.8.2014, and 0.46% from 1.1.2010 to 31.8.2014 (using Bloomberg data). So, net of the transactions costs of the swaps, the swap transactions would have yielded expected benefits of at least 0.15% as well as reducing risk.*

180. We note that four months prior to providing the above advice Lally advised the NZ Commerce Commission that the long term average difference between 10 and 5 year base rates was 8bp. It is, therefore, relevant to examine the differences in methodology that give rise to these very different estimates. When arriving at the

[82] Lally, Transitional arrangements for the cost of debt, November 2014, FN 10, p. 27.

8bp estimate for the New Zealand Commerce Commission Lally describes his methodology as follows.[83]

> *…five year data is only available in New Zealand since 1985. However, data is available on both five and ten-year rates in the US since 1953. This allows an approximation as follows. Firstly, the average differential for the New Zealand five and ten year rates since 1985 has been 0.07%.[20] In addition, the average differential for the US five and ten year rates over the period 1953-1985 has been 0.08%. I extrapolate the latter differential to New Zealand for the same period…*

181. Applying the same method in Australia would result in the combination of the US 8bp estimate from 1953 to 1985 with the 28bp estimate for Australian data between 1998 and 2014 that Lally reports in his November 2014 report for the AER. The weighted average of these estimates, ignoring the 2 year gap in the data is 9.5bp.

182. However, this would not be the best estimate because Lally's reported 28bp difference between 10 and 5 year rates go back only to 1988. This is because Lally limits himself to examining the term structure of the swap curve. However, a much longer Australian data source (from January 1972 onwards)[84] is available if 5 and 10 year government bond rates are used.[85]

183. Had Lally used data from January 1972 to August 2014 he would have estimated an average term premium between 10 and 5 years of 22bp not 28bp. We have updated this to November 2015 and the Australian term premium remains at 22bp on average. The US term premium from April 1953 to December 1971 is 6bp. Combining these two estimates in a weighted average, in the same way that Lally performed for the NZ Commerce Commission, results in a 17bp average term structure.

184. This suggests that there are some small potential expected benefits over the long term from adopting a swap strategy. However, any consideration of the benefits of pursuing these benefits must be weighed against:

- the costs of doing so (in the form of transaction costs of hedging); and

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83 Lally, Review of submissions on the cost of debt and the TAMRP for UCLL and UBA services, June 2014.

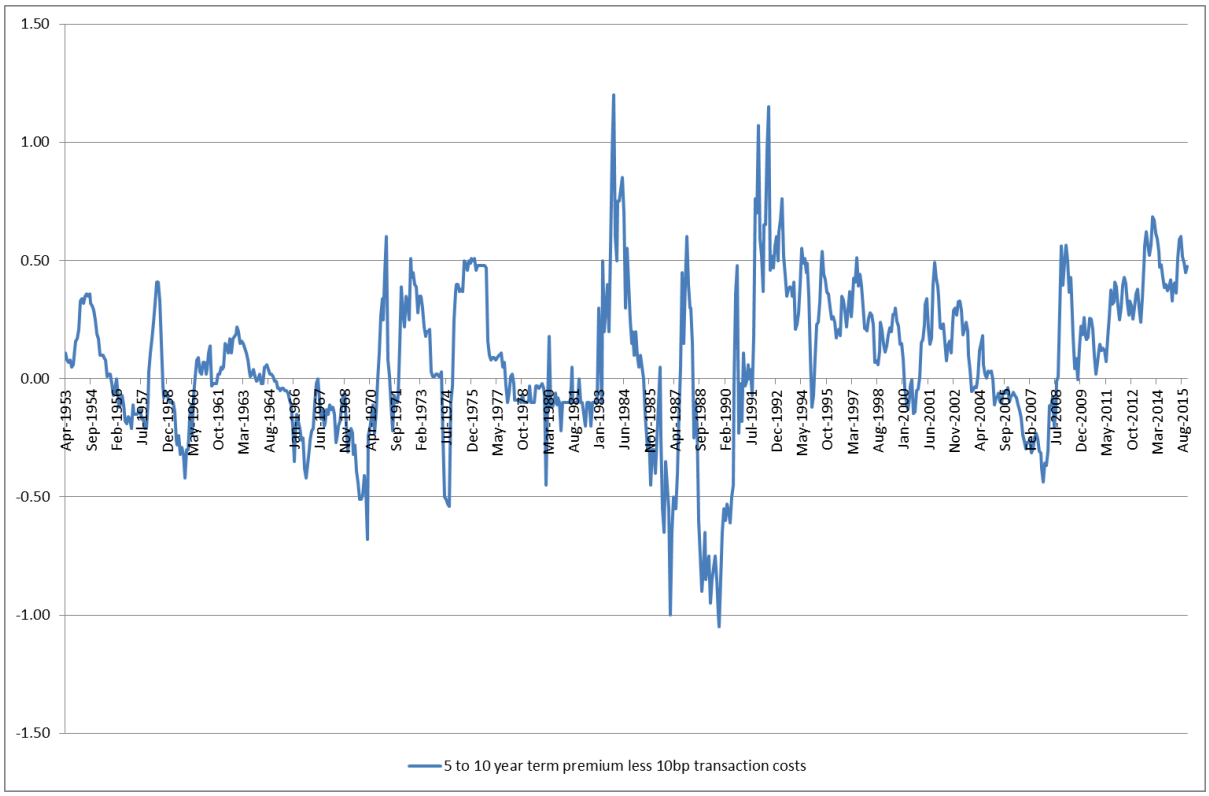
84 RBA, F2 Capital Market Yields - Government Bonds (www.RBA.gov.au).

85 There is no obvious reason to believe that the average spread between 10 and 5 year swaps would have been different to the average spread between 10 and 5 year government bonds prior to 1998. Moreover, the relevant term structure to the swap market is the term structure expected in a mature and liquid swap market – such as the BEE would have been expecting to transact in. It is likely that the term structure in the government bond market is a better proxy for this than the term structure in the swap market in the early years of the swap market's existence.

- the reliability of earning these benefits.

185. Lally is critical of the QCA estimate of swap transaction costs of 15-20bp that we refer to in our June 2015 report. For the purpose of assessing transaction costs in this section, although we do not necessarily endorse it, we adopt Lally's estimate of 10bp.[86] This leaves a 7bp net expected benefit from 100% hedging relative to 0% hedging (3.5bp when compared to 50% hedging). Now, let us consider the reliability of receiving that benefit. Figure 14 below shows the time series of this difference.

Figure 14: 10 less 5 year base rates (US data pre 1972) less 10bp transaction costs



186. Here, 17bp is the average value of the time series in this figure but it is very noisy and it is certainly not the case that a business could reliably expect to earn 7bp net of transaction costs (which will themselves very through time) by using interest rate swaps in the manner proposed by the AER and Lally. In some circumstances it will earn more and in many circumstances it will earn less including negative values (i.e., it will raise costs to pursue this strategy).

86 Lally, 21 October 2015, p.12 and Lally, November 2014, p. 27. Although we note that some estimates of transaction costs reviewed by Lally exceed 17bp.

187. Moreover, if an inverted term structure is associated with an expectation of recession, which is commonly believed to be the case,[87] then a business exposing itself to a loss in these circumstances may well create higher systemic risk. That is, when 'hedging strategy' hurts the shareholders is precisely when they are least able to absorb the losses (i.e., when the rest of the economy is performing badly).

188. As noted in section 4.1.5 above this volatility in the term premium is one reason why Lally and the AER have overstated the value of hedging to the cost of debt allowance – even when one restricts the comparison purely to the base rate (ignoring variations in the DRP). (Section 4.1.5 also explains that Lally incorrectly assumed that the AER's on the day allowance was based on a 5 year term when rejecting our views that this term structure was a source of risk.)

189. Of course, as we noted in our June 2015 report, a business could speculate that the 5 year swap rate plus swap transaction costs will be below the 10 year swap rate. However, that is precisely what such a strategy would be; speculation. The word "speculate" is used here in the same manner that Chairmont used in the quote at paragraph 148 above and Lally uses it below. [88]

> *It is also interesting to see from para 6.3 of Annexure BT-2 to Thiow's Statement that TransGrid engages in speculation (switching between nominal and inflation-linked debt, and between short-term debt and long-term debt depending upon market conditions), and engaging in such speculation would preclude the use of swaps for hedging in the manner under discussion here. Thus, an additional reason for TransGrid not using* ***swaps is its desire to speculate, but this is not efficient behavior*** *and therefore would not warrant a regulator granting the firm a different allowed cost of debt.*
>
> [Emphasis added]

190. Both Lally and Chairmont argue that a utility business will efficiently focus on hedging its costs to the regulatory allowance. In order to be consistent with this, to the extent that an interest rate swap strategy is to be judged efficient it must be on the basis that it successfully manages interest rate risk – not that it takes on risk in order to give rise to potential speculative gain.

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87 Rosenberg and Maurer, in a New York Federal Reserve paper, state "Since the 1970s, an inverted yield curve has been a reliable signal of an imminent recession." Joshua V. Rosenberg and Samuel Maurer, Signal or Noise? Implications of the Term Premium for Recession Forecasting, FRBNY Economic Policy Review / July 2008.

