REVIEW OF SUBMISSIONS ON TRANSITION ISSUES FOR THE COST OF DEBT

Dr Martin Lally
Capital Financial Consultants Ltd

21 October 2015

CONTENTS

EXECUTIVE SUMMARY

The AER has proposed switching from setting the cost of debt at the rate prevailing at the beginning of the regulatory cycle to setting it in accordance with an annually revised ten-year trailing average, with a ten-year transitional process applied to the entire cost of debt. This paper has reviewed the AER's arguments in support of its proposed transitional process, the contrary arguments raised in various submissions, and then assessed all proposals against a set of criteria drawn from the legislative requirements. The conclusions are as follows.

Firstly, I agree with the AER's criteria for assessing the relative merits of transitional processes for the cost of debt, subject only to replacing their first criterion by the more general requirement when changing regimes to neutralize large one-off effects on businesses in either direction, even if they do not violate the NPV = 0 principle.

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 behavior to the new regime in which use of these swaps is no longer warranted.

Thirdly, in respect of transitional processes for the base rate, three options are available: the AER's proposal, an alternative favoured by many of the regulated businesses, and an alternative presented earlier by me. The results from the first two of these proposals range from a small gain to a small loss to businesses from the switch to the new regime, over the ten-year transitional period, depending upon the path of future interest rates and whether or not the benchmark efficient entity reacts to the regime change in the way assumed in the second proposal. The third possible transitional regime would completely neutralize the impact of the regime change on businesses, but only if the businesses did not engage in a new round of swap contracts in response to the regime change, and this is unclear. So, none of the options is clearly best. However, there is some merit to the AER using the same transitional process for the base rate and the DRP, and this factor favours the AER's proposed approach.

Fourthly, in respect of the AER's proposed transitional process for the DRP, this is designed to largely neutralize the large one-off impact of the regime change on the regulated sector, which is good regulatory policy in general, and it also avoids the use of contentious historical DRP data. Many submissions favour immediate adoption of the trailing average DRP but present no arguments that counter these desirable features of the AER's proposed approach.

Fifthly, and also in respect of the AER's proposed transitional process for the DRP, two submissions in respect of particular businesses claim that the present value of the differences between the DRP allowances received and incurred are adverse up to the date of the regime change and the AER's proposed transitional process would aggravate this situation rather than ameliorate it. However, these alleged future effects from the AER's proposed process are not consequences of it but of the combined effect of the GFC and the timing of the regulatory resets for these businesses, and would have arisen even had the old regime been maintained. In addition, these exercises incorporate not merely past mismatches between the DRP allowed and that incurred arising from the GFC but all past mismatches, including those arising from errors by regulators in setting the allowed DRP, and such a broad remit is unwarranted because the additional mismatches are not evidently substantial, may not even be real because of errors in estimating past incurred DRPs, and implicitly judge some past regulatory determinations to be wrong (whenever the determination differs from the contemporaneous value for the historical DRP series that is used to estimate the past DRP incurred by the businesses). Furthermore, one of these two exercises seems to favour compensation now for all such past mismatches, and therefore would involve the AER

judging many past determinations (including its own) to be wrong, as judged by retrospective use of a DRP series that the AER has currently selected for this purpose, and compensating accordingly. Such an exercise would be bordering on the surreal. I therefore do not favour it.

Sixthly, in respect of the five criteria drawn from legislative requirements and against which all proposals are assessed, one of these criteria requires a formulaic approach and is therefore clearly satisfied by both the AER's proposed transitional approach and the alternatives proposed by some of the regulated businesses, involving immediate adoption of the trailing average DRP and/or a different transitional process for the base rate. The remaining criteria are essentially equivalent, and can be expressed more precisely as satisfying the NPV = 0 principle and neutralizing the impact of any large one-off effects from a regime change. In respect of the base rate, these requirements are satisfied by the AER's proposed transitional approach and also by the alternative transitional approach favoured by some of the businesses. In respect of the DRP, these requirements are also satisfied by the AER's transitional approach to the DRP but they are not satisfied by the alternative approach involving immediate adoption of a trailing average DRP.

Finally, I have previously provided advice on the transitional issue to the AER and nothing in these submissions warrants any change in that advice.

1. Introduction

In its recent Rate of Return Guidelines (AER, 2013), the AER proposed switching from setting the cost of debt at the prevailing rate at the beginning of the regulatory cycle to setting it in accordance with an annually revised ten-year trailing average. In addition it favoured the use of a transitional process over ten years, in which the prevailing rate is used in the first year, this weight is reduced by 10% each year in favour of the prevailing ten-year rate in that year so that a ten-year trailing average arises in the tenth year following the commencement of this process, and the ten-year trailing average is thereafter maintained. This proposal has generated a number of contrary submissions. In accordance with the Terms of Reference (see Appendix 1) this paper seeks to review the AER's arguments, the arguments raised in these submissions, and then to assess all proposals against a set of criteria drawn from the legislative requirements.

2. Review of the AER's Position

The AER (2015, pp. 141-191) reviews four possible options in respect of switching from the current methodology to a ten-year trailing average cost of debt: maintain the current methodology, transition to the ten-year trailing average over ten years, immediately switching to the ten-year trailing average DRP whilst transitioning in respect of the base rate, and immediately switching to the new regime. In choosing between these options, the AER invokes the following five criteria.

(1) Promoting efficient financing practices consistent with the principles of incentive based regulation. The AER equates this criterion with regulatory behavior that ensures that businesses face the consequences of their past decisions (whether favourable or unfavourable). It concludes that immediately switching to the trailing average base rate fails this test because the benchmark efficient entity (BEE) would have entered into interest rate swaps under the previous regime, these swaps are not efficient under the new regime, they cannot be instantly abandoned, and therefore a transitional process is required.

(2) Providing a BEE with a reasonable opportunity to recover efficient financing costs. The AER equates this with the NPV = 0 principle, and concludes that immediate adoption of the trailing average DRP or the trailing average cost of debt fails this test for reasons given in Lally (2015, section 8.9).

(3) Matching the allowed cost of debt with efficient costs for each regulatory period. The AER concludes that immediate adoption of a ten-year trailing average base rate would fail this test because a BEE would have previously engaged in interest rate swaps, these could not be immediately unwound, and therefore the base rate costs incurred by a BEE once the new regime was adopted would diverge from the ten-year trailing average allowed base rate. The AER also considers that failure to immediately allow the trailing average DRP might fail this test.

(4) Not retrospectively selecting averaging periods for determining allowed returns, even on the part of the regulator. The AER concludes that immediate adoption of a trailing average DRP or cost of debt fails this test.

(5) Avoiding the use of contentious historical DRP data. The AER concludes that immediate adoption of a trailing average DRP or cost of debt fails this test.

Taking account of these criteria, the AER favours a transitional regime for both the base rate and the DRP. The AER uses these criteria to assess the merits of four options, which cover two fundamentally different decisions: whether to shift from the current regime to a trailing average, and in the event of switching whether to adopt a transitional process for the base rate, the entire cost of debt, or neither. In respect of whether to change regimes, I think a broader range of criteria are required and the option of only adopting a trailing average for the DRP should also be considered. As described in Lally (2014a), I favour continued use of the on-the-day regime because its disadvantages (violation of the NPV = 0 principle, greater bankruptcy risk, and greater output price variation) are minor and less significant than its advantages, which are ease of implementation and lesser incentive problems for capex and new entrants (or lesser complexity if these incentive problems are addressed). In addition, the CDS market is likely to continue to develop and may reach the point at which the DRP risk under the on-the-day regime could be better hedged by regulated businesses, which also favours continued use of the on-the-day regime. So, consistent with the Terms of Reference, I therefore limit my comments here to the secondary question of whether to adopt a transitional process for the base rate, the entire cost of debt, or neither in moving to a trailing average approach.

Turning to the AER's criteria, (1) is merely one example of a much broader issue of regime changes inducing one-off effects on businesses. Accordingly, I would replace (1) by the requirement to avoid large one-off effects on businesses in either direction, even if they do

not violate the NPV = 0 principle. In addition, I would limit (4) to actions taken by a regulator because actions of this type taken by firms could reasonably be supposed to be taken by firms so as to benefit themselves, and this would violate both (1) and (2). Otherwise I favour the AER's criteria. Furthermore, since criteria (3), (4) and (5) could conflict with (1) or (2), it is desirable to specify a ranking for the criteria where possible. I consider (3) much less important than (1) and (2), because violations of (3) that do not involve violations of (1) and (2) would involve largely offsetting mismatches in different regulatory periods. I also consider (4) much less important than (1) or (2), because violations of (4) that do not involve violations of (1) and (2) involve only actions by a regulator that are suspected to be prejudicial towards businesses or consumers as opposed to actually being so. Finally, in respect of (5), difficulties with historical data could range from the trivial to the overwhelming and therefore the ranking of (5) could range from the lowest to the highest respectively.

Turning finally to the application of these criteria to the three transitional options, I agree with the AER's comments subject only to use of a transitional process for the DRP being likely to fail criterion (3) for some of the businesses.

CEG (2015g) critiques the AER's analysis described above, using the same criteria adopted by the AER.[1] In respect of promoting efficient financing practices consistent with the principles of incentive based regulation, CEG (2015g, paras 5-11) argues that transitioning the entire cost of debt does not correspond to any practically implementable financing practice and therefore cannot satisfy this requirement. As argued by me above, this criteria should be generalized to that of avoiding large one-off effects on businesses in either direction when regime changes occur, even if they do not violate the NPV = 0 principle. As discussed in Lally (2015, section 8), the AER's proposal to transition the entire cost of debt does satisfy this test and CEG's specific objections to this reasoning will be addressed later in this report.

In respect of providing a BEE with a reasonable opportunity to recover efficient financing costs over the life of its assets, CEG (2015g, paras 12-21, Appendix B) disputes the AER's

[1] The AER includes the old regime amongst the options examined, and CEG therefore does likewise. However, for reasons given above, I limit the analysis to the relative merits of transitioning the base rate, the entire cost of debt, or neither.

claims concerning the size of the DRP 'gain' (DRP allowances less that incurred) in the period from 2008 till 2014. Since this involves a dispute over the size of the DRP rather than the appropriate criteria to invoke in choosing between competing policies, I therefore deal with this in section 4.4.

In respect of matching the allowed return on debt with efficient financing costs for each regulatory period, CEG (2015g, paras 22-29) argues that the AER's proposal to transition the entire cost of debt fails this test in respect of the next regulatory period, and most particularly in respect of the DRP. It is uncontroversial that the AER's proposed approach is likely to lead to a mismatch between the allowed and incurred DRPs over the next regulatory period. The more important issue is whether this mismatch is important relative to satisfying the NPV = 0 principle and avoiding large one-off effects from a regime change. In my view, the latter two criteria are far more important and they favour the AER's proposed process.

In respect of not retrospectively selecting averaging periods for determining allowed returns, even on the part of the regulator, CEG (2015g, paras 30-34) argues that a trailing average necessarily uses historical data and therefore this criterion is inevitably breached. I do not agree. The AER's point is that, given that a trailing average is to be used, the transition towards that point should never use any data that is currently historical and the future data to be used must be drawn from periods that are specified in advance, so as to ensure that a business does not select an averaging period after observing the results in that period. Furthermore, once the trailing average is in operation, the businesses must select the averaging periods in advance. Thus CEG's argument is wrong.

CEG (2015g, paras 30-34) also argues that the AER's proposed transition using only prospective data will almost certainly result in a lower allowed cost of debt for the next year than immediate adoption of the new regime or transitioning only in respect of the base rate, because the prevailing cost of debt is below its trailing average.[2] However, in referring to the AER's proposal as using only prospective data, CEG contradicts its claim described in the previous paragraph. Furthermore, the difference between the AER's proposed approach and

[2] CEG are assuming that the BEE did not hedge the base rate component under the old regime and their reference to the next year is actually a reference to the first year under the new regime. If the BEE did hedge the base rate component, the AER's proposed approach would only result in a lower cost of debt for the first year of the new regime than immediate adoption of the new regime if the prevailing DRP at that point were below its trailing average. This is currently the case, but may not be when firms with resets in 2018 are first subject to the new regime.

immediate adoption of the new regime will be affected by not only the interest rate in the first year of the new regime but the base rates in the following nine years, and there is much less certainty about the outcomes in those years.[3] Furthermore, and most importantly, the AER first proposed this transitional process in 2013, which is between one and five years prior to the regime taking effect (for firms with resets in 2014…2018). Thus the AER proposed a course of action well before the consequences for businesses in general would have been clear for even the first year of the new regime. By contrast, businesses with resets in 2014 or 2015 and who favoured a particular course of action at that time would have known the effect of the regime change in the first year of the new regime at that point and therefore were highly exposed to self-interest in expressing their preference.

In respect of avoiding the use of contentious historical DRP data, CEG (2015g, paras 35-41) argues that the most important requirement is to use the "correct dataset". I do not agree. If the correct data set were historical, and the data were simply unavailable, CEG's proposal would be incapable of implementation. CEG may have intended to argue that the problems with historical data are not substantial and, in that event, the criterion is secondary to other criteria. If this is CEG's point, I think it is uncontentious.

CEG (2015g, paras 35-41) also argues that there is no reason to believe that prospective averaging periods will be less contentious than historical periods. I do not agree. The historical data is drawn from a period that includes a DRP spike of unprecedented magnitude (as judged by the US DRP data for 1953-2015 that is used by Lally, 2015, Appendix 2).

CEG (2015g, para 41) also argues that the transitional regime favoured by the AER intensifies the potential for dispute because the weight given to the initial averaging period is greater than even under the old regime whereas every past month in a ten-year trailing average receives a weight of only 1/120. However, the weight given to the initial averaging period is 100% in the first year declining to 10% in the tenth year, with an average of 55%. By comparison, the weight given to it under the old regime would be 100% for the first five years and zero thereafter, for an average of 50% over the first ten years. Thus, the weight given to the initial averaging period is only marginally greater under the AER's proposed transitional regime than under the old regime. Furthermore, within the historical period,

[3] The DRPs in years beyond the first under the new regime exert the same impact on the allowed DRP under both the AER's transitional regime and immediate adoption of the new regime (10% in both cases).

much of the data from mid 2008 to the end of 2013 is highly contentious, as judged from CEG (2015c, Figure 14 and 15). So, if a trailing average were adopted immediately, much of the data used would be highly contentious. Furthermore, all of this contentious data would continue to afflict the trailing average for several years. By contrast, the data are not highly contentious from the end of 2013, as judged from CEG (2015c, Figure 14 and 15). Accordingly, I think that there is more room for dispute in immediately adopting a trailing average than in adopting the AER's proposed transitional regime.

3. Review of Submissions on a Transitional Process for the Base Rate

3.1 CEG: *Optimal Use of Interest Rate Swaps*

The AER's decision to adopt a transitional regime in respect of the base rate component of the cost of debt reflects a belief that it was efficient practice under the old regime for businesses to fully hedge the base rate by engaging in interest rate swap contracts. Lally (2014b, pp. 26-27) argues that, under the on-the-day regime, the use of interest rate swap contracts reduces expected interest costs (because the five-year base rate is generally lower than the ten-year rate, and by more than the transactions costs of the swaps), and it reduces risk (by aligning the base rate within the cost of debt that is incurred with that allowed by the regulator), and it is the general practice of private-sector regulated firms to do so. Accordingly, it can be judged to be efficient practice. 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.

CEG (2015b) responds to each of these points. Firstly, CEG (2015b, section 3.9) disputes the claim that it is the general practice of private-sector entities to engage in these swaps, by referring to a statement made by Jemena's Treasury Head that is "not inconsistent" with the firm hedging less than 100% of its cost of debt base rate. These comments by this Treasury Head neither support nor contradict any claim in this area, and are therefore neutral. By contrast, Lally (2014b, page 26) cites a number of such businesses and their advisers who claim that it is their practice or general practice to hedge in this way. In particular, Citipower

et al (2013, page 7) indicate that they do hedge in this way, AGN (2015, page 45) do likewise, the AER (2009, pp. 152-154) in summarizing submissions from private-sector entities concludes that such hedging is standard practice amongst private-sector firms, SFG (2012, page 24) claim that it is standard practice amongst small to medium sized businesses to hedge in this way, NERA (2014, page 22) make the same claim, and Jemena (2013, page 19) claims that it is standard practice amongst NSPs in general. CEG do not contest any of this evidence. In addition, SFG (2015, footnotes 2 and 32) refers to SA Power Networks, Citipower, Powercor, JGN, JEN, and United Energy as practitioners of this method. Furthermore, amongst these papers, the only references to the hedging being done at any level less than 100% are 80 – 100% by Envestra (AER, 2009, pp. 152-154), 98 – 100% by SP Ausnet (AER, 2009, pp. 152-154), and 80 – 100% by AGN (2015, page 45). So, all of this evidence indicates that hedging at or close to 100% was the general practice in the private sector under the previous regime.

Secondly, CEG (2015b, section 3.8) disputes the claim that the expected reduction in interest costs of at least 0.25% (by moving from the ten-year base rate to the five-year base rate) exceeds the transactions costs of the swaps (of no more than 0.10%) by citing the QCA (2014, page 29), who claim the transactions costs to be 0.15% - 0.20%. However the QCA does not provide any evidence in support of its estimate, and also states that the transactions costs would be "considerably less" than the expected reduction in interest costs; thus, the QCA contradicts CEG's primary claim, even with estimated transactions cost in excess of those presented in Lally (2014b, page 27). Much lower estimates of transactions costs are noted by Lally (2014b, page 27), comprising 0.09% by Jemena (2013, page 22, page 27) and 0.05% by Chairmont (2013, page 19). More recently, Chairmont (2015, page 31) estimates them at 0.03 - 0.10%, UBS (2015b, section 3.2) at 0.10%, and UBS also refers to a 2013 estimate by Evans and Peck (2013) of 0.16%. The latter figure is an outlier. Using only the two estimates from 2015, the result is up to 0.10%, which is still consistent with Lally's (2014b, page 27) conclusion of up to 0.10%. Even adding the Evans and Peck estimate to the 2013 estimates, the median of these estimates is still only 0.09%, which is also consistent with Lally's (2014b, page 27) conclusion of up to 0.10%. CEG (2015b, section 3.8) also refers to a claim by the AFMA (2013, pp. 2-3), that transactions of this kind do not reduce

costs due to "recent international regulatory developments".[4] However, as noted by Lally (2014b, page 28), the AFMA neither elaborate upon this comment nor provide any evidence in support of it.

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. If one accepts the (standard) view that the term structure of interest rates conforms to the expectations hypothesis with a liquidity premium, the expected result to this firm will be expected allowances that are less than the ten-year cost incurred. For example, if the liquidity premium is 1% and the current five-year base rate is 4%, the expected five-year base rate in five years must be the solution to the following equation (van Horne, 1984, Chapter 5, and equation 5-7):

$$(1.05)^{10} = (1.04)^{5}[1 + E(R_5) + .01]^{5}$$

This implies an expected five-year base rate in five years of 5%. Thus the allowance for the next five years is 4% followed by an expected allowance of 5%, whilst the base rate incurred will be 5% for the entire ten years. Thus, the cost incurred will exceed the expected allowances. Alternatively, if the current five-year base rate is 6% whilst the current ten-year base rate remains 5%, then the expected five-year base rate in five years would be 3%. So, again, the cost incurred (5% for ten years) will exceed the expected allowances (6% for five years followed by 3% for five years, with an average of 4.5%). 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

[4] CEG provides a reference to the AFMA comments in AER (2009, page 122) but there is no reference there to it. The comments are presumably drawn from AFMA (2013, pp. 2-3).

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.

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).

Thirdly, CEG (2015b, section 3.4 and section 4) argues that Lally's conclusion that swaps reduce risk even when it is defined to relate to the entire cost of debt (rather than just the base rate) is contingent upon his use of data from 1953-2015, and use of the more appropriate period 1986-2015 would have reversed the conclusion. In order to better appreciate the arguments for using that shorter period, I repeat parts of the analysis in Lally (2015, Appendix 2). Under the on-the-day regime, a business would receive an allowed cost of debt over a regulatory cycle equal to the sum of the ten-year risk-free rate and the ten-year DRP averaged over a short window shortly before the beginning of the regulatory cycle. Assuming a one-month window, this allowed rate for a regulatory cycle would be as follows:

$$k(Allow) = R_{f10}^{OTD(1)} + DRP_{10}^{OTD(1)} \tag{1}$$

If a business did not engage in swaps, the incurred cost (of staggered fixed-rate ten-year debt) over each month in the regulatory cycle would be the sum of the prevailing ten-year trailing averages of the ten-year risk-free rate and the DRP:

$$k(Paid) = R_{f10}^{TA} + DRP_{10}^{TA} \tag{2}$$

The standard deviation of the difference between the allowance in (1) and the incurred cost in (2) is then

$$SD(Allow - Paid) = SD\left[\left(R_{f10}^{OTD(1)} - R_{f10}^{TA}\right) + \left(DRP_{10}^{OTD(1)} - DRP_{10}^{TA}\right)\right] \quad (3)$$

By contrast, if the business does engage in these interest rate swaps, the incurred cost for each month during the regulatory cycle would be the sum of the five-year risk-free rate prevailing at the beginning of the cycle and the ten-year trailing average of the ten-year DRP:[5] If the swap contracts are entered into over a five-month window (centered on the one-month window used by the regulator), the result would be as follows:

$$k(Paid) = R_{f5}^{OTD(5)} + DRP_{10}^{TA} \quad (4)$$

The standard deviation of the difference between the allowance shown in equation (1) and this incurred cost in (4) is then as follows:

$$SD(Allow - Paid) = SD\left(R_{f10}^{OTD(1)} - R_{f5}^{OTD(5)} + DRP_{10}^{OTD(1)} - DRP_{10}^{TA}\right) \quad (5)$$

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 the last equation becomes

$$SD(Allow - Paid) = SD\left(DRP_{10}^{OTD(1)} - DRP_{10}^{TA}\right) \quad (6)$$

So, in the absence of hedging, equation (3) prevails and therefore the firm is exposed to two sources of risk over the course of a regulatory cycle: differences between the allowed risk-free rate set at the beginning of the cycle and the ongoing ten-year trailing average, and also differences between the allowed DRP set at the beginning of the cycle and the ongoing ten-year trailing average. By contrast, in the presence of hedging, equation (6) prevails and therefore the firm is exposed to only the second of these two sources of risk. Typically, additional sources of risk aggravate overall risk. However, if the two sources of risk in equation (3) are sufficiently negatively correlated, the standard deviation from (3) could be

[5] This assumes that the five and ten-year swap rates match the corresponding risk-free rates. Lally (2015, Appendix) shows that this is a minor issue.

less than (6) and therefore not hedging would have lower risk. To examine this point more closely, let *H* denote the proportion of the base rate cost that is hedged. Invoking equations (2) and (4), the incurred cost is then

$$k(Paid) = HR_{f5}^{OTD(5)} + (1-H)R_{f10}^{TA} + DRP_{10}^{TA}$$

Treating the five-year risk-free rate here as if it were equal to the ten-year rate (so as to focus upon the key point), and deducting this incurred cost from the allowance in equation (1), the standard deviation of the difference between the allowed and incurred cost is then

$$SD(Allow - Paid) = SD\left[\left(R_{f10}^{OTD(1)} - R_{f10}^{TA}\right)(1-H) + \left(DRP_{10}^{OTD(1)} - DRP_{10}^{TA}\right)\right] \qquad (7)$$

Expressing the last equation in terms of variances rather than standard deviations, and letting $\tilde{R}_f$ denote the difference in the risk-free rate terms in the last equation and $D\tilde{R}P$ the difference in the DRP terms there, this equation (7) can be expanded as follows

$$\sigma^2(allow - Paid) = \sigma^2(\tilde{R}_f)(1-H)^2 + \sigma^2(D\tilde{R}P) + 2\sigma(\tilde{R}_f)(1-H)\sigma(D\tilde{R}P)corr(\tilde{R}_f, D\tilde{R}P)$$

Differentiating with respect to *H*, and solving for the optimal value of *H* yields

$$H = \frac{\sigma^2(\tilde{R}_f) + \sigma(\tilde{R}_f)\sigma(D\tilde{R}P)corr(\tilde{R}_f, D\tilde{R}P)}{\sigma^2(\tilde{R}_f)} \qquad (8)$$

So, if the correlation between the risk-free rate and DRP terms is negative, the optimal hedge ratio will be less than 1. With these preliminaries, I now turn to CEG's arguments concerning the appropriate historical period from which to draw data. 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. In support of using the shorter period, CEG (2015b,

section 4.3.1) argues that inflation in the US was high and unstable from 1970 to 1986, and this is no longer the case. In addition there would have been significant errors in predicting inflation in this period, with underestimation in the 1960s and 1970s followed by overestimation in the 1980s.[6] 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.

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. 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). 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

[6] CEG present the claims about high/unstable inflation, and errors in predicting inflation, as two separate arguments. However, the second point follows from the first. Furthermore, the observation that inflation was higher and less stable in the 1970-86 period than currently is not a sufficient condition for excluding this period; it is necessary to demonstrate that it significantly affects the results from equations (3) and (5). CEG's second argument seeks to do so. So, I analyse only their second argument.

not provide any explanation for why this would be so. Thus, CEG's argument for excluding data from the 1970-86 period is unsupported. 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.

Despite this, two arguments for excluding the 1970-86 period could be offered. The first possible argument relates to the standard deviation of the risk-free rate differentials in equation (8). If the correlation between the risk-free rate and DRP differentials is negative, any phenomenon that raises the variance of the risk-free rate differentials will raise the optimal hedging ratio, and therefore (5) will tend to outperform (3). An inflation spike will have this effect: as inflation rises, the risk-free rate differentials will rise and then fall as inflation falls, and this will increase the standard deviation of the risk-free rate differentials. Furthermore, if one did undertake retrospective adjustments to the allowed base rate at the beginning of each cycle in accordance with the CEG argument discussed in the previous paragraph, this would amplify this tendency. So, providing the correlation between the risk-free rate and DRP differentials is negative, (5) will tend to outperform (3) during a high inflation era, and this is much less relevant to the present era of low inflation. This is consistent with the data; across the series of five year periods examined in Lally (2015, Appendix 2), starting in March 1963, March 1964, March 1965, March 1966, and March 1967, and in respect of the average within-cycle value of the risk-free rate differentials in equation (3), the three highest values (in absolute terms) occur within or largely within the 1970-86 period to which CEG refers: 1982-87, 1980-85, and 1981-86 (these averages are all positive). However, this argument presumes that correlation between the risk-free rate and DRP differentials was negative during the 1970-86 period. In fact the correlation was moderately positive, as shown in Table 1 below. So, the increased standard deviation for the risk-free rate differentials would have reduced the optimal hedge ratio, and therefore mitigated the extent to which (5) outperformed (3).

A second possible argument for truncating the period of analysis to that from 1986 relates to the correlation coefficient shown in equation (8), being that between the risk-free rate and

DRP differentials shown in equation (7). This correlation coefficient is driven by the correlation coefficient between the contemporaneous ten-year risk-free rate and the ten-year DRP. Using the US data, the estimates from various historical periods are shown in Table 1. The estimate using all of the data (1953-2015) is positive (.05) and therefore hedging is unsurprisingly favoured over not hedging when using all of this data. By contrast, using the subperiod 1986-2015 favoured by CEG, the estimated correlation coefficient is strongly negative (-0.57) and therefore not hedging is unsurprisingly favoured over hedging when using only data from this shorter period. Thus, it might be argued (even if CEG have not) that data prior to 1986 should be rejected because the true correlation coefficient changed around that point. However, as shown in the last four rows of Table 1, 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.[7] Furthermore, 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. 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. Thus there is no good argument for using only data from 1986.