88 Lally (2015), Review of Submissions on the Cost of Debt, April 2015, p. 46

6 Business practice

191. The AER's preliminary and draft decisions seek to downplay the evidence on efficient use of interest rate swaps in our June 2015 report on the basis that it is inconsistent with business practice.[89]

> *Lally was not also persuaded by CEG's proposition that a negative correlation between the base rate and the debt risk premium entails a natural hedge between these two variables; such that it would be efficient to hedge only a portion of the base rate.* ***In particular, Lally noted that CEG's analysis does not undercut the fundamental point that private sector service providers hedge the interest rate risk****. This is* ***a fundamental point*** *because:*
>
> - *Private firms need to raise capital directly from capital markets. To do so require [sic: requires] discipline given that private firms face higher refinancing and bankruptcy risk (relative to their government-owned counterpart).*[2112]
> - *As set out in this decision,* ***we rely on industry norms among the privately owned firms in estimating aspects of the debt methodology****, including debt term, credit rating, the use of staggered debt and hedging practices.*
> - *CEG analysis* ***did not rely on the practices of the privately owned firms in Australia.***
>
> *Lally agreed with this view. Lally stated:*
>
> > *…in order to prefer CEG's conclusion, one would have* ***to ignore the fact that private-sector firms do use swaps****, and ignore the fact that these swaps reduce expected interest costs, and define risk in relation to the entire cost of debt (rather than just the base rate), and to conclude that the best data to determine the optimal course of action is from 1986-2015.*

192. Lally makes the same claim repeatedly in his advice to the AER that the CEG analysis of efficient use of interest rate swaps (which suggests that less than 100% hedging is appropriate) should be rejected on the basis that it is inconsistent with actual business practice:[90]

89 AER, Jemena preliminary decision, October 2015, 3-558.

90 Lally, 21 October 2015, p.22.

> *…the fundamental point still remains that private-sector firms do hedge this risk (apparently at or close to the 100% level), and this gives rise to the reasonable presumption that this is efficient behavior.*

193. However, and as previously noted, neither Lally nor the AER actually provide any reliable source (in the case of Lally no source is referenced at all) for these claims. The AER provides the following in support of a position that some businesses make some use of interest rate swaps in the manner assumed to be efficient by the manner AER. [91]

> *A staggered debt portfolio with interest rate swaps is also the financing strategy that most privately owned service providers generally adopt under the on-the-day approach. This tendency is reflected in:*
>
> - *corporate treasurers' statements to our 2009 weighted average cost of capital (WACC) review*
> - *the data on debt financing strategies of the privately owned service providers we collected during the 2009 WACC review,*
> - *submissions from privately owned service providers to the Australian Energy Market Commission (AEMC) during the 2012 network regulation rule change process*
> - *submissions to our development of the 2013 rate of return guideline.*

194. However, at best this evidence suggests, as the AER indeed puts it, a *tendency* to use swaps in the manner the AER believes is efficient. It does not suggest that hedging 100% of the base rate exposure is standard or, even common, practice amongst regulated businesses. In our view it is not sufficient for the AER and Lally to point to some use of interest rate swaps to justify a 100% hedging ratio over an optimal hedging ratio of less than 100%.

195. As we noted in section 3.9 of our June 2015 report, the AER has referenced statements from only 4 out of 10 Australian firms used to set the equity beta and these statements only establish some use of interest rate swaps not 100% use of interest rate swaps. This is borne out by the fact that the AER includes a statement from the Treasurer of Envestra (now AGN) in support of its first dot point in the above quote. However, actual data from AGN, as reported in Chairmont's October 2015 report for the AER, suggests only 66% of the cost of debt is hedged. [92] Clearly,

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91 AER, Preliminary decision, Jemena, October 2015, 3-187.

92 Chairmont, October 2015, Appendix B, p. 68. *"As at 30 June 2015, the level of fixed/floating rate debt was 34%/66%. In this context, fixed rate debt issued in USD and then converted into floating rate AUD exposure using cross-currency swaps is included in the 66% floating rate exposure.* ***The remaining***

this is data in support of a less than 100% hedging strategy as 'actual business practice'.

196. The evidence from the same Chairmont source[93] is less precise for the other businesses. We summarise this evidence here:

- AGN used interest rate swaps in the fashion envisioned by the AER on 66% of its debt portfolio.
- Ausnet used interest rate swaps in the fashion envisioned by the AER on 90 to 100% of the portfolio (generally closer to 100%);
- Citipower/Powercor[94] stated: "*Before the start of the 2011-15 regulatory control period we considered it prudent to hedge all our floating interest rate exposure due to the market uncertainty caused by the global financial crisis";*
- Jemena claimed commercial-in-confidence over this aspect of its debt management strategy but stated that it used interest rate swaps in the fashion envisioned by the AER "*only for a portion of its overall portfolio*";
- SAPN stated that it "*did hedge a majority of existing floating rate debt*" in the fashion envisioned by the AER but does not say that this is at or close to 100%;
- United Energy states that "th*e overall proportion of the debt portfolio that was hedged was certainly less than 100%*";
- APA is not included in the list of companies in the Chairmont report despite being a privately owned NSP currently regulated (and a business that was named (paragraph 12) in the commissioning of our June 2015 report).

197. If anything can be concluded from the above evidence is that on an average the industry will have less than 100% debt hedged. Equally, the practice appears to be varied – i.e., not centred on a single strategy. We also note that the above sample of firms does not include all private businesses (such as APA) and the government owned electricity distribution businesses. In summary, of the 7 private NSPs listed above there is evidence that:

- two businesses (Ausnet and Citipower/Powercor) hedged 100% or close to 100% in the manner envisioned by the AER (and in the case of

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34% of the portfolio is fixed and the interest rates paid reflect an average of fixed rate borrowing undertaken since 2003*."* Emphasis added.

93 Chairmont, October 2015, Appendix B.

94 We note that from Chairmont, October 2015, Appendix B it appears that Citipower and Powercor appear to have responded to an AER information request as a single entity (or been treated as such by Chairmont) – suggesting that they have a joint debt management strategy. We treat these operating companies as a single observation for this reason.

Citipower/Powercor the statement was made in the context of the conditions prevailing at the time of the commencement of the previous regulatory period; indicating that the adoption of this practice was particular to the then prevailing market conditions, suggesting it would not necessarily adopt a strategy of 100% in all market conditions);

- one businesss clearly hedged substantially less than 100% (AGN at 66%);
- the other four businesses hedging ratio is unclear but there does not appear to be any basis to conclude that they hedged close to 100%.

198. It is also a matter of public record that the NSW government owned distribution businesses did not, or did not materially, use interest rate swaps in the manner envisioned by the AER.[95] It can be argued, and CEG has made this argument in the past, that the business practice of government owned businesses cannot be presumed to reflect the efficient practice of a privately owned business due to the fact that the they have a potential financial 'fall back' in the form of the taxpayers of the jurisdiction of the relevant Government.

199. However, in the case of the NSW electricity businesses a reasonable case can be made for having regard to their practice. This is because they are corporatised entities who are required by their owner to maintain a 'stand-alone' (i.e., independent of government) investment grade credit rating. The maintenance of this credit rating was a key concern of these businesses in relation to the AER's most recent review.[96] Efficient management of interest rate risk is an important element of maintaining an investment grade credit rating and, on this basis, one can assume that these entities did have, at least to some degree, incentives to act in a similar manner to private businesses (noting also that some businesses treated as 'private' in the above list have government ownership – albeit not from the same jurisdiction that they operate).

200. In summary, the facts appear to be that there is a range of practice amongst businesses but that the average practice appears to be to hedge less than 100% of their debt portfolio. In this context precisely the opposite conclusion to that which Lally posits is the case:

    - the empirical estimates of the optimal hedging ratio are less than 100%;

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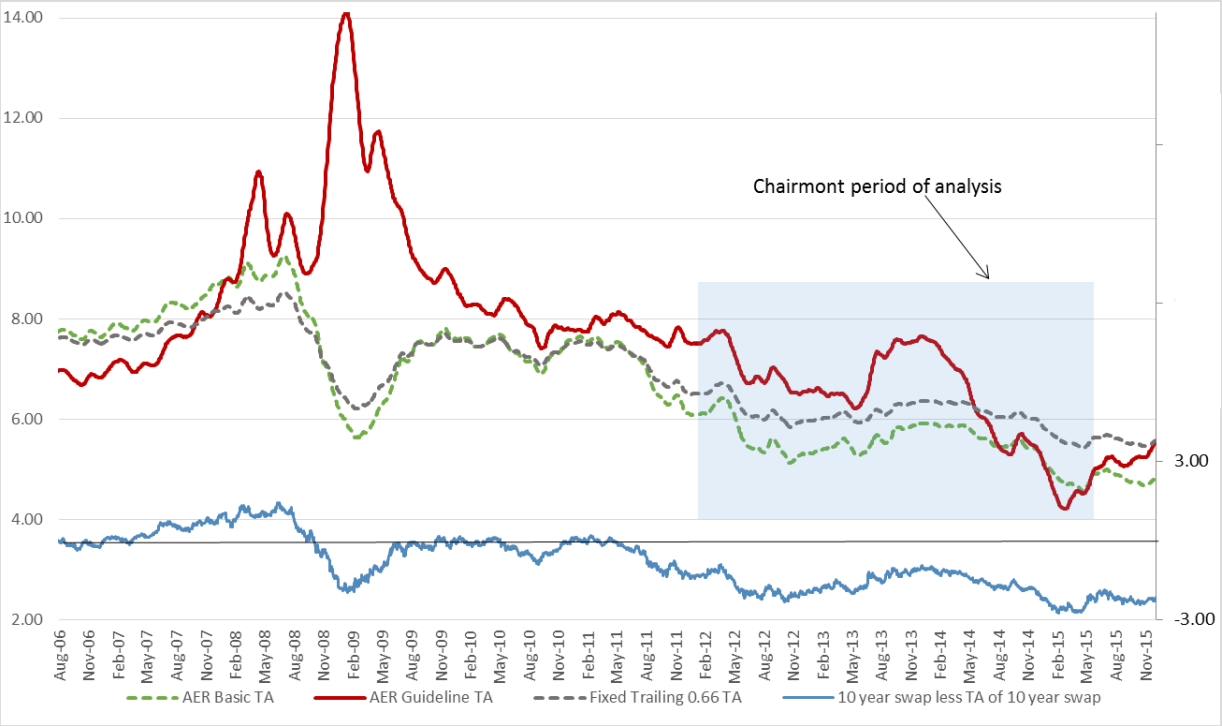
95 The AER states on page 3-164 of its final decision for Transgrid (AER, Final decision, Transgrid transmission determination, April 2015) that "We consider a benchmark efficient entity would have hedged the base rate component of its debt to the allowed return on debt. This position is supported by advice from Chairmont and Lally. However, alternatively, a service provider might have chosen to not hedge the base rate component. **The NSW service providers adopted this approach**." (Emphasis added.)

96 For example, see Ausgrid's Revised Regulatory Proposal and Preliminary Submission, 1 July 2014 – 30 June 2019, 20 January 2015 p.13.

- average practice amongst private regulated businesses is less than 100%; and
- average practice amongst publicly owned regulated businesses is less than 100% hedging.

201. This suggests that the assumption that 100% hedging is efficient is at odds with both actual practice and empirical estimates of optimal hedging. In this context, it is useful to reproduce Figure 9 but to show the results for a hedging ratio that is the same as that disclosed for AGN in the Chairmont report.

Figure 15: Chairmont Graph 1 extended backwards (and forwards) in time – 66% hedging



202. As it happens, this hedging ratio (66%) would deliver costs more or less equal to the regulatory allowance if that allowance were set in an averaging period of November 2015.