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

[7] The subperiods were chosen to identify the two periods in which the estimated correlation is positive.

CEG (2015b, section 3.3, 3.6 and Appendix B) also presents estimates of the relationship between credit spreads and risk-free rates from a variety of (mostly) academic papers, all of them negative, claims that it is "well established in the finance literature since at least Longstaff and Schwartz (1995) that credit spreads are inversely related to the base level of interest rates", and that this negative correlation explains the superiority of not hedging. The virtual unanimity in the negative correlations in these cited studies would seem to suggest that the issue is beyond doubt. However, amongst the cases in which CEG reports the period examined, the average such period is only 10 years, which is much less than the 29 year series (1986-2015) favoured by CEG, let alone the 62 year series (1953-2015) favoured by Lally (2015), and one of the studies cited by CEG uses only four years of data. Thus, on this basis alone, these cited studies are far inferior to the analysis undertaken by CEG, and presumably have been reported merely to add ballast.

Furthermore, many features of these papers further reduce their value in the present circumstances. For example, the analysis by Longstaff and Schwartz (1995, section IV) relates to *changes* in credit spreads and *changes* in the risk-free rate rather than to levels, and this apparently innocuous difference has significant effects: over the period April 1977 to December 1992 examined by these authors, the correlation between the monthly DRP and ten-year risk-free rate in the US data used by both Lally and CEG is 0.19 whilst the correlation between the monthly changes is -0.77, and the latter has the same sign as the coefficients in the regressions conducted by Longstaff and Schwartz.[8] Furthermore, the regression model used by the authors incorporates equity returns as a further explanatory variable, with the result that the relationship estimated between changes in credit spreads and changes in the risk-free rate involves holding constant the additional explanatory variable. Thus, had Longstaff and Schwartz conducted their analysis on levels rather than changes and not added the additional explanatory variable, they would presumably have reported a positive correlation between credit levels and the risk-free rate, and CEG would presumably not then have cited the paper. Furthermore, given the variation in results shown in Table 1, there are presumably a host of actual empirical studies reporting positive correlations

[8] There is no inconsistency in these two markedly different correlation coefficients (using levels and then changes). A positive correlation in levels for X and Y would be achieved if both series rose over the relevant period, and this would not preclude a negative correlation when using changes because variable X could fall in months when variable Y rose and rise when Y did not change.

between credit spreads and the risk-free rate; it simply depends upon which historical period one uses.

CEG (2015b, section 3.7 and Appendix D) also presents estimated correlations between base rates and DRPs for ten Bloomberg DRP series, five from the US and five more from other countries. They are all negative. The period examined is not disclosed but it is presumably from 2015 back as far as possible. By contrast, the length of each data series is disclosed and the average is 14 years. In respect of the US data used by Lally (2015), the estimated correlation over the same 14 year period (2001-15) is -0.38, and therefore there is little value is citing additional US data over the same period. Furthermore, additional data from other countries that yields similar correlations merely demonstrates that the underlying base rate and DRP data is strongly correlated across countries. The fundamental problem remains: 14 years of data is inferior to the 29 years of data used by CEG (2015b), and even more so to the 62 years of data used by Lally (2015). Furthermore, if one is going to select relatively short data series finishing in 2015, the US data used by Lally generates an estimated correlation that is positive over the period 2008-2015. Thus, had CEG presented results for this period using the same indexes, the results would have presumably been typically positive.

CEG (2015b, section 3.7 and Appendix D) also presents estimated correlations between base rates and DRPs for a further four US DRP series, over the period 2000-2015. Again, the results are all negative. Given that the five US results reported by CEG and referred to in the previous paragraph are over essentially the same period, there is little additional value in these additional four correlations. One could generate literally thousands of results of this type, by slight variations in the periods examined, variations in the data reporting frequency (daily v weekly v monthly), and variations in the types of firms examined.

The most striking feature of CEG's results is that all of them are negative. Clearly, CEG intends this to be persuasive. However, as shown in Table 1 above, results in this area are quite variable according to the period examined. Furthermore, as also discussed above, they can flip from positive to negative purely in accordance with whether the correlations are in respect of levels for the two variables or for changes in them. So, the fact that *all* of CEG's reported results are negative is grounds for considerable suspicion rather than acceptance of a seemingly incontrovertible fact.

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 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 behavior 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.

CEG (2015b, section 5.1 and 5.2) also argues that there are a number of weaknesses in the analysis by Lally (2015, Appendix 2) and proposes corrections to these. The first of these corrections is to conduct the analysis for every possible regulatory start date rather than just the March start dates examined in Lally (2015). This expands the number of possible time series from 5 to 60 (for a given strategy pursued by a firm). I agree with this extension to Lally (2015). As shown in CEG (2015b, Table 6, first section), this expansion in the number of regulatory starting points has no material effect on the results when the 1953-2015 data set is used, i.e., the use of swaps still yields much lower risk. However, when the data used commences in 1986 or later, the situation changes. 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.

CEG's second proposed correction is to pool data across all 60 possible regulatory starting dates before determining the standard deviation. This would be appropriate if a firm had 60 regulatory businesses, each with a different start date. However, since this is not the case, determining the standard deviation for each possible start date is more appropriate, followed

by averaging over these standard deviations to determine the risk faced by an average firm (as done in Lally, 2015).

CEG's third proposed correction is to determine the standard deviation of each series relative to zero rather than the sample mean. However, by definition, the result from doing so would not be a standard deviation but a root mean squared error (RMSE). The effect on the unhedged strategy should be slight because the mean difference between the cost allowed and that incurred should be close to zero in the absence of hedging. However, in the presence of hedging, the base rate incurred would be the five-year rate whilst that allowed by the AER under the old regime was the ten-year rate. Since the ten-year rate typically exceeds the five-year rate, the average difference between the allowed and incurred base rates would be positive; this is an advantage to hedging and has been noted as such in Lally (2015), i.e., hedging reduces average costs as well as risk. However, under CEG's proposal, this favourable differential would raise the RMSE and therefore be treated as an adverse feature of hedging (as is apparent in CEG, 2015b, Figure 6, second section). Since the favourable differential is a desirable consequence of hedging, CEG's correction is flawed.

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

[9] The results in CEG's Table 7 contradict the results in these figures, and are presumably in error.

[10] CEG (2015b, para 283) extends the series back to 1994 by *assuming* a constant DRP in this four year period. This extension cannot be viewed as a genuine data series.

series will be more negative than is truly the case. Thus, of the corrections that CEG suggests to the methodology in Lally (2015), only the addition of extra starting months is warranted and doing so undercuts CEG's claim that the use of data from 1986 or later reverses the conclusions in Lally (2015).

In summary, the use of interest rate swaps seems to be general practice amongst private-sector entities, and it reduces expected interest costs by at least 0.15% per year, and it reduces risk in the sense of largely eliminating differences between the base component of the cost of debt that is incurred by a firm and that allowed by the AER under the on-the-day regime. This suggests that the use of these swaps is an efficient strategy. CEG disputes all three points. However, nothing in their submissions on the first two points undercuts the conclusions there. 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), and not using swaps produces moderately lower such risk so long as the data used to assess this is from 1986-2015 rather than 1953-2015, and use of the shorter data period is warranted. Accordingly, they argue that the use of these swaps is inefficient. However, 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.

Collectively, these conditions for judging the use of swaps to be inefficient are a formidable hurdle to overcome. In respect of using data from the 1986-2015 period, the only argument presented by CEG is not shown by them to have any material impact on the analysis in Lally (2015, Appendix 2), any effect from their argument would be much less than claimed by them because it rests upon a misunderstanding by them about the AER's revenue-setting process, and neither of the two alternative arguments that I examine are persuasive. Furthermore, whenever one uses a subset of the available data, one must have particularly strong reasons for doing so, because it raises the suspicion that the subset is preferred for self-interested reasons.

In respect of ignoring the actual behavior of firms, the usual practice of regulators is to treat the actual behavior of private-sector firms to be efficient unless there are strong contrary arguments. For example, regulatory leverage levels are generally set by reference to the

average leverage of relevant comparator firms. Similarly, staggered ten-year borrowing by regulated firms is generally considered to be efficient because firms do so. Thus, if the general practice of private-sector firms subject to the on-the-day regime is to engage in these swaps, it would be reasonable to conclude that it was efficient purely on this basis alone.

In respect of the appropriate level at which risk is defined, the usual practice in financial economics is to define risk at the market level. In particular, the relevant risk of an investment project is its "systematic" risk. By contrast, when dealing with hedging, the usual practice in financial economics is to assess its merits at the firm level (because its impact on investors' portfolios is otherwise neutral). Consequently, natural hedges at any point within the firm's net cash flows are relevant. However, in many cases, these natural hedges are too difficult to quantify or insufficiently strong, and are therefore ignored. Thus, a firm might insure a building because it eliminates certain risks of that building despite some natural hedges existing within the firm.

Turning to the current problem, the use of swaps clearly reduces risks associated with the base rate component of the cost of debt. If natural hedges within the firm are to be considered, they may exist at points beyond the DRP component of the cost of debt. In fact, one such hedge is apparent: in particular, deviations between the DRP allowed under the on-the-day regime and the trailing average that is paid are favourable when economic conditions are poor, and therefore when the MRP compensation provided by the regulator is likely to be too low (because the true MRP is likely to be above its allowed value, which has always been 6% - 6.5% for the AER). Similarly, the DRP mismatches are most unfavourable to firms when the prevailing DRP is low relative to its ten-year trailing average, this occurs when economic conditions are favourable and therefore when the MRP compensation is likely to be too high (because the true MRP is likely to be below its allowed value).[11] In light of this natural hedge between the DRP and the MRP, the use of swaps to remove the base rate risk in the cost of debt is likely to achieve lower risk than not hedging it. Naturally, this matter cannot be empirically investigated because errors in setting the MRP are not observable. However, it is an argument that CEG should be sympathetic to because they have frequently argued that the DRP and the MRP are positively correlated (for example, CEG, 2012, paras

[11] Notwithstanding these comments, I have not favoured MRP estimates that are more variable over time than the estimates favoured by the AER because estimators that are quite sensitive to changes over time in the true MRP have high standard deviations, and the higher standard deviation outweighs the likely reduction in bias.

46-63, 96). Furthermore, even if these additional natural hedges (beyond the DRP) are ignored, the natural hedge between the base rate and DRP components of the cost of debt may be considered too difficult to quantify or too weak, and therefore be ignored. This is consistent with the evidence in Table 1, which reveals the difficulties in reliably estimating the correlation coefficient between the base rate and the DRP. Thus there is not a strong argument for taking account of the natural hedge between the base rate and the DRP components of the cost of debt. A Corporate Treasurer who failed to hedge the base rate risk, and thereby subjected their firm to a significant loss (because the DRP did not move in the anticipated direction) might find their Board of Directors somewhat unimpressed by their exculpatory exposition on the best historical period to use in estimating the correlation coefficient.

In conclusion, 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. CEG also argues that, using a different definition of risk and using US data back to 1986 or Australian data back to 1998, risk appears to be increased moderately by engaging in these swap contracts. However, CEG do not present any persuasive evidence on the questions of general practice and 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.

3.2 UBS

UBS (2015a) presents an analysis of the transactions costs of interest rate swap contracts. This document is identical to that referred to as UBS (2015) in Lally (2015), and therefore no additional comment is required to that in Lally (2015, section 9.1). In addition UBS (2015b) covers the same material and only differs in estimating the pure transactions costs of the swaps (credit, execution and cost of capital, but excluding "tracking error" and "deferral" costs") at 0.10% rather than 0.05%. The latter figure is presumably an error on the part of

UBS (2015a), in providing an estimate for only one of the two legs required (ten-year fixed to floating and floating to five-year fixed). However, since Lally (2014b, page 27) estimates these transactions costs at no more than 0.10%, the UBS update does not change anything in the analysis of Lally (2014b). In particular, the use of swaps would still have reduced expected interest costs under the previous regime.

3.3 Amadeus

Amadeus (2015, section 8.4) favours a partial transitional process for the base rate, to reflect the extent to which the BEE did not fully hedge the base rate risk under the previous regime. The belief that only partial hedging was warranted is drawn from CEG (2015b). The drawbacks in CEG's analysis have been considered above.

3.4 Other Submissions

JEN (2015, pp. 105-107) favours a transitional process for the base rate, but not the AER's proposed process.[12] Instead, JEN favours the process outlined in Lally (2014b, pp. 10-11), involving the assumption that firms swapped their floating rate debt at the regime change point to fixed rate debt with the same maturity dates. This proposal has been previously raised by CEG (2015a, section 6.4). As discussed in Lally (2015, pp, 59-60), the results from both the AER's proposal and CEG/JEN's proposal range from a small gain to a small loss to businesses from the switch to the new regime, over the ten-year transitional period, depending upon the path of future interest rates and whether or not the BEE reacts to the regime change in the way assumed by JEN. As also shown in Lally (2014b, section 2.1), a third transitional regime would completely neutralize the impact of the regime change on businesses, but this would require that the businesses did not engage in the new round of swap contracts associated with JEN's proposal and this is unclear. So, none of the three transitional options is clearly best. However there is some merit to the AER using the same transitional process for the base rate and the DRP, and this factor favours the AER's proposed approach.

JEN's approach is also favoured by United Energy (2015, pp. 15-23), Energex (2015, section 7.3.1), and AGN (2015, section 10.9).

[12] The absence of any comment in the submissions of firms indicates that their submissions are in agreement with the AER's proposal concerning the transitional process for the base rate.