6.1 Disentangling hedging of debt vs equity component of the WACC

203. The above discussion is predicated on the assumption that all hedging of the base rate using interest rate swaps should be attributed to hedging the cost of debt. However, it is not obvious that this is correct. Even if a firm had zero debt, it might still engage in the same strategy to reduce the impact of volatility in base rates of interest (and the cost of equity allowance) on cash-flows.

204. To understand why, note that, under the on-the-day regime as practiced by the AER, both the cost of equity and the cost of debt moved in accordance with prevailing base interest rates. The cost of equity was set based on a fixed MRP plus a floating (prevailing) value of the 10 year risk free rate. Therefore, movements up or down in the risk free rate had a direct impact on the cost of equity allowance.

205. A firm seeking to smooth out such impacts in order to maintain a more stable return to investors could have entered into a series of overlapping (trailing average) long term pay floating/receive fixed swap contracts[97] creating long term stable positive income and unstable floating liabilities. This would, then, allow them to enter into pay fixed/receive floating interest rate swaps at the beginning of each regulatory period. The effect of which would be to cancel out the floating exposure for the term of the regulatory period. The residual impact would be the difference between a trailing average receive fixed swap rates (income) and the prevailing pay fixed swap rate at the beginning of the regulatory period (expense). Thus, if swap rates were high (and the cost of equity allowance for the next 5 years would be high) then their swap contract expenses would also be high relative to swap contract income (and *vice versa*). This would then offset the impact of volatility in risk free rates on the income from the cost of equity allowance.

206. This strategy is essentially the same as the hedging strategy that is proposed by the AER to be efficient for the cost of debt. The AER assumes that:

- a firm has a trailing average fixed rate debt portfolio;
- enters into a receive fixed pay floating swap contracts for this debt – creating a trailing average swap portfolio that is the mirror of the debt portfolio;
- enters into pay fixed swaps at the beginning of the regulatory period.

207. The second two steps describe precisely the strategy undertaken with respect to hedging variability in the allowed cost of equity. Therefore, observing this practice does not imply that it is the cost of debt allowance that is being hedged – it could equally be the cost of equity allowance being hedged.

208. Therefore, when interpreting actual business practice it would be appropriate to apportion any observed hedging of the base rate at the beginning of the regulatory period to both debt and equity – in the same proportion to which they are funded.

209. In this regard, we note the statement of Mr Sim Buck Khim, Head of Jemena Treasury Department where Mr Khim refers to hedging the revenues from the asset

97 For example, a firm could maintain a 10 year trailing average of 10 year term pay fixed swap contracts.

base (i.e., Mr Khim does not distinguish between the revenues that compensate for the debt vs equity component of the asset base): [98]

> *We also undertake hedging. Hedging is like an insurance policy against certain risks. For example we have currency hedges when we issue bonds in currencies other than Australian dollars. Similarly we also hedge against interest rates moving away from that forecast. In hedging interest rates, one of the factors that we consider for that part of our* ***asset base*** *that is regulated is when the AER sets our revenue reset because our* ***regulated revenues cashflows are derived from the interest rate used in the regulatory reset***. [Emphasis added.]

6.2 Swap transaction costs

210. A further example of efficient costs that the AER is proposing not to compensate are swap transaction costs. The AER has decided not to compensate for swap transaction costs based on the advice from Lally[99]:

> *Lally concluded that hedging would have been self-funding because the saving in converting 10 year debt into 5 year debt would have offset the cost of the hedge.*

211. As we noted in section 5 this is not necessarily true. It is possible, and has been the case, that the opposite is true and 5 year swap rates are higher than 10 year swap rates. In any event, this is irrelevant if the AER's cost of debt allowance is to be based on an actual debt funding strategy – in which case there will be no 'offsetting errors' to rely on in order to not compensate for the cost of swap hedges if these are efficient.

212. For example, if the AER's allowance is based on transitioning from the 100% swap hedging (hybrid) debt management strategy then the initial benefits of the firm using swap rates of an average maturity less than 10 years will already be captured in a lower cost of debt allowance. There will be no offsetting error in base rate compensation to justify not correctly compensating for the cost of swap transactions.

213. We note that there have been a variety of estimates of swap transaction costs provided in regulatory processes. Estimates provided by regulators or their consultants include the following:

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98 Statement of Sim Buck Khim, Head of Jemena Treasury Department, Paragraph 5.25 to 5.26. The Joint Industry Associations (JIA), Submission on the explanatory statement: WACC review, February 2009, JIA Appendix E; https://www.aer.gov.au/node/11822.

99 AER, Preliminary decision for Jemena, October 2015, p. 3-577

- QCA estimates of 15-20bp;[100]
- Evans and Peck have advised the QCA that the costs of implementing a swap strategy (but fixing over only 2 years) would be 13.5bp; [101]
- Chairmont estimate for the WA Economic Regulatory Authority (ERA) of 11.5bp;[102]
- Lally's estimates in reports for the AER of10bp.[103]

214. Other parties, such as UBS[104] have estimated materially higher swap hedging costs. In the context of the above estimates adopting the Chairmont estimate is conservative. This is also the only report specifically commissioned by a regulator addressing the appropriate level of swap transaction costs to allow under the NGR or NER.

215. The question also arises as to how, if at all, these estimates should be phased out over-time as a trailing average is implemented and how to allocate these costs to different assumed efficient debt management strategies. The most conservative way to initially allocate the swap transaction costs to each strategy on the basis of the assumed use of interest rate swaps for hedging. For example, in the first year of the transition the 11.5bp cost would be allocated as follows:

- zero swap transaction costs if the BEE's debt management strategy is already consistent with a trailing average approach;
- 1/3rd of these costs (e.g., 1/3rd of 11.5bp = 3.8bp) if the BEE's debt management strategy to date has been to hedge 1/3rd of their base rate exposure; or
- 100% of these costs if the BEE's debt management strategy is assumed to have hedged 100% of their base rate exposure.

216. The most conservative way to transition these costs overtime would be to reduce them by 10% in each subsequent year of the transition on the basis that no such swap transactions are entered into with respect to new debt.

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100 QCA, Position paper: Long-term framework for SEQ water retailers – weighted average cost of capital (WACC), August 2014, p. 29.

101 Evans and Peck, SEQ Retail Water Price Review, 4 February 2013, P. 2

102 Chairmont, ERA Hedging Costs in the Cost of Debt, May 2015, p. 6.

103 Lally, 21 October 2015, p.12 and Lally, November 2014, p. 27. Although we note that some estimates of transaction costs reviewed by Lally exceed 17bp.

104 UBS, UBS response to the Networks NSW request for financeability analysis following the AER Draft Decision of November 2014, January 2015. UBS estimates the all in costs at 38bp.

217. We say that these are conservative assumptions because, in reality, a BEE may continue to use swap contracts. For example, a BEE will also continue to incur cross-currency swaps on foreign issued debt and will use fixed rate interest rate swaps to fix the AUD costs of such issues. Based on the Chairmont estimates[105] these costs will be 6.3bp and will continue to be incurred even after the end of the transition (and incurred in the no transition scenario). Even putting foreign currency issues aside, it will not always be possible for the BEE to spread its debt raising evenly out over any pre-specified averaging period (e.g., due to lumpy capex requirements and/or less than perfectly smooth maturity profiles for existing debt). In this context, the BEE may attempt to use swap contracts to align its base rate exposure to the regulatory averaging period.

6.3 Reference to NERA advice

218. The AER has also relied on advice from NERA, in a report authored by Dr Hird who is also the author of this report, to justify not providing compensation for swap transaction costs. The AER's position is as set out below.

> *We are not satisfied that customers should pay for the service providers' reduction in interest rate risk that results from hedging. NERA supported this view. In 2007, NERA assessed whether network service providers should be compensated for hedging costs. NERA concluded:*
>
> > *It is important to note that the beneficiaries of this reduction in risk are not Powerlink's customers but rather are Powerlink's owners. Unlike operating expenditure required to ensure the network's ongoing reliability, expenditure on interest rate hedging only benefits the owners of the asset. This raises the obvious question:*
> >
> > *"Why should Powerlink be compensated for risk reductions that, if they are efficient, will pay for themselves?"*

219. However, the advice in that report is squarely and clearly linked to the operation of regulation under the NER as it existed then. We noted in that report that the Rules required that the AER impose the on-the-day regime and left businesses to respond to that regime as they saw fit.[106] Clause 6.5.2(c) of the now NER defines the allowed rate of return objective (ARORO) as:

> *The allowed rate of return objective is that the rate of return for a service provider is to be commensurate with the efficient financing costs of a benchmark efficient entity with a similar degree of risk as that which*

[105] Chairmont, ERA Hedging Costs in the Cost of Debt, May 2015, p. 6 (4.9bppa +35% of 4bppa).

[106] NERA, *Hedging for regulated businesses*, April 2007, p. 6.

applies to the service provider in respect of the provision of reference services (the allowed rate of return objective).

220. Under the current NER it is our view that, if the AER believes that interest rate swaps form part of the BEE's financing strategy they must be compensated for. Consistent with the advice in the report referred to by the AER (and in this report) we do not accept that 100% interest rate swap hedging is efficient. However, the AER's position is that it is efficient and, if this is accepted, compensation for these costs must be provided if the task is to estimate efficient financing costs (as required by the ARORO).

7 Not compensating based on efficient costs

221. Notwithstanding its view that a 100% swap based strategy was efficient under the old regime, the AER has not accepted the businesses' proposed adoption of compensation on the basis that they transition from this strategy to a trailing average.

222. The AER previously considered that overs and unders would approximately cancel out over time under the 'on-the-day' approach meaning that an NSP would have been fairly compensated for its efficient financing costs over the life of the asset under the on-the-day approach. By the AER's logic this also seemed to imply that if the on-the-day approach was going to impose a loss (gain) on an individual business in the next regulatory review then this was likely appropriate because it likely reflected the fact that there were past gains (losses) that were being offset.

223. This was rejected by Chairmont[107]:

> *At this point in time, on the evidence submitted and the analysis undertaken, the conclusion is that overs and unders cannot be adequately measured over the life of the assets.*

224. The AER accepted this view and stated[108]:

> *Since we are persuaded that this exercise is not achievable to a sufficient degree of precision, we have not relied on analysis of whether our transitional approach will erode past windfall gains or losses in making our decision.*
>
> *That is, in evaluating whether the transition approaches will allow the service provider the opportunity to recover at least its efficient costs, we have not relied on analysis of* ***past or future*** *windfall gains or losses. [Emphasis added.]*

225. Chairmont has proposed a transition path that is consistent with the 100% hybrid debt management approach, this is also recognised by the AER[109]:

> *Within this scope, Chairmont recommended that:*

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107 Chairmont, Financing practices under regulation, October 2015, p. 39

108 AER, Preliminary decision for Jemena, October 2015, p. 3-571

109 AER, Preliminary decision for Jemena, October 2015, p. 3-164

- *AER should continue to use the [hybrid approach (Option 3)] for its depiction of EFPs for NSPs going into the transitional phase.*
- *As a consequence of the above, the allowed return on debt should be calculated in line with the [hybrid approach (Option 3)], i.e. a trailing average DRP and the average 1-10 year swap rates.*

226. Chairmont's approach is the correct transition corresponding to the 100% swap strategy that the AER believes is efficient. However, Chairmont[110] also noted that "consideration of policy level issues" is outside the scope of their report. The AER used this to justify rejecting Chairmont's advice[111]:

> *We agree with Chairmont that the hybrid approach will provide a good match over the 10 year transition period to the costs of a benchmark efficient entity entering the transition from the 'on-the-day' regime.*
>
> *However, having regard to wider policy issues, we have maintained the Guideline approach. In particular we consider that proposal and adoption of the hybrid approach on the basis of changes in prevailing rates would introduce bias into regulatory decision making and violate the NPV=0 principle.*

227. Our view is that the AER's logic is internally inconsistent. The Chairmont transition will provide the correct compensation prospectively for a firm following the 100% swap strategy that the AER presumes is efficient. The AER accepts this. Therefore, for the AER to argue against this on the basis of an NPV=0 principle the AER must, by definition, be presuming that there has been over/under-compensation (windfall gains/losses) in the past which its transition is offsetting by creating under/over-compensation in the future.

228. This is inconsistent with its claim that, "*in evaluating whether the transition approaches will allow the service provider the opportunity to recover at least its efficient costs, we have not relied on analysis of* ***past or future*** *windfall gains or losses".* Or, if it is consistent, it must mean that the AER has presumed that there are past windfall gains/losses rather than relying on any analysis to that effect – which is also not a reasonable basis for departing from the NPV=0 principle prospectively.

229. In this regard we note the following statement:[112]:

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110 Chairmont, Financing practices under regulation, October 2015, p. 16

111 AER, Preliminary decision for Jemena, October 2015, p. 3-164

112 AER, Preliminary decision for Jemena, October 2015, p. 3-165

> *Transitioning from the on-the-day approach using the hybrid transition can create a mismatch between the allowed return on debt and the efficient financing costs of a benchmark efficient entity over the life of its assets.* ***The change in the regulatory regime can therefore create windfall gains or losses*** *to service providers or consumers. Windfall gains or losses do not result from a service provider's efficient or inefficient decisions. In effect, they are a side effect of changing the methodology for estimating the return on debt at a particular point in time. They should be avoided, so that economic regulatory decisions deliver outcomes based on efficiency considerations, rather than timing or chance.*

230. Once more, the idea that introducing a regime that correctly compensates efficient costs prospectively creates windfall gains or losses must, by definition, be based on a view that it is appropriate to claw back past gains (compensate past losses) and that failure to do so 'creates' a windfall.

231. In our view, while the AER has explicitly stated that it is no longer justifying its transition based on claw back of past gains, this is, in fact, still the AER's reasoning.

Appendix A Other errors in Lally's analysis

A.1 Lally's views on how inflation is compensated in the regulatory regime

232. In Appendix 2 of his October 2015 report, Lally sets out in detail an example of how he considers inflation is dealt with in the regulatory framework that is in fact materially different to how it is actually dealt with. Lally provides no references to the operation of the PTRM or the RAB roll forward model in setting out his understanding. Based on his understanding of how inflation is compensated Lally's Appendix 2 concludes that if inflation is 2% above forecast then the regulatory regime will deliver only 0.57% higher nominal compensation to a business than if actual inflation equalled forecast inflation (not 2% higher nominal compensation). Similarly, although not stated, if inflation is 2% below forecast, roughly the same proportional reduction in compensation will occur.

233. On this basis Lally concludes:[113]

> *By contrast, CEG(2015b, para 122) claims that the inflation forecast error (2% here) would raise the allowed cost of debt by the same amount (2%). So, even if inflation forecast errors were retrospectively assigned to the allowed cost of capital, the extent of the adjustment would be much less than claimed by CEG.*

234. Once more, Lally is correct for the regulatory regime that he describes. However, this is not the regulatory regime that actually applies to the NSPs regulated by the AER.

235. The AER should not endorse Lally's analysis because it is demonstrably wrong. The error that Lally makes in his Appendix 2 (October 2105 report) is that the regulatory regime seeks to deliver nominal revenues over the regulatory period that match the nominal return on debt/equity that is estimated at the beginning of the regulatory period. This is not the case. The regulatory regime (now and in the past) seeks to deliver a nominal return in two[114] components:

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113 Lally, 21 October 2015, p. 61

114 Or three components if compensation assumed to come in the form of imputation credits from the ATO (and so deducted from the nominal return on equity via adjust to the tax building block) is included.

- real compensation (nominal costs less expected inflation) over the regulatory period; plus
- compensation for inflation in the form of a higher RAB *at the start of the next regulatory period*.

236. For the absence of doubt, we set out a correct description of the operation of the regulatory regime to illustrate the issues. Let the on-the-day cost of debt (which is also the 10/5 year swap rate) be 12% comprised of a 10% base swap rate and 2% DRP. Let, also, the regulator's forecast of inflation at the beginning of a regulatory period be 5% p.a. In this scenario the PTRM (both now and under the on-the-day regime) will set revenues based on the regulated business receiving:

- Nominal revenues during the regulatory period that are equal to a 7% (12%-5%)[115] return on the debt component of the RAB plus actual inflation during the regulatory period; plus
- An increase in the RAB at the beginning of the next regulatory period based on actual inflation over the regulatory period.

237. If actual inflation turns out to be 5% (as expected) then the composition of the compensation for inflation will be:

- 7%*(1.05) = 7.35% in revenues in year 1, 7%*(1.05)*(1.05) = 7.72% in revenues in year 1, … 8.9% in in revenues in year 5; plus
- An increase in the RAB at the beginning of the next regulatory period of 28%.

238. Note that while the 7% return embodied in revenues is escalated for inflation, this inflation escalation *does not* provide anything like full compensation for inflation. This is because the 7% return is increased by (1+5%) each year while full compensation for inflation requires an additional 5% of the RAB (as opposed to 5% of 7% of the RAB) also be compensated. Thus, the great majority of compensation for inflation comes from the increase in the RAB at the next regulatory reset. Indeed, it is on the expectation of this 5% p.a. compensation from a higher RAB that revenues are set 5% p.a. below the 12% nominal cost of debt estimated at the beginning of the regulatory period.

239. Now consider a scenario where actual inflation is 0% instead of the expected (forecast) 5%. In this scenario there will be zero compensation for inflation (either in revenue in the current regulatory period or in a higher RAB in the next regulatory period). The business will receive 7% nominal compensation in revenues which is 5% less than the nominal cost of debt measured at the beginning of the regulatory

[115] This ignores the Fischer effect – which if calculated precisely is (12%-5%)/(1+5%)=6.67%. Accounting for the Fischer effect will complicate the example but not alter the conclusion.

period. This is, just as we stated in our June 2015 report (and which Lally contests) equal to the full amount of the inflation forecast error.[116]

240. For completeness, consider the cashflows of a business that locked in a 5 year swap rate at the beginning of the regulatory period (when the cost of debt was 12%). Let the swap rate be 10% (implying a roughly 5% real swap rate, 5% inflation forecast and 2% DRP). The business will be paying this 10% nominal swap rate plus DRP[117] but will only receive 7% nominal compensation. Clearly, the swap hedge has not been effective in this circumstance in hedging either the actual base rate compensated or the total cost of debt.

241. However, in this scenario Lally's April 2015 methodology will assume that the base rate is perfectly hedged. This is because Lally's methodology assumes that the nominal compensation received by the business is equal to the nominal rate prevailing at the beginning of the regulatory period. This is only correct if forecast inflation at the beginning of the regulatory period accurately predicts actual inflation over the regulatory period.

242. As we stated in our June 2015 report – for the purposes of assessing this particular issue, this is a reasonable assumption over the period of low and stable inflation since the implementation of inflation targeting by central banks. It is not a reasonable assumption in the 1970s and early 1980s when inflation was high and unstable.

A.2 Lally's claim that the variability in the term premium does not affect the quality of the hedge using swaps

243. On pages 13 to 14 Lally concludes that CEG is in error when we argued that the differential between 5 and 10 year swap rates was unstable and this reduced the efficacy of using swaps to hedge the cost of debt. We made this argument based on the fact that the regulator set compensation based on the prevailing 10 year rate – reset once every 5 years. Consequently, a firm attempting to hedge the base rate could not use 10 year swap rates because these reset every 10 years while the regulator resets the allowance every 5 years.

244. To illustrate the problem we were highlighting imagine that the 5 year swap rate can be anywhere between the 10 year swap rate plus or minus 1%. (As we shall discuss below, the 5 year swap rate has been materially above and materially below the 10 year swap rate over the last 15 years.) Further, assume that the DRP to swap is zero (or invariant) so that we can focus solely on the hedge of the base rate. In this case,

116 In fact, it is slightly more than this once account is taken of the Fisher effect.

117 The businesses DRP may be different to the on-the-day DRP.

using 5 year swaps to hedge a 10 year base rate will leave the business with a cost of debt that can be anywhere between plus or minus 1% relative to the allowance set by the regulator.