4. Review of Submissions on a Transitional Process for the DRP

4.1 QTC

The QTC (2015) characterizes the AER's transitional process for the DRP as a mechanism for inflicting future 'losses' on firms (by reducing the allowed DRP below the DRP incurred) in order to offset past 'gains' (DRP allowances in excess of DRP incurred) that have allegedly occurred. The QTC further argues that both Energex and Ergon Energy (hereafter referred to collectively as EE) suffered losses over the period from the commencement of regulation for them in 2001 until the regime change took effect for them in 2015 (in present value terms), and that the present value of these losses will be significantly aggravated by use of the AER's proposed transitional regime compared to immediate adoption of the new regime.[13] Accordingly, in respect of EE, the AER's approach aggravates rather than mitigates the problem. The QTC argues that the appropriate solution is to desist from a transitional regime (and therefore immediately adopt the new regime) and it also suggests that there should be compensation for the past losses (or claw back of past gains).[14]

I consider that the QTC's characterization of the AER's proposed transitional process, as a mechanism to inflict future losses on firms so as to compensate for past gains, is very emotive. Furthermore, the AER (2013) first favoured this transitional regime between one and five years before it would first take effect (for businesses with resets in 2014…2018), and therefore well before the 'gains' up to the adoption point could be reliably estimated for most businesses. I think a better description of the AER's proposal is that it is designed to effectively delay the introduction of the new regime so as to allow the full effects of an unprecedented DRP shock to dissipate, and therefore allow a natural squaring up process to operate at (at least) the industry level. Furthermore, in respect of the QTC's estimate of the losses for EE, there are aspects of the QTC's calculations that could be challenged. Nevertheless, even if the 'losses' suffered by EE were close to zero, significant losses are entirely possible for other firms should the AER's approach be adopted. The more important

[13] The QTC (2015, page 2) refers to the historical losses as the difference between the DRP allowed under the old regime (on-the-day) and that incurred under the hybrid regime. However, the choice of regime (hybrid or on-the-day) affects the DRP allowed rather than that incurred. The DRP incurred is always the ten-year trailing average. Clearly, the QTC's calculations of the DRP incurred are in accordance with the trailing average.

[14] The QTC presents results under two methods, the PTRM weighted trailing average and a simple trailing average. The PTRM weighted trailing average recognizes the fact that increases in debt initially incur the prevailing DRP and gradually shift towards the simple trailing average whilst the simple trailing average acts as if new debt always incurs the simple trailing average. The QTC favours the former method. I agree.

question is whether the compensation/clawback approach suggested by the QTC is better than the AER's proposed transitional regime. Both approaches recognize that at least some events up to the regime change led to substantial gains or losses, and that these should be taken account of in some way. However, relative to the AER's approach, the approach suggested by the QTC suffers from the following drawbacks.

Firstly, the approach suggested by the QTC claws back all past gains, compensates for all past losses, and does so back to the commencement of regulation for each individual firm. Thus, in addition to mismatches between the DRP allowed and that incurred arising from the combined effect of the GFC and the regime change in 2015, it seeks to deal with *all* other sources of mismatches from the commencement of regulation until mid 2015. These include mismatches arising from errors by regulators in setting the allowed DRP. Such a broader remit is unwarranted because the additional mismatches are not evidently substantial (and may not be even real in the case of alleged errors by regulators in setting the allowed DRP). By contrast, the mismatches arising from the combined effect of the GFC and the regime change commencing in 2014 represent a very large one-off effect from the regime change and failure to neutralize them would also violate the NPV = 0 principle as discussed in Lally (2015, section 8.5). Furthermore, the QTC's suggested approach is unquestionably a clawback/compensation process for past gains and losses whereas the AER's proposed approach merely effectively delays the introduction of the new regime, and therefore is free of the legal and emotional connotations of clawbacks.

By way of analogy, consider an insurance company that is closed down. Although no new insurance contracts would be issued, existing contracts ought to run their course so that those who paid their premiums receive all of the benefits for which they had paid, i.e., a process that involves costs followed by benefits and therefore squares up over time should not be terminated before it has run its full course. However it does not follow that it would also be sensible to revisit all other policies that have ever been written by the company and to engage in some sort of retrospective corrective action for each of them.

Secondly, the approach suggested by the QTC of clawing back all past gains and compensating for all past losses requires quite precise estimation of the DRP incurred over the entire period back to ten years prior to the commencement of regulation for each firm (because a ten-year trailing average will be required at the commencement of regulation).

However, the data does not exist to do this. The QTC's (2015, page 8) response to this is to simply assume that the DRPs incurred for the ten years prior to 2001 are all equal to the 2001 figure of 1.16%. This assumption is far too crude for the purposes of determining compensation and clawbacks, which would likely be subject to legal challenge.

Thirdly, because the approach suggested by the QTC uses both actual past allowances and DRP estimates drawn from market data, conflicts between these two sets of numbers are inevitable, and there is no satisfactory means of resolving this. The QTC's (2015, page 8) approach is to substitute regulatory determinations for its market data based estimates of the DRP wherever they conflict, for the purpose of estimating the DRP incurred. For example, the DRP allowance of 0.64% that was granted to EE in mid 2005 represents not only the compensation given but it also displaces the QTC's market-based estimate of the DRP at that time of 0.81%, for the purposes of estimating the DRP incurred by EE at that time. In effect, the historical DRP estimate arising from the market data in 2005 (0.81%) is judged to be wrong because a regulatory determination (0.64%) conflicts with it, and therefore the DRP incurred by that firm at that time is judged to be 0.64% rather than 0.81%. However, if the regulator's judgement is considered to be superior to the contemporaneous estimate arising from the selected DRP series, one could not place much reliance upon the results from the selected DRP series at other points in time as well, and therefore losses or gains calculated through the use of this DRP series could also not be relied upon. Furthermore, if another (otherwise identical) firm currently regulated by the AER had faced a regulatory determination in mid 2005 from a different regulator to the one regulating EE in 2005, and the regulatory determination was (say) 0.85%, the selected historical DRP series would be supplanted by the figure of 0.85% in 2005 for the purpose of estimating the DRP incurred by that firm at that time. Thus, if this process were adopted by the AER, it would have to simultaneously estimate the DRP incurred in mid 2005 at 0.64% for EE and 0.85% for an otherwise identical firm. Obviously, both of these numbers cannot be correct. So, the only internally consistent approach would be to use a single historical series of DRP estimates in order to determine the incurred costs of all firms, and these estimates would typically conflict with regulatory determinations at the reset dates. This would then lead to the AER judging most past regulatory determinations to be wrong (including its own), and therefore clawing back past regulatory determinations that were too 'high' whilst compensating for those that were too 'low', as judged by retrospective use of a DRP series that the AER has currently

selected for this purpose. Such an exercise would be bordering on the surreal even if it were legally possible.

By contrast, the AER's proposed transitional process is free of all three such problems. It involves a transitional process for all firms, and it has four desirable features (as discussed in Lally, 2014, section 3.2; 2015, section 8.5). Firstly, across the industry as a whole (and hence across resets dates generally), the combination of the regime change without a transitional period and a large DRP shock (such as the one arising from the GFC) could impose a large one-off impact on the present value of the net cash flows of the industry (positive or negative depending on the timing of the regime change relative to the DRP shock), and does so in the present circumstances (with the GFC commencing in 2008 and the regime change in 2014). The AER's proposed transitional regime largely neutralizes this impact for the industry as a whole (involving averaging over regulatory reset dates). Secondly, across all possible combinations of the commencement date of a DRP shock and the timing of the regime change, these one-off impacts on the industry would be generally positive and therefore failure to neutralize them would violate the NPV = 0 principle. The AER's approach also addresses this problem. Thirdly, the AER's transitional regime is expected to produce results for individual businesses (with different regulatory reset dates) that are almost identical in present value terms to those that would have been attained under the previous regime, and therefore the businesses are no better or worse off than if the regime change had never occurred.[15] Fourthly, the AER's transitional regime does not require any estimates of past DRPs, and these are controversial because of the GFC.

The relevance of these points to EE and the approach suggested by the QTC is thus. In respect of the benefits to the industry as a whole, any alleged disadvantages to EE must be considered in light of that benefit to the industry. Secondly, in respect of the transitional regime leaving businesses no better or worse off than they would have been had the regime change not occurred, the adverse impact on EE that the QTC has highlighted is not a consequence of the regime change or even the regime change with a transitional period. None of the past losses are caused by the transitional process, nor are the future expected losses identified by the QTC because they would still have occurred had the old regime

[15] This occurs because the implementation date for the new regime is usually at or beyond the point at which the DRP shock has fully subsided, in which case the expected DRP from that point is constant, in which case the expected DRP allowances that would have resulted from the old regime are identical to those expected under the transitional regime.

remained in place. These losses are principally caused by the combined effect of the GFC and the timing of the regulatory resets for EE. The QTC's argument, in effect, is that the future losses that would have been suffered under the continued operation of the old regime could be avoided by immediate adoption of the new regime rather than use of a transitional process. By analogy, if a collection of employees are subject to an employment contract that has proved (by chance) arduous for some and beneficial for others, and the contract is to be replaced by another that will be free of this problem, but will not take effect for several years so that the arduous effects experienced by some employees may continue, employees in that situation might seek immediate adoption of the new contract. However, the cause of their difficulties is not the delayed adoption of the new contract. The cause of their difficulties is the original contract. Thirdly, in respect of the requirement to collect past DRP data when immediately adopting the new regime, the resulting problems are aggravated by the approach suggested by the QTC because it will require DRP estimates not merely for the ten years preceding the regime change but the ten years preceding the initial adoption of regulation. In the case of EE, this means estimates being required from 1991 (ten years before regulation commenced) rather than 2004 (ten years before the regime change).

In addition to these fundamental points, the QTC (2015, page 5) also argues that the AER's concerns with using historical DRP data in the course of immediately implementing the new regime are inconsistent with its use of DRP data back to 2005 to support its claim that firms have received gains up to 2014. However, the AER's use of such past data is purely for the purpose of determining whether a large gain arose and therefore whether a transitional regime should be adopted. Furthermore, these gains arose from the GFC induced shock to the DRP, this shock was so extreme that large gains remain regardless of which estimates of past DRPs are used, and therefore the conclusion that a transitional regime is warranted is unaffected by which estimates of past DRPs are used. By contrast, if the new regime were immediately adopted, DRP estimates would be required back to 2005 for the purpose of determining the regulatory DRP allowance and therefore any errors in estimating these past DRPs would affect prices.

The QTC (2015, pp. 6-7) also notes arguments previously raised by me against differential treatment of firms according to the timing of their regulatory cycles; these involve difficulties in identifying the appropriate treatment for each firm, the undesirable precedent that would be established, and the fact that the corporate groups to which regulated businesses belong are

typically involved in a range of regulated activities with different reset dates and this would push businesses towards the average outcome (Lally, 2014b, pp. 4-5). In response to the last point, the QTC argues that the BEE is a stand-alone entity and therefore any smoothing out resulting from membership of a larger corporate group is irrelevant. I accept this point. However, the other two points remain and the QTC offers nothing to challenge them.

4.2 SFG

SFG (2015, paras 102-107) argues that the AER's proposed transitional process for the DRP involves them keeping a mental accounting of past gains and losses, and then seeking to square it up by intentionally inflicting a 'loss' (DRP allowance less than DRP incurred) in the next regulatory period, and that this is inappropriate. I do not agree. The on-the-day regime gave rise to accumulated gains and losses that reverse over time, i.e., there is a natural squaring up process (at least at the industry level). Immediate adoption of the new regime would bring that process to a premature end, and at a time when the accumulated position (of about $2.3b) was very large. By contrast, the transitional regime effectively delays the introduction of the new regime and therefore allows the natural squaring up process to operate. The squaring up is not imposed by the AER; it is a consequence of the previous regime and the AER's transitional process merely allows it to continue operating until the full effects of an extraordinarily large DRP shock (from the GFC) dissipate. Furthermore, the effect of this transitional regime is to largely neutralize a large one-off effect arising from the combination of the GFC and the regime change, and neutralization of such one-off effects (whether positive or negative) is desirable policy because it protects businesses from bankruptcy risk and it satisfies the NPV = 0 principle (as argued in Lally, 2015, section 8.3).

SFG (2015, paras 108-110, 118-119) argues that it is good regulatory policy to set allowed returns at each determination so as to match the efficient costs of the BEE in the forthcoming regulatory period and therefore to not take account of past shortfalls or excesses. I agree with this in relation to the progressive operation over time of a particular policy. However, in the face of regime changes which could impose large one-off effects in either direction, it is good regulatory policy to neutralize such large effects so as to protect businesses from bankruptcy risk and to satisfy the NPV = 0 principle (as argued in Lally, 2015, section 8.3). There is no inconsistency in these two regulatory policies.

SFG (2015, paras 111-112) notes that clause 6.5.2 (c) of the NER requires that the rate of return should be commensurate with the costs of a BEE and argues that this precludes consideration of disparities in prior regulatory periods. However, as discussed in Lally (2015, section 8.2), the legal requirement cited is equivalent to the NPV = 0 principle (which is also forward-looking) and as discussed in Lally (2015, section 8.3) this implies that the large one-off effects of regime changes be neutralised. Furthermore, even if the NPV = 0 principle is not breached, it is still good regulatory policy to neutralize such large effects so as to protect businesses from bankruptcy risk. Doing so may require, at the time of the regime change, consideration of events prior to the regime change.

SFG (2015, para 113) argues that it would be impossible for a regulator to keep a running balance of overs and unders over the life of a regulated asset. However, the AER's proposed approach does not involve doing so. It instead involves assessing, at the time of a regime change, whether there is a large one-off effect resulting from the regime change and then deciding how best to neutralize it. This process may require some analysis of recent historical events and their impact on the regulated sector but it does not require precise measurement and therefore does not require any running balance over the life of every regulated asset.

SFG (2015, paras 114-117) argues that the AER's proposed approach is a mechanism for addressing problems arising from the previous regime, and asserts that this is "very dangerous" but do not elaborate on these alleged dangers. I agree that the AER's proposed process is a response to a feature of the previous regime but I consider that it would be dangerous to *not* do so. In particular, immediate adoption of the new regime would lead to a large one-off gain to regulated businesses at the expense of their customers. It could have been in the other direction, and therefore subjected the businesses to significant risk of bankruptcy. Furthermore, regardless of the actual direction, a policy of not neutralizing such effects would likely violate the NPV = 0 principle. SFG do not dispute any of these consequences arising from immediate adoption of the new regime.

SFG (2015, para 120) argues that the AER's proposed transitional regime creates risk and discourages investment, because businesses will not know in advance which windfall gains and losses will be addressed and how. However, the alternative of not addressing any of them is worse. It will leave businesses completely exposed to the possibility of a future

regime change whose effect on the businesses could be highly favourable or highly adverse. This is risk, arising from future possible regulatory actions, and a regulatory policy of seeking to neutralize large impacts of this kind will mitigate the risk, even when there is uncertainty about the definition of "large" and the particular process that is chosen to neutralize the impact. So, the AER's proposed actions are risk-reducing rather than risk creating, and therefore encourage investment. By analogy, farmers whose businesses are exposed to the uninsurable vagaries of weather are thereby exposed to risk, and that risk is mitigated by a government policy of assisting farmers when faced with particularly severe weather conditions. This mitigation of risk exists even if it is not known in advance what the government's definition of severe is or what particular form the assistance might take.[16]

SFG (2015, para 121) argues that the AER has not provided any proper quantification of the past windfall for individual firms and no demonstration that the transitional regime will square it up. SFG refers to the analysis in Lally (2014b) and considers that this analysis does not satisfy its requirements just described. Relative to the analysis in the QTC (2015), the analysis in Lally (2014b) uses rough estimates of the historical path of the DRP and it does not draw upon the actual DRP allowances granted to individual firms but assumes instead that allowances would correspond to the historical DRP path that is estimated. So, presumably SFG is alluding to these two features of the analysis in Lally. However, the DRP shock that is revealed in Lally (2014b) is so large that the conclusions reached there would not be sensitive to such refinements. These conclusions are that immediate adoption of the new regime in 2014 would leave the regulated sector as a whole with a very large windfall gain, that use of a transitional regime would largely mitigate that industry gain, and it would also produce results for individual firms that would in present value terms match or closely match those obtained if the regime change did not occur (and hence leave firms no better or worse off than if the regime change had not occurred). Furthermore, because the analysis in Lally (2014b) is conducted at the industry level, it is reasonable to suppose that regulatory allowances match the DRP incurred. Furthermore, once one uses actual DRP allowances along with market data for the incurred DRP, the particular choice of market data will lead to inconsistencies between the DRP allowances and the contemporaneous market DRP estimates, and therefore one will inevitably be implying that some regulatory judgements are

[16] Such government interventions are limited to adverse events and therefore raise the value of farms as well as reducing risk. By contrast, regulatory interventions should apply in both directions and therefore only reduce risk.

wrong. In view of the considerable effort made by regulators to assess these questions, such implications would be unwarranted, and can be avoided by conducting the analysis without reference to specific regulatory judgements.

SFG (2015, para 121) also argue that, if the DRP experienced a spike during the transitional period, it would produce a second windfall gain and therefore require further delays in introducing the new regime. SFG do not elaborate on this matter but CEG (2015a, section 5.5) do analyse this issue. However, as argued in Lally (2015, pp. 55-57), CEG's example does not change the conclusions reached in Lally (2014b).

SFG (2015, para 121) argues that the AER's proposed transitional process raises the question of how far back the regulator should estimate the windfall gains or losses. The answer to this question is clear from Lally (2014b); the estimation runs from the commencement of the GFC until the regime change in 2014, and the commencement date of the GFC is chosen because the GFC coupled with the regime change in 2014 causes the very problem that warrants a transitional regime (a very large windfall gain to businesses at the expense of consumers).

SFG (2014, para 121) argues that the previous on-the-day regime contained a natural hedge between the DRP (allowances are too large during a crisis because the prevailing value is used rather than the trailing average) and the MRP (allowances are too low during a crisis because the prevailing value is high but regulators underestimate it by placing high weight on historical averages). However, unlike the DRP windfall effect, the MRP under compensation cannot be estimated and therefore it is impossible to determine whether it would even approximately offset the DRP windfall.[17] The most that can be said is that there would likely be some mitigation of the DRP windfall but of an unknown amount. Ironically, this argument concerning a natural hedge undercuts the merits of switching to a trailing average DRP so as to better align the regulatory allowances with the costs incurred by a BEE.

SFG (2015, para 124) argues that the AEMC (2012, page 76) views transitional arrangements purely as a means of allowing businesses to unwind any financial arrangements entered into under the previous regime, which is incompatible with the motives underlying the AER's proposed transitional arrangements for the DRP. However, at this point in its report, the

[17] The MRP under or over compensation issue exists because the MRP can't be precisely estimated.

AEMC merely summarized the views of Professor Gray, who is the author of the SFG report. So, Professor Gray is citing himself. The views of the AEMC (ibid, page 216) as opposed to Professor Gray are far less restrictive and are not inconsistent with the motives underlying the AER's proposed transitional arrangements for the DRP.

SFG (2015, para 145) argues that the AER's concerns about the availability of historical DRP data to enable immediate adoption of the new regime are unwarranted. However, as argued in Lally (2014b, section 2.3), there are data availability issues and the available data is very contentious for a significant part of that historical period. SFG do not respond to these points.

SFG (2015, para 146) also argues that data availability should not drive the regulatory process. This is a straw man. Data availability is not a primary factor in this decision. The primary issue is the large windfall gain to businesses at the expense of consumers resulting from the combined effect of the regime change and the unprecedented DRP shock arising from the GFC. Data issues are secondary to this.

SFG (2015, paras 147-149) argues that the AER's concerns about opportunistic behavior are not warranted. As argued in Lally (2014b, section 2.4), I agree.

SFG (2015, paras 150-156) argues that it is good regulatory policy to match the DRP allowance to the costs incurred by a BEE, and therefore to immediately adopt the new regime. I agree with this in relation to the progressive operation over time of a particular policy. However, in the face of regime changes which could impose large one-off effects in either direction, it is good regulatory policy to neutralize such large effects so as to protect businesses from bankruptcy risk and to satisfy the NPV = 0 principle (as argued in Lally, 2015, section 8.3), and this supports the use of the transitional process. There is no inconsistency in these two regulatory policies.

4.3 Frontier Economics

Frontier Economics (2015) largely replicates (word for word) an earlier report by the same author (SFG, 2015), as discussed above. In particular, the wording in SFG (2015, paras 102-125, 145-158) is replicated in Frontier (2015, paras 49-72, 105-118). I therefore comment only on new arguments raised by Frontier, as follows.

Frontier (2015, para 91) argues that the "windfall gains" up to 2014 are not the result of changing methodology but of the proper application of the previous regime. It is tautological that any gains (DRP compensation in excess of that incurred) up to 2014 do not result from changing methodology in 2014; an event in 2014 cannot cause earlier events. However the phrase "windfall gains" was introduced by Lally (2014b, page 17) to refer to the accumulated differences between the allowed and incurred DRP (or their present value) from the commencement of the GFC until their cessation through either dissipation or immediate adoption of the new regime. Thus, with no change in regime, this accumulation or present value is small because the 'gains' prior to 2014 are expected to be offset by their subsequent reversal. With an immediate change in regime, this accumulation or present value is large. So, the "windfall gains" arise from the combined effect of the GFC shock to the DRP and an immediate regime change.

Frontier (2015, paras 119-122) refers to the issue of double-counting some DRP figures that would result from immediately switching from the on-the-day regime to the new regime. For example, Lally (2014b, Table 2) estimates the prevailing DRP in mid 2009 as 4.1%. Thus, under the old regime, firms experiencing a regulatory reset in mid 2009 would have received a DRP allowance of 4.1% (or thereabouts). If the new regime were immediately adopted in mid 2014, the same figure of 4.1% would be given a 10% weight in determining the allowed DRP for 2014/15, and would continue to receive that weight for a further four years. So, the high DRP in 2009 contributes to the DRP allowed under both the old regime and the new regime, which is double-counting. Frontier's response is to reject the claim of double-counting because the DRP allowances under the new regime properly reflect the costs incurred by a BEE. However the double-counting claim rests on precisely this point coupled with the operation of the previous regime. If double-counting is caused by the combination of A and B, stating that B occurs is not a rebuttal. Frontier also argues that the alleged double-counting is simply part of the normal operation of the trailing average regime, in the sense that the DRP in (say) 2015 affects the regulatory allowances for the ten following years under a trailing average regime. However, with immediate adoption of the new regime, the DRP in 2015 will only affect the DRP allowances under the new regime just as the DRP in 2004 or earlier years only affects the DRP allowance under the old regime. By contrast, the DRPs for all years 2005-2013 affect the allowances under both regimes, i.e., they are counted twice. This is not part of the normal operation of a trailing average regime and would never

have arisen if the trailing average regime had always been used. It would occur only because of immediate adoption of the new regime. Furthermore, the double-counted years include many years with unusually large DRPs and double-counting large numbers is favourable to the businesses at the expense of their customers.

4.4 CEG

CEG (2015c, section 4.3.2) refers to clause 6.5.2 (k) (4) of the NER and its counterpart in the NGR, requiring the AER to have regard to "any impacts…on a benchmark efficient entity that could arise as a result of changing the methodology that is used to estimate the return on debt…". CEG does not consider that this wording supports the AER's proposed transitional process for the DRP. I consider the words "any impacts" to be sufficiently embracing that the AER's proposed transitional process is perfectly consistent with it.

CEG (2015c, section 4.3.2) also refers to clause 6.5.2 (c) of the NER, which requires that the allowed 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…". CEG argues that this requirement is prospective in nature, and that this rules out the AER's consideration of past events (the 'windfall gain') in favouring its transitional regime for the DRP. However, as discussed in Lally (2015, sections 8.2-8.5), this legal requirement is equivalent to the NPV = 0 principle (which is also forward-looking), this principle implies that the only viable regulatory policy is to neutralize the one-off effects of regime changes or at least the one-off effects that are large in either direction, and the AER's proposed transitional regime does so. Doing so may require, at the time of the regime change, consideration of earlier events.

CEG (2015c, section 4.3.2) also argues that clause 6.5.2 (c) must be prospective in nature in order to preclude constant regulatory reassessment of past decisions and thereby undercut incentives for firms to minimize their cost of debt. I hold no view on the legal question here but consider that regulatory reassessments of past decisions in the course of implementing a particular regulatory regime are highly undesirable for the reason given by CEG. However, the circumstances in question here relate to a change in regulatory regime rather than the normal operation of a particular regulatory regime. As argued above, it is imperative to neutralize the large one-off effects of regime changes and doing so may require, at the time of the regime change, consideration of earlier events. Furthermore, doing so does not undercut

any incentives for a business to minimize its cost of debt. On the contrary, it protects businesses from the one-off impact of a regime change (which could be highly adverse) and this maintains incentives for businesses to invest. A business contemplating investment but facing a possible regime change that could exert a highly adverse and uncompensated effect on them would be discouraged from investing.

CEG (2015c, section 4.3.2) argues that the AER's approach to the DRP windfall gain issue involves the same transitional process for all firms and therefore some firms (those with cycles beginning in 2007, 2010, and 2011) will be subject to losses "greater than any estimated past over compensation". However, this claim is false; as shown in Lally (2014b, Table 4), the (small) losses for these firms (DRP compensation less than DRP incurred) result from the previous regulatory regime, not from the transitional process. Furthermore, as shown in the same table, the results for all firms from using the proposed transitional process are almost identical to those that would have occurred had the previous regime been maintained.

CEG (2015c, section 4.3.2) argues that, given the AER's approach to the DRP windfall gain, it ought to favour a different transitional process for each firm. However, the contrary arguments appear in Lally (2014b, pp. 29-30) and CEG do not address any of them.

CEG (2015c, section 4.3.2) argues that, if transitional arrangements for the DRP are warranted so as to take account of the windfall gain arising from the GFC, they should also account for earlier under and over compensation. However, the issue here is not one of past under or over compensation per se. The issue is that the combined effect of the GFC and immediate adoption of the new regime 2014 generates an extraordinarily large one-off impact on regulated businesses, and this requires neutralization. There is no earlier event that has such an effect.

CEG (2015c, section 4.3.3) argues that the excess of DRP compensation over that incurred up to the time of the regime change are not the result of the adoption of the trailing average DRP, and therefore should be ignored in the course of adopting the new regime. It is tautological that the accumulated DRP excess from the commencement of the GFC until 2014 was not caused by the change in methodology in 2014; an event in 2014 cannot cause earlier events. The appropriate course of action now depends only upon the future

consequences of actions. If the regime is not changed, this accumulated effect is expected to dissipate. With immediate adoption of the new regime, this does not occur. With a transitional process, this accumulated effect is also expected to dissipate. So, relative to no regime change, immediate adoption of the new regime yields a highly favourable one-off effect. Such effects should be neutralized, and the proposed transitional regime does so. Alternatively, as in Lally (2014b), one could have compared the consequences of these three possible courses of action over the period from the commencement of the GFC in 2008. In this case, the accumulated excess from 2008 to 2014 equally affects the results of all three courses of action and therefore does not affect the choice between them. This choice is driven entirely by the differences in their *future* consequences.

CEG (2015c, section 4.4.1) argues that the AER's concerns about the use of historical DRP data are unwarranted. These arguments replicate those raised in CEG (2015a) and are addressed in Lally (2015, pp. 57-59).

CEG (2015c, section 4.4.2) refers to arguments raised by the AER concerning price level and volatility. CEG characterizes these arguments as being equivalent to the "windfall gain" argument. This windfall gain is the highly favourable one-off gain to businesses at the expense of their customers, arising from the combined effect of the GFC and immediate adoption of the new regime, and in my view ought to be neutralized. So, characterizing the AER's arguments concerning price level and volatility as being equivalent to the windfall gain issue supports rather than undercuts them.