245. Put simply, and incontrovertibly, variability between the 10 and 5 year swap rates reduces the quality of the 5 year swap rate as a hedge to the allowed base rate (which is a 10 year rate). Lally reaches a different conclusion on pages 13 and 14 because his analysis incorrectly proceeds as if the regulator sets compensation based on a 5 year term. [118]

> *CEG (2015b, section 3.8) also notes that the differential between the five and ten-year base rates fluctuates significantly, and this reduces the utility of using swaps. However, volatility in this differential is an essential condition for the swaps having any utility rather than reducing their utility. To illustrate this point, consider a regulated business that has just commenced operations and* ***borrows for ten years at a base rate of 5%*** *whilst receiving a* ***base rate allowance for the first five years at the current five-year base rate followed by the five-year base rate prevailing in five years****.*
>
> *….*
>
> *… However, in both cases, use of swap contracts would convert the ten-year base rate otherwise incurred into the current five-year base rate for five years followed by the five-year base rate in five years.* ***Accordingly, the costs incurred would match the allowances, and would do so regardless of the differential between the five and ten-year base rates****. So, the swaps eliminate a risk and also reduce expected costs. All of this assumes that the differential between the contemporaneous five and ten-year base rates fluctuates. If this differential never changed, it would have to be zero and therefore the cost incurred would always match the allowance, regardless of whether swaps were undertaken. So, swapping would be pointless. Thus, fluctuations in the differential between the five and ten-year base rates give rise to an advantage from using swaps rather than reducing their utility.* ***CEG's contrary claims are therefore incorrect.*** [Emphasis added.]

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[118] Lally, 21 October 2015, pp. 13-14. For example:

> *CEG (2015b, section 3.8) also notes that the differential between the five and ten-year base rates fluctuates significantly, and this reduces the utility of using swaps. However, volatility in this differential is an essential condition for the swaps having any utility rather than reducing their utility. To illustrate this point, consider a regulated business that has just commenced operations and* ***borrows for ten years at a base rate of 5%*** *whilst receiving a* ***base rate allowance for the first five years at the current five-year base rate followed by the five-year base rate prevailing in five years****.*

> *CEG (2015b, section 3.8) also argues that the use of swaps becomes "very expensive" if the current five-year base rate exceeds the current ten-year rate.* ***However, as demonstrated in the previous paragraph, this claim is incorrect. The use of swaps always matches the cost incurred to that allowed,*** *whilst not swapping always leads to costs incurred exceeding the expected allowances (so long as there is uncertainty about future differentials between the five and ten year rates, and hence a liquidity premium exists).*

246. The problem with this analysis is that it makes a critical assumption (in the first piece of highlighted text) that does not describe how the regulatory allowance was set under the on-the-day regime. The NER as previously constituted (and AER practice under the NGR) did not compensate based on a 5 year term (with this reset every 5 years). Rather, as explained above, compensation was based on a 10 year term (with this reset every 5 years). This leads to the reduction in the efficacy of a swap hedging strategy as described above.

247. CEG would be incorrect if the on-the-day approach was as assumed by Lally. However, Lally's assumption is not correct and, therefore, it is Lally who is incorrect and not CEG.[119]

248. As discussed below, the 5 year swap rate was above (up to 40bp above) the 10 year swap rate from mid 2006 until late 2008. Adopting a swap strategy for a regulatory period starting in this period was indeed expensive because the five year base rate being locked in was above the 10 year rate being allowed – even before considering transaction costs of swaps. Lally is incorrect when he claims to demonstrate that this is not correct – because Lally's demonstration relies on the assumption that the regulator set the cost of debt based on a 5 year term.

249. It is curious that Lally makes this error in his analysis on page 13 and the first two pages of paragraph 14 given that in the immediately following paragraph on page 14 Lally refers to his Appendix 2 analysis from his April 2015 report which clearly did not make this error (and which we built on in our June 2015 report). That said, Lally does explicitly assume on page 15 of his October 2015 report that the regulator sets compensation based on the 5 year rate. He does this by assuming that the 5 and 10 year base rates are the same.[120]

> *To focus upon the crucial point, I ignore the difference between the five and ten-year risk free rates at the beginning of each regulatory cycle shown in the last equation, in which case…*

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119 It is curious that Lally makes this error in his analysis on pages 13 and 14 when his analysis on page 15

120 Lally, 21 October 2015, p. 15.

250. Naturally, this assumption eliminates the problem that we identified in that the hedge instrument has a different term to the allowance. However, once more, it eliminates it by assumption – an assumption that is not, in fact, reflected in reality.

A.3 Claim that CEG did not present evidence to support its views

251. The quote extracted at paragraph 115 in section 4.1 is only the first part of a long paragraph. The remainder of the paragraph is set out in separate extracts in the following paragraphs.

> *Furthermore, even if one accepted CEG's argument that differences between the expected and realized inflation rate should be retrospectively assigned to the allowed cost of debt, and in particular to the base rate because this embodies the inflation forecast,* ***CEG does not present any evidence on the extent of this effect and how it would have affected the analysis in Lally (2015, Appendix 2****).*

252. We do not understand how Lally reaches the conclusion that we did not present any evidence on the extent of the effect on the analysis in Lally's (April 2015) Appendix 2. We clearly did present evidence that Lally's conclusion that a 100% swap strategy had lower (measured) interest rate risk than a 0% swap strategy depended entirely on the inclusion of the 1970s and early 1980s. However, Figure 2 above repeats that evidence including inflation that is contemporaneous to the year in which the first regulatory period is assumed to start. It can be seen quite clearly that for regulatory periods starting after the peak in inflation in the late 1970s the measured risk of a 0% strategy drops precipitously to be below the measured risk of a 100% swap strategy.

253. Lally then states:

> *CEG's claim that there would have been inflation forecast errors in the 1970-1986 period is uncontroversial, but there will be inflation forecast errors in all periods; it is merely a question of degree and CEG's point must be that the errors were sufficiently large in the 1970-1986 period to in some way undermine the value of the data from this period for the purposes of the analysis in Lally (2015, Appendix)* ***but they do not provide any explanation for why this would be so****. Thus, CEG's argument for excluding data from the 1970-86 period is unsupported.*

254. We clearly set this reasoning out with factual evidence in section 4.3.2 of our June 2015 report (and 4.3 more generally). Based on empirical analysis we concluded:[121]

[121] CEG, June 2015, section 4.3.2, paragraph 130.

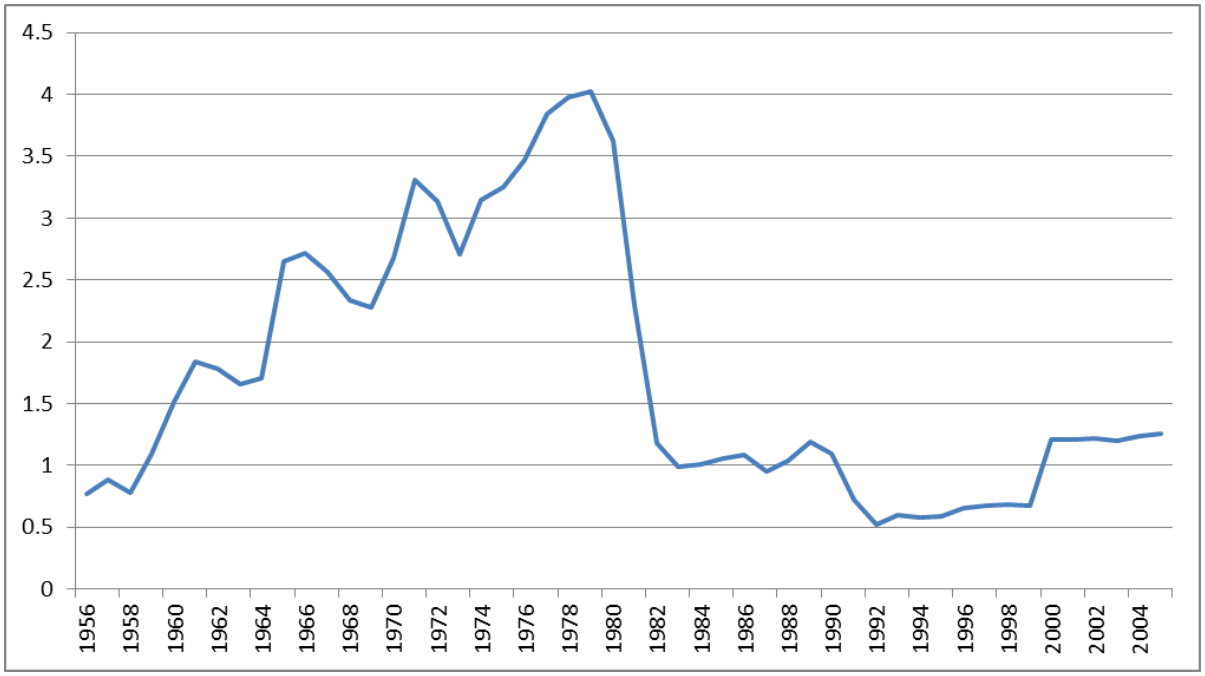
> *This chart* [Figure 9 in our June 2015 report] *suggests that investors materially underestimated prospective inflation from the early 1960s to the late 1970s (often receiving negative real returns on bonds) and then materially overestimated inflation until the late 1980s (when real yields fell down to around 7% or less).*

255. It is, in our view, unreasonable for Lally to state that we provided no explanation for why inflation forecast error would be higher in the 1970s and early 1980s.

256. We clearly explained that the unstable inflation in the 1970s and early 1980s meant that Lally's measurement of nominal compensation (to which the measure of actual cost was compared) was unreliable due to the existence of this inflation forecast error and noted that excluding this period resulted in materially different conclusions.

257. It is simply not credible for Lally to argue that inflation forecast errors post inflation targeting differs only as 'a matter of degree' to the 1970s and early 1980s. Inspection of Figure 9 from our June 2015 report (to which the above quote refers) is ample to demonstrate this. However, we also quantify the standard deviation in annual inflation over a 10 year rolling window in Figure 16 below. It can be seen that the volatility in inflation is much lower (one quarter the level) after the 1970s and early 1980s. Lower volatility is, naturally, associated with lower potential forecast error.

Figure 16: Standard deviation of US inflation (10 year rolling window)



Source: FRED database, CEG analysis.

258. Lally goes onto state:

> *Furthermore, CEG (2015b, para 122) claims that inflation forecast errors would affect the allowed cost of debt by the same amount, and this claim* ***is not correct****; the impact on the allowed cost of debt (assuming the forecast errors are retrospectively attributed to the allowed costs of capital) would be much less than the forecast error, as shown in the Appendix.* ***Thus, CEG fail to demonstrate that these forecast errors would exert any material impact on the analysis in Lally (2015, Appendix 2) and any effect from their point would be much less than claimed by them.***

259. As already explained, Lally's Appendix (October 2015) to which he refers in support of his claim, is based on an erroneous assumption about the operation of the NER. Correcting this, CEG's 'claims that inflation forecast errors would affect the allowed cost of debt by the same amount" are borne out to be correct and Lally's conclusion to the contrary is incorrect.

A.4 Lally's claim that CEG's definition of interest rate risk is 'alternative' and "not clearly superior"

260. Lally's October 2015 report also represents our June 2015 report as using a 'different' or 'alternative' definition of interest rate risk. Lally portrays CEG's definition of interest rate risk as an 'alternative' concocted by ourselves.

> *Furthermore, CEG's alternative definition of risk is not clearly superior*[122]
>
> *In respect of the third point, they argue that a more appropriate definition of risk is that relating to the entire cost of debt (rather than just the base rate)*[123]
>
> *CEG also argues that, using a different definition of risk…*[124]
>
> *CEG also argues that, using a different definition of risk (that associated with mismatches between the allowed and incurred cost of debt rather than just the base rate)*[125]

261. The only place that Lally actually explains what CEG's 'alternative' definition of risk is and how it is different to what the reader is invited to regard as the 'conventional' definition is on page 11.[126]

> *CEG (2015a, sections 4.4-4.6) contested each of these claims, and most particularly the claim that the swaps would reduce risk because use of them would eliminate a natural hedge between the base rate and the DRP. In effect, Lally (2014b) defines risk as that associated with the base rate allowed net of that incurred whilst CEG (2015a) defines it as that associated with the entire cost of debt allowed net of that incurred. In response, Lally (2015, Appendix 2) rebuts CEG's claims, and in particular demonstrates that, even using CEG's definition of risk, the use of swaps still reduces risk.*

262. It is therefore peculiar that Lally's terms of reference for his April 2015 report includes the following:[127]

> *The AER defined interest rate risk as 'The risk resulting from a potential mismatch between the allowed return on debt and the actual return on debt of a benchmark efficient entity'. AER, TransGrid draft decision, November 2014, p.3-106.*

263. The AER repeats this definition in its October and November 2015 preliminary and draft decisions[128].

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122 Lally, 21 October 2015, p. 3

123 Lally, 21 October 2015, p. 24

124 Lally, 21 October 2015, p. 26

125 Lally, 21 October 2015, p. 52

126 Lally, 21 October 2015, p. 52

127 Lally, April 2015, Appendix 1 on page 68.

> *Interest rate risk—the risk associated with a mismatch between the allowed return on debt and a benchmark efficient entity's actual return on debt.*

264. In other words, CEG's 'alternative' definition of interest rate risk is the same as the AER's definition of interest rate risk – and the definition that underpinned Lally's April 2015 analysis. It is not an 'alternative' definition: it is the orthodox definition.

265. It is correct that Lally 2014 did focus only on the base rate and, in doing so ignored the mismatch between the DRP component of the cost of debt and the DRP component of the allowance for the cost of debt. However, this was an error as pointed out by CEG in our January 2015 report for Networks NSW where we explained that negative correlation between the prevailing DRP and the prevailing base rate meant that one could not presume that hedging the latter improved the hedge for the overall cost of debt. Lally corrects this error in his April 2015 paper and does not appear in that paper to suggest that this correction is in any way inappropriate.

266. The reality is that interest rate risk must be measured at the level of the cost of debt (not one of its individual components). Any other definition is nonsensical. Interest rate risk is a measure of sensitivity of net cash-flows to movements in interest rates. Given that the DRP is an important component of both allowances and costs (and therefore risk) it must be included in any analysis of interest rate risk.

267. Notwithstanding this, Lally states in a number of places:[129]

> *CEG's alternative definition of risk is not clearly superior…*

268. Lally does not explain what is unclear about the superiority of our and the AER's definition of interest rate risk.

A.5 Claim that CEG presents internally inconsistent results that must be in error

269. Lally states that: "The results in CEG's Table 7 contradict the results in these figures, and are presumably in error."[130] This is incorrect. The results in Table 7 were clearly labelled in the title to the Table as using "*Lally's approach to averaging standard deviations estimated for each regulatory cycle*" while the Figures to

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128 AER, Preliminary decision for JEN distribution, p. 3-166.

129 Lally, 21 October 2015, pp. 3, 26 and 52.

130 Lally, 21 October 2015, p. 23.

which Lally refers were clearly described as using CEG's preferred method for calculating standard deviations (see paragraph 168 of our June 2015 report).

A.6 Claim that CEG misrepresented its results

270. Lally states: [131]

> *When only March regulatory start dates are used, as Lally (2015) did, not hedging is superior for data sets commencing from any point from 1986 to 1995 (CEG, Figure 8). By contrast, when using 60 regulatory starting points, there are various times within the period 1993-1995 at which use of the swaps is superior to not using them (CEG, 2015b, Figure 37).* ***Remarkably, CEG (2015b, para 304) claims otherwise*** *but CEG (2015b, Figure 37) is quite clear.*

[Emphasis added.]

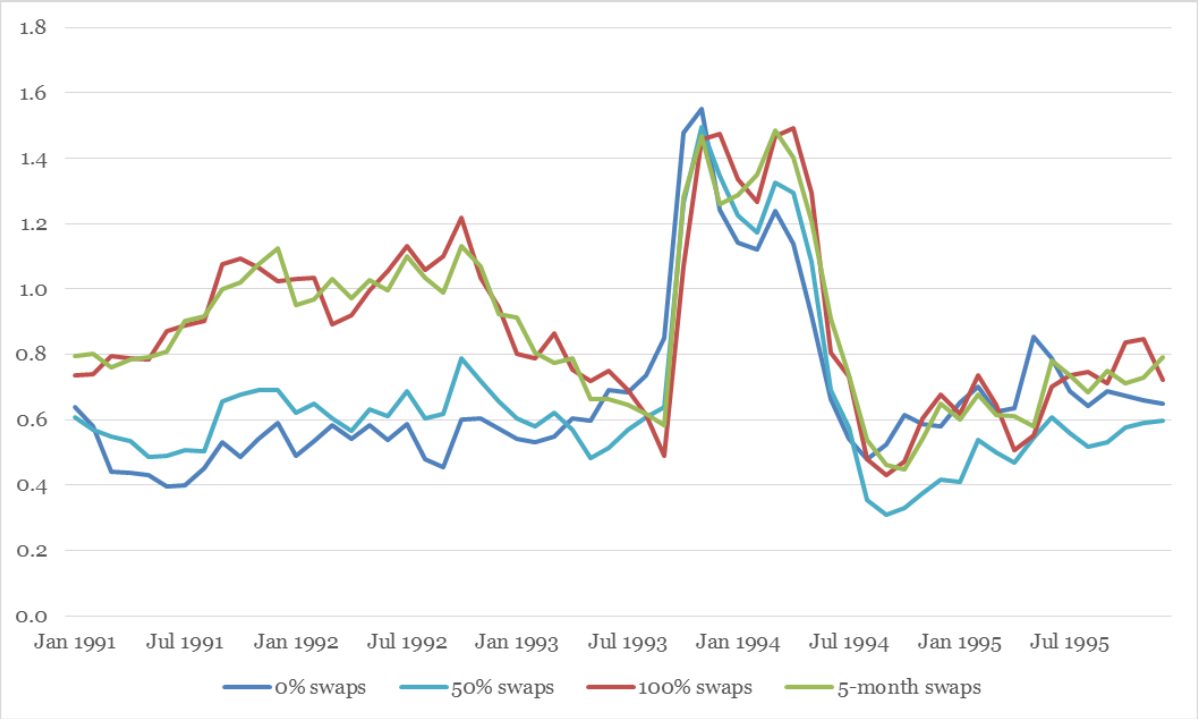
271. In fact, paragraph 304 stated:

> *"It can be seen from Figure 37 that the 0% interest rate swaps debt management strategy (blue line) has a lower standard deviation than the 100% interest rate swap debt management strategy (red line)."*

272. We did not state that this was universally the case in every one of the 60 regulatory cycles plotted on the x-axis merely that it was generally the case (although from inspection of Figure 37 reproduced below it is plain that it was nearly universally the case). We do not consider that there is anything remarkable or erroneous in how we described the data which, unlike in the Lally report, was transparently provided immediately below our description.

[131] Lally, 21 October 2015, p. 22.

Figure 17: Reproduction of Figure 37 (Standard deviations – US Post-Volcker dataset)



Source: CEG analysis

A.7 Incorrect problem definition

273. Lally's October 2015 report persists in setting up the problem '*as if*' the question to be answered was a binary comparison of 0% vs 100% swap hedging:[132]

> *Lally (2015, Appendix 2) uses the longest available data set (US data from 1953-2015) to compare the standard deviations from equations (3) and (5) and finds that the standard deviation from (5) is lower (0.82% versus 1.49%), and therefore hedging lowers risk. CEG (2015b, section 3.4 and section 4) argues that using data from April 1986 onwards rather than April 1953 onwards produces a standard deviation from (3) that is lower than that from (5) (0.71% versus 0.97%), and therefore not hedging lowers risk.*

274. This is not an accurate description of what CEG June 2015 section 3.4 and section 4 argue. The key conclusion in those sections was not that 'not hedging lowers risk'.

[132] Lally, Review of submissions on transition issues for debt, October 2015, p.16.

The key conclusion in those sections was that the optimal amount of hedging was between 0% and 100%. Indeed, we were critical of Lally's prior analysis for committing precisely the error of comparing the efficiency of 0% to 100% hedging – rather than attempting to estimate the efficient level of hedging.

Appendix B AER support for exclusion of 1970s US data

275. In our June 2015 report we explained that the high and variable inflation period of the 1970s and early 1980s played a critical role in raising the measured optimal hedging ratio towards 100%. We argued that this was inappropriate because:

- Lally's methodology assumes that the nominal interest rate at the beginning of the regulatory period was the nominal interest rate that would be earned by the regulated business after inflation indexing of the RAB was undertaken in the RAB roll forward model (as set out in the NER and NGR under which the BEE operated including under the on-the-day regime). We argued that this was not an appropriate assumption in the high and volatile inflation environment of the 1970s and early 1980s – but was appropriate in the low and stable inflation environment that prevailed under inflation targeting in the late 1980s/early 1990s; and
- Even putting aside the above problem, the nominal interest rate environment in the 1970s and early 1980s was dramatically different to that of the inflation targeting era. Even if the above methodological problem did not exist, it would be unsound to rely on what we know was a dramatically different interest rate environment in the 1970s and 1980s when doing so results in a dramatically different estimate to that using only data after that period.