CEG (2015c, section 4.4.3) refers to arguments raised by the AER (2014, page 122) concerning opportunistic behavior by businesses, i.e., transitional arrangements not involving past data discourages businesses from favouring a particular course of action (immediate adoption of the new regime) for self-interested reasons (higher allowed revenues than for no regime change). This is embodied within the fourth criterion adopted by the AER (2015), as discussed in section 2 above. CEG's response is that the AER's transitional process has the wrong starting point (the current regime rather than the efficient strategy for businesses under the old regime). The AER's concerns seem to me to be uncontroversial and CEG's response seems to be entirely tangential.

CEG (2015d, sections 4.3 and 4.4) replicate the wording in CEG (2015c, section 4), as reviewed above. CEG (2015e, sections 4.3 and 4.4) do likewise.

CEG (2015f) estimates the under or over compensation experienced by SAPN during its past two regulatory periods (2005-2015) and the next two (2015-2015), and concludes that there was past under compensation averaging about 0.06% per year (ibid, para 82) and future expected under compensation averaging about 0.50% per year (ibid, Figure 8). However, unlike the QTC, these estimates are for the entire cost of debt rather than just the DRP. This is unhelpful because estimates of under or over compensation for the base rate and the DRP have different policy implications. In particular, estimates of under compensation in respect of the DRP might be used to challenge the AER's use of a transitional regime for the DRP whilst estimates of under or over compensation in respect of the base rate could at most affect judgements about the form of the transitional process. CEG's calculations are premised upon SAPN using swap contracts during the previous regime, and this implies that some form of transitional process will be required for the base rate. So, in examining CEG's calculations, the significant aspect here is estimates of under or over compensation relating to the DRP.

In respect of the DRP, CEG states that there is under compensation at the commencement of the new regime under the AER's transitional process, of 0.89% (ibid, para 68). However, no further figures for only the DRP are provided. Thus, I will assume that CEG's calculations for the DRP do reveal past under compensation and expected future under compensation. In this case, the situation is similar to that of Energex and Ergon Energy as examined by the QTC (2015) and reviewed in section 4.1 above, and the same conceptual problems arise. Firstly, CEG's process estimates all disparities between the DRP allowed and incurred by SAPN for the 2005-2015 period. Thus, in addition to mismatches between the DRP allowed and that incurred arising from the combined effect of the GFC and the regime change that took effect for them in 2015, it includes *all* other sources of mismatches from 2005 until 2015. These include mismatches arising from errors by regulators in setting the allowed DRP. Such a broader remit is unwarranted because the additional mismatches are not evidently substantial (and may not be even real in the case of alleged errors by regulators in setting the allowed DRP). By contrast, the mismatches arising from the combined effect of the GFC and the regime change commencing in 2014 are very large for the industry and failure to neutralize them would also violate the NPV = 0 principle as discussed in Lally (2015, section 8.5).

Secondly, CEG's estimates of past disparities requires quite precise estimation of the DRP over the entire period back to 1995 (ten years before the 2005 reset point, from which CEG perform their calculations, because a ten-year trailing average DRP is required in 2005). However, the data does not exist to do this. CEG's (2015f, para 61) response to this is to simply assume that the DRPs (relative to the swap rate) for the 1995-2001 period were equal to four times the swap to CGS spread. This assumption is very crude, and undercuts the credibility of CEG's estimate of past under compensation.

Thirdly, because CEG estimates the DRP incurred by SAPN from a DRP series involving market data, and also uses the actual DRP allowances received by SAPN, the two data sets conflict at the regulatory reset points. This leads CEG to implicitly judge past regulatory determinations to be wrong. Furthermore, if the AER carried out the same type of calculations, it would also judge most past determinations (including its own) to be wrong, as judged by retrospective use of a DRP series that the AER has currently selected for this purpose. Such an exercise would be bordering on the surreal, even if it were legally possible. In view of these problems, I do not think that the estimates provided by CEG are useful.

CEG (2015g, paras 12-21, Appendix B) disputes the AER's claims concerning the size of the DRP 'gain' (DRP allowances less that incurred) in the period from 2008 till 2014. CEG's initial comments on this matter appear in CEG (2015a), and my response appears in Lally (2015, section 9.6). In particular, I state there that:

> "*CEG (2015, paras 104-105) argues that the analysis of windfall gains in Lally (2014a, section 3.1) assumes that businesses with regulatory cycles commencing in mid 2009 received DRP compensation of 4.1% but the compensation granted to the NSW businesses was in fact 2.03%, being the cost of debt compensation of 8.82% (based upon an averaging period of 18.8.2008 to 5.9.2008) net of the contemporaneous five-year swap rate of 6.79%. However, the DRP results presented in Lally (2014a, Table 2) are drawn from a CEG report in which the DRP is defined relative to the ten-year CGS rather than the five-year swap rate and therefore derivation of a DRP from an allowed cost of debt would have to deduct the ten-year CGS. Over the period 18.8.2008 to 5.9.2008, this is 5.75% (data from the RBA), yielding an implied DRP of 3.08%. Furthermore, since this implied DRP is for*

27.8.2008 (the mid-point of the averaging period), it would have to be compared to the DRP value in Lally's Table 2 for the same point in time and interpolating over the values of 3.2% for mid 2008 and 4.1% for mid 2009 yields a figure of 3.34% for 27.8.2008. This figure differs from CEG's implied DRP of 3.08% by only 0.26% rather than the difference of 2.03% claimed by CEG."

In response to this, CEG (2015g, Appendix B) defend their definition of the DRP as the cost of debt net of the five-year swap rate on the grounds that the AER assumes that entities regulated in accordance with the old regime entered into such swap contracts, and therefore their estimate of 2.03%. This defence contains three errors. Firstly, assuming that businesses borrow for ten years (which is uncontroversial), their incurred cost is the ten-year base rate plus the DRP defined relative to that base rate. So, if the base rate is treated as the swap rate, it is the ten year swap rate and the DRP is then relative to the ten-year swap rate. If they also enter a swap contract to convert the ten-year swap rate into the five-year swap rate, their incurred cost of debt k is then the ten-year cost of debt k_{10} plus the effect of the swap contract, which is equal to the five-year swap rate plus the DRP defined against the ten-year swap rate as follows:

$$k = k_{10} + SWAP = S_{10} + (k_{10} - S_{10}) + (S_5 - S_{10}) = S_5 + (k_{10} - S_{10})$$

So, even here, the DRP must be defined and therefore estimated relative to the ten-year swap rate rather than the five-year rate. Accordingly, CEG's estimation of a DRP by deducting a five-year swap rate from a total cost of debt for ten years is incorrect.

Secondly, and more importantly, although defining and therefore estimating the DRP relative to the swap rate rather than the CGS rate is more natural in the present circumstances (because of the presumption that the BEE would have engaged in swaps under the old regime), DRPs can be defined and therefore estimated relative to either CGS or swap, and CEG have done both; CEG (2014, Figure 1) is relative to CGS and CEG (2015c, Figure 17) is relative to swap. Consequently, one must be consistent when comparing an allowed DRP to an incurred DRP. Lally (2014b, Table 2) presents DRP estimates defined relative to CGS, and drawn from CEG (2014, Figure 1). CEG (2015a) presents an estimate defined relative to swap, and then concludes that Lally's estimate is too high. No sensible comparison is possible because these DRPs are defined differently. To argue that Lally's DRP was too

high, CEG would need to present an estimate defined in the same way, which is relative to CGS, and this remains true even if one thought that the DRP should be defined relative to the swap rate.

Thirdly, for the purposes of estimating the DRP compensation that should be paid to businesses under immediate adoption of the trailing average regime, CEG (2015c, Table 21) presents estimates (relative to swap) of 3.0% for the 2008 calendar year average and 3.9% for the 2009 calendar year average, and these figures are considerably larger than CEG's figure of 2.03% (relative to swap) in late 2008 referred to above (and claimed to be relevant to mid 2009) for the purposes of disputing the analysis in Lally (2014b). So, depending upon whether the purpose is to dispute the analysis in Lally (2014b) or to recommend an allowance that should be paid, CEG's DRP estimates at similar points in time are quite different.

4.5 Schlogl

Schlogl (2015, para 16) argues that the DRP "windfall gain" referred to by the AER is not a consequence of the regime change, and therefore the AER's claims to the contrary are incorrect. However, this apparent difference in views arises merely from different definitions of the "windfall gain". To better appreciate this point, suppose that the present value of the accumulated net DRP allowance (allowance less incurred) from the commencement of the GFC in 2008 to the regime change in 2014 is denoted X_1, and this period is denoted Period 1. Suppose further that the period from 2014 is denoted Period 2, and the present value of the expected accumulated net DRP allowance in this period had the old regime been maintained is denoted X_2. Schlogl is clearly referring to Period 1 and he claims that X_1 exists regardless of whether there is a regime change in 2014, i.e., there is a "windfall gain" of X_1 in Period 1 regardless of what happens in 2014. This is tautological; an event in 2014 cannot affect events in an earlier period. By contrast, the AER is referring to both periods 1 and 2 and claims that, in the absence of a regime change, the present value of the aggregate net DRP allowance over periods 1 and 2 is approximately zero, because the excess accumulated in Period 1 is expected to reverse in Period 2. Furthermore, with immediate adoption of the new regime in 2014, the present value over both periods is just X_1 because X_2 does not arise with immediate adoption of the new regime in 2014. So, relative to continuation of the old regime, the immediate adoption of the new regime in 2014 yields a present value of X_1. This is the "windfall gain" referred to by the AER. In summary, the alternative definitions of "windfall gains" are as follows:

Schlogl: X_1

AER: PV(new regime, no trans) – PV(no regime change) = $X_1 – (X_1 + X_2) = X_1 – 0 = X_1$

So, Schlogl is correct to assert that X_1 exists regardless of the regulatory change in 2014 and the AER is correct to assert that the present value of the accumulated net DRP from immediate adoption of the new regime in 2014 relative to continuation of the old regime is also X_1. So, Schlogl's claim that the AER is in error is incorrect. Schlogl has simply misunderstood the AER's argument.

Schlogl (2015, para 17) notes the AER's claim that their proposed transitional arrangements will reduce the potential for windfall gains or losses to businesses. Schlogl denies this and claims that the AER's proposed transitional regime will impose windfall losses in the future in order to compensate for windfall gains in the past, i.e., the AER imposes X_2 in order to offset X_1. However, in describing the effect of its proposed transitional regime and using the word "windfall", the AER is again referring to the aggregate effect over both Period 1 and Period 2; with a transitional regime, the aggregate effect would be approximately zero because X_1 is largely offset by X_2, and the same is true with continuation of the old regime. So, relative to continuation of the old regime, the present value of the accumulated effect from the new regime with a transitional period is zero:

AER: PV(new regime, trans) – PV(no regime change) = $(X_1 + X_2) – (X_1 + X_2) = 0 – 0 = 0$

The windfall gain or loss referred to by the AER is this difference in results across both Period 1 and Period 2 from using a transitional regime relative to no regime change. So, again, Schlogl has simply misunderstood the AER's argument. Furthermore, one does not need to first observe the size or direction of X_1 in order for the last two equations to be approximately valid, i.e., regardless of the size and direction of X_1, a new regime without the transitional period will yield a present value of X_1 and a new regime with the transitional process will yield a present value of approximately zero. Furthermore, the AER expressed its preference for this transitional regime as early as 2013 (AER, 2013) and therefore before the size of X_1 was known.

Schlogl (2015, para 17) also argues that the AER's proposed process is an attempt to "regulate the rate of return retrospectively". I think that this is a very emotive phrase, and it is also quite inaccurate. As noted above, the AER first expressed its preference for the transitional regime in 2013 whilst the regime change did not commence until 2014 (for businesses with resets in 2014) and the commencement date will be as late as 2018 for businesses with resets in 2018. One cannot retrospectively regulate anything with a process that is chosen up to five years before the consequences of that process are known. A better description of the AER's proposed process is that it is a defacto deferral of the introduction of the new regime in order to allow a natural reversal process to operate and thereby approximately neutralize what is expected to be a large one-off gain to regulated businesses resulting from the combined effect of the GFC and the regime change commencing in 2014.

Schlogl (2015, para 17) also argues that the AER's conclusion that its transitional process will yield similar results to continuation of the old regime presumes that the DRP will revert to its pre GFC level of 1.3% and remain there, and that doing so ignores the possibility of future variation in the DRP. In support of this claim, he cites Lally (2014b, Table 2). Schlogl's claim concerning reversion of the DRP back to 1.3% is numerically correct but this is an *expected* path rather than an assumed actual path, and therefore does not preclude the possibility of variations from that expectation. Furthermore, since the DRP is a mean reverting process and in the years just before 2014 was in the process of subsiding from an extraordinary spike, an expectation of continued subsidence back to the pre GFC level is entirely sensible. Similarly if inflation in Australia rose to 6% and then started to subside back towards its longer term level of 2.5%, a reasonable expectation of its future path would be continued subsidence back towards 2.5% and this expectation would not preclude the possibility of variation from it.

Schlogl (2015, para 18) also argues that the AER would only be justified in imposing its transitional arrangements if it were pursuing the objective to manage the rate of return of regulated entities retrospectively as well as prospectively. I do not agree. The AER's proposed action would also be justified if it were seeking to neutralize large one-off shocks to the present value of the net DRP compensation resulting from a regime change, so as to protect businesses from bankruptcy risks and to act in accordance with the NPV = 0 principle (as discussed in Lally, 2015, section 8.3). Furthermore, if the AER were in the business of retrospectively managing the rate of return of regulated entities, there would be a trail of such

retrospective actions in the past 15 years. There is no such trail. So, the present proposal is a response to a regime change.

Schlogl (2015, para 19) also argues that retrospective management of the rate of return of regulated entities would be appropriate only if the mechanism by which it was to occur was known to regulated entities ex ante, and this is not the case. Accordingly, regulated entities would have operated under the assumption that they had to bear the risk of mismatches between the allowed and incurred DRP. However, I do not agree that the AER is engaged in this retrospective management. I do agree that regulated entities would have operated under the belief that they had to bear the risk of mismatches between the allowed and incurred DRP in the course of being subject to the on-the-day regime, and all of their experience under that regime would have supported that belief. However, I do not think that they would have operated under the belief that they would bear the risk of a large one-off gain or loss as a result of a regime change. Furthermore, had the result here been a large one-off loss rather than a gain, I imagine that they would have petitioned for relief and been able to present reports from many experts in support of that. The contrary claims in the face of a one-off gain therefore have a very self-interested look.

4.6 Citipower

Citipower (2015, pp. 228-233) favours immediate adoption of the trailing average DRP, consistent with this currently being paid by regulated businesses. In support of this, Citipower refers to the legal requirement to set allowed returns in accordance with the costs of the BEE and that this is to be interpreted in the forward-looking sense. However, as discussed in Lally (2015, section 8.2), the legal requirement is equivalent to the NPV = 0 principle (which is also forward-looking) and as discussed in Lally (2015, section 8.3) this implies that the only viable regulatory policy is to neutralize the large one-off effects of regime changes. Doing so may require, at the time of the regime change, consideration of events prior to the regime change.

4.7 SA Power Networks

SAPN (2015, pp. 383-388) favours immediate adoption of the trailing average DRP, consistent with this currently being paid by regulated businesses. SAPN summarises the arguments in SFG (2015), CEG (2015c), CEG (2015f), and Schlogl (2015), which have been discussed above. So, only additional arguments are considered here.

SAPN refers to the requirement in clause 6.5.2 (k) (4) of the NER for the AER to have regard to "any impacts…on a benchmark efficient entity that could arise as a result of changing the methodology that is used to estimate the return on debt…". SAPN argues that this provision "..does not provide a general license to bring to account costs over the life of the regulatory assets but rather focuses on the specific impacts of a movement from one regime to another." However, the windfall gain referred to by the AER in support of a transitional regime for the DRP is in fact a specific impact of the regime change. Without the regime change, the present value of the net DRP compensation from the commencement of the GFC in 2008 until its full effects have dissipated is approximately zero. By contrast, with immediate adoption of the new regime, this present value is substantial and this is the windfall gain referred to by the AER. So, in arguing for a transitional regime, the AER is focusing upon the specific impact of a movement from one regime to another.

4.8 Australian Gas Networks

AGN (2015, section 10) favours immediate adoption of the trailing average DRP, consistent with this currently being paid by regulated businesses. AGN summarises the arguments in CEG (2015e), which have been discussed above. So, only additional arguments are considered here.

AGN refers to the requirement in Rule 87 (11) (d) of the NGR for the AER to have regard to "any impacts…on a benchmark efficient entity that could arise as a result of changing the methodology that is used to estimate the return on debt…". AGN argues that this provision "..does not provide a general license to bring to account costs over the life of the regulatory assets but rather focuses on the specific impacts of a movement from one regime to another." However, the windfall gain referred to by the AER in support of a transitional regime for the DRP is in fact a specific impact of the regime change. Without the regime change, the present value of the net DRP compensation from the commencement of the GFC in 2008 until its full effects have dissipated is approximately zero. By contrast, with immediate adoption of the new regime, this present value is substantial and this is the windfall gain referred to by the AER. So, in arguing for a transitional regime, the AER is focusing upon the specific impact of a movement from one regime to another.

4.9 Other Submissions

Ausnet (2015, pp. 336-339), ActewAGL (2015, section 5), Energex (2015, section 7.3.1), JEN (2015, pp. 89-94), United Energy (2015, section 4), and Amadeus (2015, section 8.4) all favour immediate adoption of the trailing average DRP, consistent with this currently being paid by regulated businesses. ActewAGL (2015, section 5) also summarises the arguments in CEG (2014) and SFG (2015), which have been discussed above. Energex (2015, section 7.3.1) also summarises the arguments in QTC (2015) and Frontier Economics (2015), which have been discussed above.

5. Assessment of Proposed Approaches Against Relevant Criteria

The AER has identified a number of criteria drawn from the legislative requirements, against which methods for estimating the cost of debt should be assessed. These are as follows:

(1) The method will or is likely to promote efficient investment in, and efficient operation and use of, electricity and gas services for the long term interests of consumers.
(2) The method is likely to provide service providers with a reasonable opportunity to recover at least the efficient costs the operator incurs in providing regulated network services.
(3) The method is likely to provide a return commensurate with the regulatory and commercial risks involved in providing regulated network services.
(4) The method produces a return on debt 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 regulated network services. The AER defines a benchmark efficient entity as a pure play, regulated energy network business operating within Australia. The AER also considers a benchmark efficient entity would have a BBB+ credit rating and a 10 year debt term.
(5) The method is capable of producing annual changes in revenue through the automatic application of a formula specified in the regulatory determination. That is, whether the approach can be fully specified upfront in the regulatory determination such that no judgement or discretion is required to annually update the return on debt each year, and therefore there are no elements of the approach which are open for debate or dispute in applying the pre-specified approach.

The last criterion requires a formulaic approach and is therefore clearly satisfied by the AER's proposed transitional approach. The same applies to the alternatives favoured by some of the regulated businesses, involving immediate adoption of the trailing average DRP and a different transitional process for the base rate.

The first four criteria listed above are essentially equivalent, and are most fully expressed in the fourth criterion. In turn this criterion can be expressed more precisely as satisfying the NPV = 0 principle and neutralizing the impact of any large one-off effects from a regime change. In respect of the DRP, these fundamental tests are satisfied by the AER's transitional approach to the DRP and are not satisfied by the alternative approach involving immediate adoption of a trailing average DRP. Finally, in respect of the base rate, these fundamental tests are satisfied by the AER's transitional approach. In addition, they would also be satisfied by the alternative transitional approach favoured by JEN, United Energy, Energex, and AGN.

In summary, these five criteria listed above are satisfied by the AER's proposed approach and the alternative transitional process for the base rate that is favoured by some of the regulated businesses. By contrast, the proposal favoured by some of the regulated businesses to immediately adopt the trailing average DRP does not satisfy the first four criteria.

6. Conclusions

The AER has proposed switching from setting the cost of debt at the rate prevailing at the beginning of the regulatory cycle to setting it in accordance with an annually revised ten-year trailing average, with a ten-year transitional process applied to the entire cost of debt. This paper has reviewed the AER's arguments in support of its proposed transitional process, the contrary arguments raised in various submissions, and then assessed all proposals against a set of criteria drawn from the legislative requirements. The conclusions are as follows.

Firstly, I agree with the AER's criteria for assessing the relative merits of transitional processes for the cost of debt, subject only to replacing their first criterion by the more general requirement when changing regimes to neutralize large one-off effects on businesses in either direction, even if they do not violate the NPV = 0 principle.

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 behavior to the new regime in which use of these swaps is no longer warranted.

Thirdly, in respect of transitional processes for the base rate, three options are available: the AER's proposal, an alternative favoured by many of the regulated businesses, and an alternative presented earlier by me. The results from the first two of these proposals range from a small gain to a small loss to businesses from the switch to the new regime, over the ten-year transitional period, depending upon the path of future interest rates and whether or not the benchmark efficient entity reacts to the regime change in the way assumed in the second proposal. The third possible transitional regime would completely neutralize the impact of the regime change on businesses, but only if the businesses did not engage in a new round of swap contracts in response to the regime change, and this is unclear. So, none of the options is clearly best. However, there is some merit to the AER using the same transitional process for the base rate and the DRP, and this factor favours the AER's proposed approach.

Fourthly, in respect of the AER's proposed transitional process for the DRP, this is designed to largely neutralize the large one-off impact of the regime change on the regulated sector, which is good regulatory policy in general, and it also avoids the use of contentious historical

DRP data. Many submissions favour immediate adoption of the trailing average DRP but present no arguments that counter these desirable features of the AER's proposed approach.

Fifthly, and also in respect of the AER's proposed transitional process for the DRP, two submissions in respect of particular businesses claim that the present value of the differences between the DRP allowances received and incurred are adverse up to the date of the regime change and the AER's proposed transitional process would aggravate this situation rather than ameliorate it. However, these alleged future effects from the AER's proposed process are not consequences of it but of the combined effect of the GFC and the timing of the regulatory resets for these businesses, and would have arisen even had the old regime been maintained. In addition, these exercises incorporate not merely past mismatches between the DRP allowed and that incurred arising from the GFC but all past mismatches, including those arising from errors by regulators in setting the allowed DRP, and such a broad remit is unwarranted because the additional mismatches are not evidently substantial, may not even be real because of errors in estimating past incurred DRPs, and implicitly judge some past regulatory determinations to be wrong (whenever the determination differs from the contemporaneous value for the historical DRP series that is used to estimate the past DRP incurred by the businesses). Furthermore, one of these two exercises seems to favour compensation now for all such past mismatches, and therefore would involve the AER judging many past determinations (including its own) to be wrong, as judged by retrospective use of a DRP series that the AER has currently selected for this purpose, and compensating accordingly. Such an exercise would be bordering on the surreal. I therefore do not favour it.

Sixthly, in respect of the five criteria drawn from legislative requirements and against which all proposals are assessed, one of these criteria requires a formulaic approach and is therefore clearly satisfied by both the AER's proposed transitional approach and the alternatives proposed by some of the regulated businesses, involving immediate adoption of the trailing average DRP and/or a different transitional process for the base rate. The remaining criteria are essentially equivalent, and can be expressed more precisely as satisfying the NPV = 0 principle and neutralizing the impact of any large one-off effects from a regime change. In respect of the base rate, these requirements are satisfied by the AER's proposed transitional approach and also by the alternative transitional approach favoured by some of the businesses. In respect of the DRP, these requirements are also satisfied by the AER's

transitional approach to the DRP but they are not satisfied by the alternative approach involving immediate adoption of a trailing average DRP.

Finally, I have previously provided advice on the transitional issue to the AER and nothing in these submissions warrants any change in that advice.

APPENDIX 1: Terms of Reference

Services required

Based on a review of the material listed in the attachment to this request for quote, provide a supplementary report updating the advice provided in November 2014 and April 2015.[18] The report is to:

1. Critically review the AER's position and reasons for adopting a transition to a trailing average approach, and the form of that transition.

2. Critically review the criticism of the AER's position and reasons, and criticisms of Dr Lally's previous reports, as submitted by service providers with current regulatory determinations. Among other matters, this should include:

    a. A review of the argument that under the on-the-day approach it was optimal to hedge less than 100 per cent of the base rate. In particular, review the material from CEG on this topic.[19]

    b. A review of the argument that taking into account the regulatory approach applied to debt over the previous two regulatory periods, and the AER's transition approach which will apply for the next two regulatory periods, a benchmark efficient entity will be undercompensated for its efficient financing costs. In particular, review the material from the QTC and CEG on this topic that relate to a benchmark efficient entity in the circumstances of the Queensland and South Australian electricity distribution networks[20]

3. Critically review the alternative hybrid transition approach proposed by service providers with current regulatory determinations.

4. Explain whether and why your advice and conclusions on adopting a transition to a trailing average, including the form of that transition, are either changed or unchanged from the November 2014 and April 2015 reports.

5. Consider the comments in recent submissions from consumer groups on the return on debt, to the extent relevant to this advice.

---

[18] Lally, *Transitional arrangements for the cost of debt*, 20 November 2014; Lally, *Review of submissions on the cost of debt*, April 2015.

[19] CEG, *The hybrid method for the transition to the trailing average rate of return on debt—Assessment and calculations for AGN*, June 2015; CEG, *Efficient use of interest rate swaps to manage interest rate risk—Privileged and confidential*, June 2015

[20] QTC, *Return on debt transition analysis, A Joint Report for Energex and Ergon Energy*, July 2015; CEG, *The hybrid method for the transition to the trailing average rate of return on debt—Assessment and calculations for SAPN*, June 2015

6. In answering each of the above questions, compare and contrast the AER's transition approach with the alternative hybrid transition approach proposed by service providers with current regulatory determinations, and advise on:

    a. Whether the approach will or is likely to promote efficient investment in, and efficient operation and use of, electricity and gas services for the long term interest of consumers

    b. Whether the approach is likely to provide service providers with a reasonable opportunity to recover at least the efficient costs the operator incurs in providing regulated network services

    c. Whether the approach is likely to provide a return commensurate with the regulatory and commercial risks involved in providing regulated network services

    d. Whether the approach produces a return on debt commensurate with the efficient financing costs of a benchmark efficient entity with a similar degree of risk at that which applies to the service provider in respect of the provision of regulated network services. The AER defines a benchmark efficient entity as a pure play, regulated energy network business operating within Australia. The AER also considers a benchmark efficient entity would have a BBB+ credit rating and a 10 year debt term.

    e. Whether the approach is capable of producing annual changes in revenue through the automatic application of a formula specified in the regulatory determination. That is, whether the approach can be fully specified upfront in the regulatory determination such that no judgement or discretion is required to annually update the return on debt each year, and therefore there are no elements of the approach which are open for debate or dispute in applying the pre-specified approach.

Attachment—Background documents

Rate of return guideline

Key AER rate of return guideline documents including consultant reports commissioned by the AER are listed in the following table.

Author and document link	Document
AER (2013)	AER, *Better regulation—Explanatory statement to the draft rate of return guideline*, August 2013, pp.73–97.
AER (2013)	AER, *Better regulation—Final rate of return guideline*, December 2013, pp.18–20.
AER (2013)	AER, *Better regulation—Explanatory statement to the final rate of return guideline*, December 2013, pp. 98–125.
Lally (2013)	Lally. *Estimating the cost of debt of the benchmark efficient regulated energy network business*, 13 August 2013
Chairmont (2012)	Chairmont, *Debt risk premium expert report*, 9 February 2012.