276. In relation to the second point, we note that the AER has previously expressed precisely the same view about the use of the same data source and time period as relied on by Lally. Specifically, the AER expressed the view that quantitative estimates derived from pre-1990 data sourced from the Federal Reserve Bank of St. Louis (specifically, the Moody's Seasoned Baa US Corporate Bond yield data) should be interpreted with caution. The AER stated: [133]

> *Specifically, since the early 1900s, the US monetary policy has undergone significant changes. It should be recognised that monetary policy influences the inflation rate and nominal rate of return on debt. For example, it is not surprising that mismatches between the rate of return on debt and regulatory allowance computed without annual adjustment would be persistent and substantial in a prolonged period of high inflation. However, it is not clear if this observation is of direct relevance to the current domestic capital market that functions under inflation targeting.*

[133] AER, *Draft Rate of Return Guideline: Explanatory Statement*, August 2013, p. 89.

277. In the Final Explanatory Statement to the Rate of Return Guideline, the AER again expressed its reservations in relation to the use of US data. [134]

> *It is not clear that the historical US data sample used in the study is of direct relevance to the current domestic capital market that functions under inflation targeting.*

[134] AER, *Rate of Return Guideline: Explanatory Statement*, December 2013, p. 113.

Appendix C Stylised example to demonstrate error in Chairmont correlation analysis

278. The following stylised example is designed so that the optimal hedging ratio is 1/3rd. This is the correct optimal hedging ratio and is also the optimal hedging ratio that Lally's equation 8 (discussed in section 4.1.2 above) provides. Specifically, in the below example, correlation (ρ) is -1 and the ratio of the standard deviation of DRP to swap rate is 2/3. Consequently, Lally's equation 8 states that the optimal hedging ratio is 1/3rd(=1- 2/3).[135]

279. Let the following be true in this stylised example:

    a. the swap rate can be either 2% or 5% in any given period with equal probability and evenly spread occurrences, such that the trailing average swap rate will be constant at 3.5%.

    b. the DRP can be 3% or 1% with equal probability and evenly spread occurrences, such that the trailing average DRP will be constant at 2%

    c. a. and b. together imply the **trailing average cost of debt** (0% hedging) will be **constant at 5.5%** (3.5% trailing average swap rate plus 2% plus 2% trailing average DRP).

    d. let the correlation between DRP and swap rates be negative 1 (i.e., perfect negative correlation) such that when the swap rate is 2% the DRP will be 1% and when the swap rate is 5% the DRP will be 2%.

    e. a. b. c. and d. imply that the:

        i. prevailing cost of debt, which also defines the **regulatory allowance** under the on-the-day regime, will be either **5%** (2% prevailing swap plus 3% prevailing DRP) or **6%** (5% prevailing swap plus 1% prevailing DRP); and

        ii. the cost of debt for a business with **a 100% swap hedge ratio** will be either **4%** (2% prevailing swap plus 2% trailing average DRP) or **7%** (5% prevailing swap plus 2% trailing average DRP).

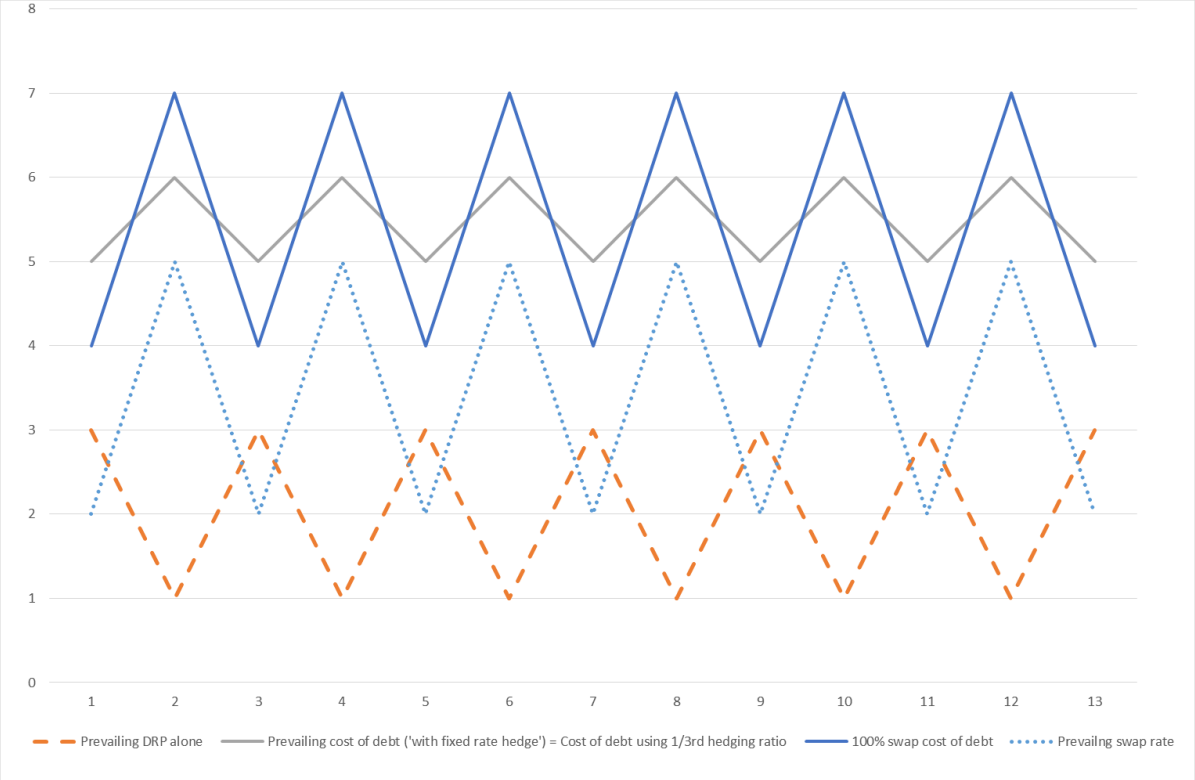
        iii. The cost of debt for a firm with a 1/3rd hedge ratio will be either **5.0%** (1/3*4.0% +2/3*5.5%) or **7.0%** (1/3*7.0% +2/3*5.5%)

[135] This is indeed the correct optimal hedging ratio in this example - notwithstanding that in 4.1.2 above we noted that Lally's equation 8 is based on simplifying assumptions. This is because in this stylised example these simplifying assumptions are true by definition.

280. In this scenario, not only is the optimal hedging ratio 1/3rd but this hedging ratio delivers a perfect hedge. That is, the cost of debt from this strategy (point e.iii. above) is equal to 5% when the prevailing cost of debt used to set the regulatory allowance is 5% and is equal to 7% when the prevailing cost of debt used to set the regulatory allowance is 7%.

281. This is illustrated in Figure 18 below which shows the cost of debt with a 0% hedging ratio cycling between 4% and 7% (which is purely driven by variation in the swap rate given that the trailing average DRP is constant). By contrast the prevailing cost of debt (also the regulatory allowance and also what Chairmont refers to as 'with fixed rate hedge') cycles between 5% and 6% with much lower volatility. The cost of debt for a business with a 1/3rd hedge ratio follows exactly the same cycle (being 5% when the allowance is 5% and 6% when the allowance is 6%).

Figure 18: Stylised example of optimal (and perfect) 1/3rd hedging ratio



282. Now, consider how Chairmont's test would assess this situation. The DRP in the above scenario is clearly more volatile than the prevailing cost of debt (what Chairmont refers to as 'with fixed rate hedge'). On this basis, Chairmont's test would conclude '*...combining swap risk with DRP risk increased overall volatility of cost rather than decreasing it. This analysis suggests there is no hedge effect by opening a swap rate risk.*' This is despite the fact that, in reality, the optimal

hedging ratio is not just 1/3rd, it also provides a perfect hedge to the regulatory allowance.

Appendix D Terms of reference

Background

Jemena Electricity Networks (**JEN**) is an electricity distribution network service provider in Victoria. JEN supplies electricity to approximately 300,000 homes and businesses through its 10,285 kilometres of distribution system. JEN's electricity distribution system services 950 square kilometres of northwest greater Melbourne. JEN's electricity network is maintained by infrastructure management and services company, Jemena Asset Management (**JAM**).

JEN submitted its initial regulatory proposal with supporting information for the consideration of the Australian Energy Regulator (**AER**) on 30 April 2015. This proposal covers the period 2016-2020 (calendar years). The AER published its preliminary determination on 29 October 2015. JEN is currently preparing its submission in response to the preliminary decision, to be submitted to the AER by 6 January 2016.

As with all of its economic regulatory functions and powers, when making the distribution determination to apply to JEN under the National Electricity Rules and National Electricity Law, the AER is required to do so in a manner that will or is likely to contribute to the achievement of the National Electricity Objective, which is:

> *to promote efficient investment in, and efficient operation and use of, electricity services for the long term interests of consumers of electricity with respect to:*
>
> *(a) price, quality, safety, reliability and security of supply of electricity; and*
>
> *(b) the reliability, safety and security of the national electricity system.*

The equivalent National Gas Objective is set out in section 23 of the National Gas Law.

Where the AER is making a distribution determination and there are two or more possible decisions that will or are likely to contribute to the achievement of the National Electricity Objective, the AER is required to make the decision that the AER is satisfied will or is likely to contribute to the achievement of the National Electricity Objective to the greatest degree.

The AER must also take into account the revenue and pricing principles in section 7A of the National Electricity Law when exercising its discretion in making those parts of a distribution determination relating to direct control network services. The revenue and pricing principles include the following:

> *A regulated network service provider should be provided with a reasonable opportunity to recover at least the efficient costs the operator incurs in:*
>
> *(a) providing direct control network services; and*
>
> *(b) complying with a regulatory obligation or requirement or making a regulatory payment.*

The equivalent revenue and pricing principles for gas network regulation are set out in section 24 of the National Gas Law.

Some of the key rules governing the making of a distribution determination are set out below.

Clause 6.4.3(a) of the National Electricity Rules provides that revenue for a regulated service provider is to be calculated adopting a "building block approach". It provides:

> *The annual revenue requirement for a Distribution Network Service Provider for each regulatory year of a regulatory control period must be determined using a building block approach, under which the building blocks are:*
>
> *(1) indexation of the regulatory asset base – see paragraph (b)(1);*
>
> *(2) a return on capital for that year – see paragraph (b)(2);*
>
> *(3) the depreciation for that year – see paragraph (b)(3);*
>
> *(4) the estimated cost of corporate income tax of the Distribution Network Service Provider for that year – see paragraph (b)(4);*
>
> *(5) the revenue increments or decrements (if any) for that year arising from the application of any efficiency benefit sharing scheme, capital expenditure sharing scheme, service target performance incentive scheme, demand management and embedded generation connection incentive scheme or small-scale incentive scheme – see subparagraph (b)(5);*
>
> *(6) the other revenue increments or decrements (if any) for that year arising from the application of a control mechanism in the previous regulatory control period – see paragraph (b)(6);*
>
> *(6A) the revenue decrements (if any) for that year arising from the use of assets that provide standard control services to provide certain other services – see subparagraph (b)(6A); and*
>
> *(7) the forecast operating expenditure for that year – see paragraph (b)(7).*

Clause 6.5.2 of the National Electricity Rules, relating to the allowed rate of return, states:

> *Calculation of return on capital*
>
> *(a) The return on capital for each regulatory year must be calculated by applying a rate of return for the relevant Distribution Network Service Provider for that regulatory year that is determined in accordance with this clause 6.5.2 (the allowed rate of return) to the value of the regulatory asset base for the relevant distribution system as at the beginning of that regulatory year (as established in accordance with clause 6.5.1 and schedule 6.2).*
>
> *Allowed rate of return*

(b) The allowed rate of return is to be determined such that it achieves the allowed rate of return objective.

(c) The allowed rate of return objective is that the rate of return for a Distribution Network Service Provider is to be commensurate with the efficient financing costs of a benchmark efficient entity with a similar degree of risk as that which applies to the Distribution Network Service Provider in respect of the provision of standard control services (the allowed rate of return objective).

(d) Subject to paragraph (b), the allowed rate of return for a regulatory year must be:

(1) a weighted average of the return on equity for the regulatory control period in which that regulatory year occurs (as estimated under paragraph (f)) and the return on debt for that regulatory year (as estimated under paragraph (h)); and

(2) determined on a nominal vanilla basis that is consistent with the estimate of the value of imputation credits referred to in clause 6.5.3.

(e) In determining the allowed rate of return, regard must be had to:

(1) relevant estimation methods, financial models, market data and other evidence;

(2) the desirability of using an approach that leads to the consistent application of any estimates of financial parameters that are relevant to the estimates of, and that are common to, the return on equity and the return on debt; and

(3) any interrelationships between estimates of financial parameters that are relevant to the estimates of the return on equity and the return on debt.

Return on equity

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

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

Return on debt

(h) The return on debt for a regulatory year must be estimated such that it contributes to the achievement of the allowed rate of return objective.

(i) The return on debt may be estimated using a methodology which results in either:

(1) the return on debt for each regulatory year in the regulatory control period being the same; or

(2) the return on debt (and consequently the allowed rate of return) being, or potentially being, different for different regulatory years in the regulatory control period.

(j) Subject to paragraph (h), the methodology adopted to estimate the return on debt may, without limitation, be designed to result in the return on debt reflecting:

(1) the return that would be required by debt investors in a benchmark efficient entity if it raised debt at the time or shortly before the making of the distribution determination for the regulatory control period;

(2) the average return that would have been required by debt investors in a benchmark efficient entity if it raised debt over an historical period prior to the commencement of a regulatory year in the regulatory control period; or

(3) some combination of the returns referred to in subparagraphs (1) and (2).

(k) In estimating the return on debt under paragraph (h), regard must be had to the following factors:

(1) the desirability of minimising any difference between the return on debt and the return on debt of a benchmark efficient entity referred to in the allowed rate of return objective;

(2) the interrelationship between the return on equity and the return on debt;

(3) the incentives that the return on debt may provide in relation to capital expenditure over the regulatory control period, including as to the timing of any capital expenditure; and

(4) any impacts (including in relation to the costs of servicing debt across regulatory control periods) on a benchmark efficient entity referred to in the allowed rate of return objective that could arise as a result of changing the methodology that is used to estimate the return on debt from one regulatory control period to the next.

(l) If the return on debt is to be estimated using a methodology of the type referred to in paragraph (i)(2) then a resulting change to the Distribution Network Service Provider's annual revenue requirement must be effected through the automatic application of a formula that is specified in the distribution determination."

[Subclauses (m)–(q) omitted].

The equivalent National Gas Rules are set out in rule 87.

Clause 6.5.3 of the National Electricity Rules, relating to the estimated cost of corporate income tax, states:

The estimated cost of corporate income tax of a Distribution Network Service Provider for each regulatory year (ETCt) must be estimated in accordance with the following formula:

ETCt = (ETIt × rt) (1 – γ)

where:

ETIt is an estimate of the taxable income for that regulatory year that would be earned by a benchmark efficient entity as a result of the provision of standard control services if such an entity, rather than the Distribution Network Service Provider, operated the business of the Distribution Network Service Provider, such estimate being determined in accordance with the post-tax revenue model;

rt is the expected statutory income tax rate for that regulatory year as determined by the AER; and

γ is the value of imputation credits.

The equivalent National Gas Rule is in rule 87A.

In its initial proposal, JEN submitted expert reports from CEG, SFG and UBS (the **Earlier Reports**) on the appropriate approach to be adopted in estimating the return on debt for the benchmark efficient entity.[136] The AER preliminary decision considered these reports.

In this context, JEN seeks a report from CEG, as a suitable qualified independent expert (**Expert**), that reviews and, where appropriate, responds to matters raised in the preliminary decision on the AER's proposed approach to transition to a trailing average return on debt. JEN seeks this report on behalf of itself, ActewAGL Distribution, Ausnet Services, Australian Gas Networks, Citipower, Powercor, and United Energy.

Scope of Work

In its preliminary decision, the AER estimated a return on debt of 5.16% for the benchmark efficient entity (**BEE**), (a) assuming the transition to the trailing average approach set out in the rate of return guideline and (b) using a simple average of yield curves published by Bloomberg and the Reserve Bank of Australia (RBA). The AER also estimated this return assuming a BBB+ credit rating and a 10 year term of debt.

The AER relied on separate expert reports from Dr Lally and Chairmont to support its approach to estimating this return, and defined the BEE as:

[136] CEG, *Critique of the AER's JGN draft decision on the cost of debt*, April 2015; SFG, *Return on debt transition arrangements under the NGR and NER*, February 2015; and UBS, *Transaction Costs and the AER Return on Debt Draft Determination*, March 2015.

a pure play, regulated energy network business operating within Australia.

In the preliminary decision the AER identified the "efficient debt financing costs" of a BEE in the following way:[137]

We consider the efficient debt financing costs of a benchmark efficient entity as those which are expected to minimise its debt financing costs over the life of its assets, while managing refinancing risk and interest rate risk:

- *Refinancing risk—the risk that a benchmark efficient entity would not be able to refinance its debt when it matures.*
- *Interest rate risk—the risk associated with a mismatch between the allowed return on debt and a benchmark efficient entity's actual return on debt.*

The Expert will provide an opinion report that:

1. Reviews and critiques the AER's preliminary decision, and the reports of Dr Lally and Chairmont, on the appropriate form of transition to the trailing average approach in light of the AER's identification of "efficient financing costs" as set out above. In undertaking this review and critique, the Expert should assume that:

   (a) the BEE is a regulated energy transport business;

   (b) the BEE was regulated under the 'on-the-day' regime to setting the cost of debt allowance; and

   (c) the BEE's response to being regulated under the 'on-the-day' regime is relevant to an assessment of efficient financing practices (even if the nature of that regulation was such that it did not necessarily result in a cost of debt allowance that was commensurate with efficient costs, being the costs that would be incurred in a workably competitive market).

2. Assesses in particular whether, in light of the AER's identification of "efficient financing costs", it is appropriate to assume that an entity that faces a rate-on-the-day approach would hedge 100% of its debt, considering:

   (a) any theoretical justification for why it may be efficient to hedge less than 100%; and

   (b) references to the debt financing costs and practices by privately-owned regulated energy networks set out in Appendix B to the 13 October 2015 Chairmont report;

   and if not, then determine the best estimate of the portion of debt that such an entity would hedge.

137 See, for example, JEN preliminary decision, Attachment 3 (Rate of Return), p 3-166.

3. Determine the best estimate of swap transaction costs for use in a 100% hybrid or optimal hedging hybrid transition, considering:

   (a) recent decisions by the Economic Regulatory Authority of Western Australia; and

   (b) advice to the AER from Chairmont.

In preparing the report the Expert will:

A. consider any relevant comments raised by the AER and other regulators, and experts engaged by those regulators; and

B. use robust methods and data in producing any statistical estimates.

Information to be Considered

The Expert is also expected to consider the following information:

- such information that, in Expert's opinion, should be taken into account to address the questions outlined above;
- relevant literature on estimating the return on debt;
- the AER's Rate of Return Guideline, including explanatory statements and supporting expert material;
- material submitted to the AER as part of its consultation on the Rate of Return Guidelines; and
- previous decisions of the AER, other relevant regulators and the Australian Competition Tribunal on the return on debt and any supporting expert material, including the recent final decisions for Jemena Gas Networks and electricity networks in ACT, NSW, Queensland, South Australia and Tasmania.

Deliverables

At the completion of its review the Expert will provide an independent expert report which:

- is of a professional standard capable of being submitted to the AER;
- is prepared in accordance with the Federal Court Practice Note on Expert Witnesses in Proceedings in the Federal Court of Australia (CM 7) set out in Attachment 1, and includes an acknowledgement that the Expert has read the guidelines [138];

[138] Available at: http://www.federalcourt.gov.au/law-and-practice/practice-documents/practice-notes/cm7.

- contains a section summarising the Expert's experience and qualifications, and attaches the Expert's curriculum vitae (preferably in a schedule or annexure);

- identifies any person and their qualifications, who assists the Expert in preparing the report or in carrying out any research or test for the purposes of the report;

- summarises JEN's instructions and attaches these term of reference;

- includes an executive summary which highlights key aspects of the Expert's work and conclusions; and

- (without limiting the points above) carefully sets out the facts that the Expert has assumed in putting together his or her report, as well as identifying any other assumptions made, and the basis for those assumptions.

The Expert's report will include the findings for each of the three parts defined in the scope of works (Section 2).

Timetable

The Expert will deliver the final report to Jemena Regulation by **6 January 2016**.

Terms of Engagement

The terms on which the Expert will be engaged to provide the requested advice shall be:

- as provided in accordance with the Jemena Regulatory Consultancy Services Panel arrangements applicable to the Expert.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