Recent AER regulatory determinations

Key recent AER regulatory determination documents including consultant reports commissioned by the AER are listed in the following table.

Author and document link	Document
(AER 2014)	AER, *Draft decision—JGN access arrangement 2015–20*, November 2014, pp.100–127, 285–289
(AER 2015)	AER, *Final decision—JGN access arrangement 2015–20*, June 2015, pp.141–191.
Lally (2014)	Lally, *Transitional arrangements for the cost of debt*, 20 November 2014.
Lally (2015)	Lally, *Review of submissions on the cost of debt*, April 2015,
Chairmont (2015)	Chairmont, *Cost of debt: Transitional analysis*, April 2015.

Current regulatory proposals

Key service provider proposal documents are listed in the following table.

Author and document link	Document
Electricity distribution—Victoria	
AusNet	AusNet, *Initial proposal*, April 2015, pp.336–339, 358.
CitiPower	CitiPower, *Initial proposal*, April 2015, pp.228–234, 238–239. [Note: Powercor's proposal is identical to CitiPower's proposal with respect to return on debt]
JEN	JEN, *Initial proposal—Attachment 9.2—Rate of return proposal*, April 2015, pp.89–94, 105–107.
UED (attached)	UED, *Initial proposal—Rate of return on debt attachment*, April 2015, pp.14–23, 60.
Electricity distribution—SA and Queensland	
Ergon	Ergon Energy, *Revised proposal—Appendix C—Rate of return*, July 2015, pp.148–151.
Ergon	Ergon Energy, *Submission to the AER—Rate of return: Cost of debt*, July 2015, pp.13–24.
Energex	Energex, Revised regulatory proposal, July 2015, pp. 103–112.
SAPN	SA Power Networks, *Revised proposal*, July 2015, pp.383–388.
Gas—ACT, SA and NT	
ActewAGL	ActewAGL, *Initial proposal—Appendix 8.01—Detailed return on debt proposal*, June 2015, section 5 [no page numbers].
AGN	Australian Gas Networks, *Initial proposal—Attachment 10.1—Rate of return*, July 2015, pp.44–51.
Amadeus	Amadeus, *Initial proposal—Access arrangement information*, August 2015, pp.28–33.

Amadeus	Amadeus, *Initial proposal—Access arrangement revision submission*, August 2015, pp. 137–147

Key consultant reports submitted or referenced by service providers in support of their proposals are listed in the following table.

Author and document link	Document	Submitted or referenced by
CEG (attached)	CEG, Application of AER criteria to methods for estimating efficient debt finance costs, June 2015.	ActewAGL
CEG	CEG, *Efficiency of staggered debt issuance*, February 2013.	AusNet JEN
CEG[21]	CEG, *Efficient use of interest rate swaps to manage interest rate risk (CONFIDENTIAL),* June 2015.	AGN UED
CEG	CEG, *Critique of the AER's JGN draft decision on the cost of debt*, April 2015.	ActewAGL AusNet CitiPower JEN UED Energex Ergon Energy SAPN
CEG (attached)	CEG, *The hybrid method for the transition to the trailing average rate of return on debt—Assessment and calculations for United Energy*, April 2015.	UED
CEG	CEG, *The hybrid method for the transition to the trailing average rate of return on debt—Assessment and calculations for AGN*, June 2015	AGN
CEG	CEG, *The hybrid method for the transition to the trailing average rate of return on debt—Assessment and calculations for SAPN*, June 2015	SAPN
Frontier Economics	Frontier Economics, Cost of debt transition: Report prepared for Energex, June 2015.	Energex.
QTC	QTC, *Return on debt transition analysis, A Joint Report for Energex and Ergon Energy*, July 2015.	Energex Ergon Energy
Schlogl	Schlogl, *The AER's JGN draft decision on the cost of debt—A review of the critique by the CEG*, 23 April 2015.	UED Ergon Energy
SFG	SFG, *Return on debt transition arrangements under the NGR and NER*, February 2015	CitiPower JEN SAPN
UBS (attached)	UBS, *Analysis of liquidity of interest rate swaps—UBS response to the TransGrid request for interest rate risk analysis following the AER draft decision of November 2014*, January 2015	UED
UBS (attached)	UBS, *Transaction costs and the AER return on debt draft determination*, March 2015.	CitiPower JEN

[21] This confidential report will be provided to the consultant after a confidentiality deed is signed.

Statements by corporate treasurers during the 2009 WACC review on their financing practices are listed in the following table.

Author and document link	Document	Submitted or referenced by
Buck Khim	Buck Khim, *Witness statement of Sim Buck Khim*, Jemena, undated.	JEN UED
Meredith	Meredith, *Witness statement of Gregory Damien Meredith*, Envestra, 31 January 2009	JEN UED
Noble	Noble, *Witness statement of Andrew Noble*, CitiPower and Powercor, undated.	JEN UED
Watson	Watson, *Witness statement of Alistair Watson*, SP AusNet, 30 January 2009.	JEN UED

Key consumer submissions submitted in current regulatory processes are listed in the following table.

Author and document link	Document
CCP	Consumer Challenge Panel, *Sub panel 3—Response to proposals from Victorian electricity distribution network service providers for a revenue reset for the 2016–2020 regulatory period*, 5 August 2015, pp.63–75, and attachment 1

APPENDIX 2: The Impact of Inflation Forecast Errors in the Period 1970-1986

This Appendix examines CEG's (2015b, section 4.3.1) argument that inflation forecast errors in the US in the period 1970-1986 would have caused the allowed cost of debt to effectively diverge from the rate prevailing at the beginning of the regulatory cycle by the amount of the forecast error. To focus upon the key issue, I assume that there is no opex or taxes, and that capex matches depreciation so that the RAB does not change.

Without loss of generality, I assume an RAB of $1000 at the beginning of the regulatory cycle and, consistent with the assumptions above, this does not change over the regulatory cycle. In addition, the prevailing WACC at the beginning of the regulatory cycle is 10%, comprising a cost of debt of 8%, a cost of equity of 12% and leverage of 50%. So, the price or revenue cap would be set at the beginning of the cycle to yield expected revenues of $1000*(0.10) = $100 per year over the five year regulatory cycle. The present value of this stream coupled with the RAB of $1000 in five years, discounted at the WACC of 10%, is equal to the initial RAB of $1000. Consistent with the AER's practice, this stream is modified so that it escalates at the actual inflation rate and a starting value (X) is chosen so that the present value is still $1000. Suppose inflation is expected to be 2%. The value of X must then satisfy the following equation:

$$\$1000 = \frac{X(1.02)}{1.10} + \frac{X(1.02)^2}{(1.10)^2} + \frac{X(1.02)^3}{(1.10)^3} + \frac{X(1.02)^4}{(1.10)^4} + \frac{X(1.02)^5 + \$1000}{(1.10)^5}$$

The solution is X = $94.54, which implies expected revenues in years 1, 2…5. If actual inflation is 4%, then the stream of revenues will be larger. CEG argues that these forecast errors should be attributed to the cost of debt and equity rather than merely to a smoothing process that is quite separate to the allowed costs of capital. However, if the higher revenues due to the inflation forecast error are attributed to the cost of capital, one must insert the realized revenues into the last equation and solve for the cost of capital that satisfies the NPV = 0 condition, as follows:

$$\$1000 = \frac{\$94.54(1.04)}{1+k} + \frac{\$94.54(1.04)^2}{(1+k)^2} + \frac{\$94.54(1.04)^3}{(1+k)^3} + \frac{\$94.54(1.04)^4}{(1+k)^4} + \frac{\$94.54(1.04)^5 + \$1000}{(1+k)^5}$$

The solution is k = .1057. So, the inflation forecast error of 2% is equivalent to raising the allowed cost of capital from 10% to 10.57%, and therefore the allowed cost of debt from 8% to 8.57%. 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.

REFERENCES

ActewAGL, 2015. *Initial Proposal-Appendix 8.01-Detailed Return on Debt Proposal* (www.ear.gov.au).

AEMC, 2012. *Rule Change* (www.aemc.gov.au).

AER, 2009. *Final Decision Electricity and Distribution Network Service Providers Review of the WACC Parameters* (www.aer.gov.au).

AER, 2013. *Better Regulation*: *Explanatory Statement Rate of Return Guideline* (www.aer.gov.au).

____ 2014. *Jemena Gas Networks Draft Decision Attachment 3 Rate of Return* (www.aer.gov.au).

____ 2015. *Final Decision Jemena Gas Networks (NSW) Ltd Access Arrangement 2015-20 Attachment 3 Rate of Return* (www.aer.gov.au).

AFMA, 2013. *AER Draft Rate of Return Guideline – Choice of Benchmark Term of Debt*, submission to the AER (www.aer.gov.au).

AGN, 2015. *Attachment 10.1 Rate of Return 2016/17 to 2020/21 Access Arrangement Information* (www.aer.gov.au).

Amadeus, 2015. *Initial Proposal – Access Arrangement Revision Submission* (www.aer.gov.au).

Ausnet, 2015. *Ausnet Electricity Services Pty Ltd*: *Electricity Distribution Price Review 2016-20* (www.aer.gov.au).

CEG. 2012, *Internal Consistency of Risk Free Rate and MRP in the CAPM*, report prepared for Envestra, SP AusNet, Multinet and APA (www.aer.gov.au).

____ 2014. *Debt Transition Consistent with the NER and NEL*, report prepared for ActewAGL (www.aer.gov.au).

____ 2015a, *Efficient Debt Financing Costs*, report prepared for ActewAGL (www.aer.gov.au).

____ 2015b. *Efficient Use of Interest Rate Swaps to Manage Interest Rate Risk* (www.aer.gov.au).

____ 2015c. *Critique of the AER's JGN Draft Decision on the Cost of Debt*, report prepared for Ausnet (www.aer.gov.au).

____ 2015d. *The Hybrid Method for the Transition to the Trailing Average Rate of Return on Debt*: *Assessment and Calculations for United Energy*, report prepared for United Energy (www.aer.gov.au).

____ 2015e. *The Hybrid Method for the Transition to the Trailing Average Rate of Return on Debt*: *Assessment and Calculations for AGN*, report prepared for AGN (www.aer.gov.au).

____ 2015f. *The Hybrid Method for the Transition to the Trailing Average Rate of Return on Debt*: *Assessment and Calculations for SAPN*, report prepared for SAPN (www.aer.gov.au).

____ 2015g. *Application of AER Criteria to Methods for Estimating Efficient Debt Finance Costs*, report prepared for ActewAGL (www.aer.gov.au).

Chairmont Consulting, 2013. *Comparative Hedging Analysis*, report prepared for the ERAWA (www.erawa.com.au).

_____ 2015. *Cost of Debt*: *Transitional Analysis*, report prepared for the AER (www.aer.gov.au).

Citipower, Powercor Australia, and SA Power Networks, 2013. *Response to the AER's Draft Rate of Return Guideline*, submission to the AER (www.aer.gov.au).

Citipower, 2015. *Regulatory Proposal 2016-2020* (www.aer.gov.au).

Ergon Energy, 2015. *Submission to the AER on its Preliminary Determination-Rate of Return*: *Cost of Debt* (www.aer.gov.au).

Evans & Peck, 2013. *QCA*: *SEQ Retail Water Price Review* (www.qca.org.au).

Frontier Economics, 2015. *Cost of Debt Transition, report prepared for Energex* (www.aer.gov.au).

Jemena, 2013. *Submission from Jemena Limited to the AER*, submission to the AER (www.aer.gov.au).

JEN (Vic) Ltd, 2015. *2016-2020 Electricity Distribution Price Review Regulatory Proposal Attachment 9-2 Rate of Return Proposal* (www.aer.gov.au).

Lally, M., 2014a. *The Trailing Average Cost of Debt*, report prepared for the QCA (www.qca.org.au).

_____ 2014b. *Transitional Arrangements for the Cost of Debt*, report prepared for the AER (www.aer.gov.au).

_____ 2015. *Review of Submissions on the Cost of Debt*, report prepared for the AER (www.aer.gov.au).

Longstaff, J., and Schwartz, E., 1995. 'A Simple Approach to Valuing Risky Fixed and Floating Rate Debt', *Journal of Finance*, 50, pp. 789-819.

NERA, 2014. *Return on Capital of a Regulated Electricity Network*, report prepared for TransGrid (www.aer.gov.au).

QCA, 2014. *Position Paper*: *Long-Term Framework for SEQ Water Retailers – Weighted Average Cost of Capital* (www.qca.org.au).

QTC, 2015. *Return on Debt Transition Analysis*, report prepared for Energex and Ergon Energy (www.aer.gov.au).

SAPN, 2015. *SA Power Networks Revised Regulatory Proposal* (www.aer.gov.au).

Schlogl, E., 2015. *The AER's JGN Draft Decision on the Cost of Debt – A Review of the Critique by CEG*, prepared for United Energy and Multinet Gas (www.aer.gov.au).

SFG, 2012. *Rule Change Proposals Relating to the Debt Component of the Regulated Rate of Return*, report prepared for AEMC (www.aemc.gov.au).

____ 2015. *Return on Debt Transition Arrangements under the NGR and NER*, report prepared for JGN, JEN and United Energy (www.aer.gov.au).

UBS, 2015a. *UBS Response to the TransGrid Request for Interest Rate Risk Analysis Following the AER Draft Decision of November 2014*.

____ 2015b. *Transaction Costs and the AER Return on Debt Draft Determination.*

United Energy, 2015. *Rate of Return on Debt*: *Proposal for the 2016 to 2020 Regulatory Period* (www.aer.gov.au).

Van Horne, J., 1984. *Financial Market Rates and Flows*, 2nd edition, Prentice-Hall, Englewood Cliffs.