Term of the risk free rate under the NER

A report for the Joint Industry Association

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1. Introduction and terms of reference

1. CEG has been asked by the Joint Industry Association (JIA) to provide a review of the Australian Energy Regulator's (AER's) draft decision in relation to the weighted average cost of capital (WACC) parameters to be set under the National Electricity Rules (NER) and associated reasoning[1] to alter the term of the risk free rate, as set out in the National Electricity Rules (NER), from 10 years to 5 years.

2. This report has been prepared by Dr Tom Hird, a Director of CEG based in its Melbourne office.

3. This report has two key conclusions. The first is that the AER appears to have based its decision to change the term of the risk free rate based on an incorrect reading of the facts in relation to the debt policies of regulated businesses. When the correct facts are used the logic of the AER decision leads to the conclusion that there is no basis for change.

4. The second key conclusion is that if the AER did proceed with a change in the definition of the risk free rate this would create a corresponding change in the definition of the market risk premium (MRP) which is measured relative to the risk free rate. The effect of this change in definition means the MRP must be increased if the value of the MRP *for a constant definition* is to be maintained. We find persuasive, even compelling, evidence for doing this.

[1] AER, *Review of the weighted average cost of capital (WACC) parameters: Explanatory statement*, December 2008 ('draft decision')

2. Summary of AER decision and reasoning

5. The AER reasoning for altering the term of the risk free rate in its draft decision focuses on accurately estimating the cost of corporate debt for regulated businesses. This is relevant to an assessment of the term of the risk free rate because the cost of corporate debt is also set based on the same term assumption. Specifically, the NER estimate of the debt risk premium (DRP) is set based on the same term assumption as is used for the risk free rate.

6. Our assessment of the key elements of the draft decision's reasoning for changing the term of the risk free rate in the NER from 10 to 5 years are as follows:

   - the AER determines that businesses' actual debt issuance practices tend to reflect the issue of 5 year debt rather than 10 year debt;[2]

   - the yield on 5 year corporate debt tends to be lower than the yield on 10 year corporate debt (by around 40bp) which reflects the higher risk of 10 year corporate debt; and

   - given that businesses do not actually issue ten year debt, compensating on the basis that they do results in overcompensation (by around 40bp). That is, if a 10 year term were used businesses are compensated for risks that they do not incur.[3]

7. The AER's conclusion and reasoning are succinctly put on page 133 of the draft decision:

   > *"A term of the risk free proxy which matches the length of the regulatory period (i.e. 5 years) better reflects the financing strategies of regulated energy network businesses.*
   >
   > *Relative to a term assumption consistent with the length of the regulatory period (i.e. 5 years), the current 10 year term assumption is expected to result in net overcompensation on average, given the risk faced over the regulatory period. In other words, the use of a 10 year term assumption is expected to violate the 'present value principle'. The empirical evidence*

[2] For example, see first dot point on page 128 of the draft decision.

[3] For example, see discussion on page 127 and the second last paragraph on page 128. See also the fourth dot point on page 7 of the draft decision.

indicates that the extent of overcompensation on the cost of debt is expected to be around 40 basis points on average."

8. In our view, the above provides a succinct description of the AER's positive reasons for change. The AER also responds to reasons put to it in submissions for why change was not appropriate. These reasons can be summarised as follows:

   i. The actual practice of businesses is to issue long term debt (the JIA estimated an average term to maturity of debt at issue of 11.4 years). This is consistent with the assumption that businesses will attempt to match the maturity of their debt to the life of their assets.

   ii. Shorter debt issuance periods will, even if they result in lower interest rates, likely result in higher total costs once transaction costs and refinancing risks are factored in. This conclusion is consistent with the revealed preference of firms to issue longer term debt as per the JIA estimate of 11.4 years.

   iii. In relation to the cost of equity, any reduction in the term of the risk free rate from 10 to 5 years would require that the market risk premium be increased (by around 20bp) to reflect the fact that the market risk premium (MRP) is higher when measured relative to 5 year Commonwealth Government Securities (CGS) than when measured relative to 10 year CGS.

9. The AER has assessed that these reasons do not provide a justification for retaining the use of a 10 year term assumption. The AER's reasons for this are as follows:

   i. The AER disagrees with the JIA on the factual issue of what term of debt regulated businesses actually issue. The AER determines, on the basis of report from Deloitte, that businesses tend, on average, to issue debt of less than 5 years rather than 10 years;

   ii. The AER relies on a (contested) interpretation of facts, namely that the businesses do not issue long term debt to argue that the revealed preferences support the adoption of 5 years not 10 years;[4]

   iii. The AER accepts that the MRP will be higher relative to a five year CGS than a 10 year CGS. However, the AER takes this into account when, nonetheless, determining to maintain the MRP at 6%.[5]

[4] See first paragraph on page 119 of the draft decision.

3. CEG analysis

3.1. Summary

10. We consider the logic of the AER draft decision hinges critically on the factual assessment of what term of debt regulated businesses actually issue. Whether a snapshot of actual debt issuance practices is appropriate is debateable.[6] In our view, the AER has made an error in this factual assessment. When this is corrected retention of the same logic in the AER's draft decision leads to a reversal of its conclusion.

11. Once this fact is corrected it ceases to be relevant whether the AER is correct in its assessment that it does not need to amend the MRP to reflect the fact that the MRP relative to 5 year CGS is higher than the MRP relative to 10 year CGS. Once there is no basis to alter the term of the risk free rate, then any associated adjustment to the MRP ceases to be relevant. If however, the AER rejects the fact that the business issue longer term debt and decides to alter the term of the risk free rate, in our view the AER's basis for not making an adjustment to the MRP is problematic for two reasons:

    i. The MRP is, by definition, a parameter which is defined and measured *relative* to other definable and measureable parameters. The MRP is measured as the difference between the return on equity and 'the' risk free rate (and presented as a premium added to 'the' risk free rate). The MRP can therefore only be defined in terms of what the practitioner defines as the risk free rate – the defined (and measured) MRP will be different depending on what definition of risk free rate is used, e.g., whether it is defined as a 5 year CGS or a 10 year CGS.

    The AER logic argues that there is no 'persuasive evidence' for altering the MRP. However, while the AER is not proposing to alter the value of the MRP (retaining it at 6%) it is proposing to alter the definition (defining it relative to 5 year CGS rather than 10 year CGS). The draft decision makes clear that applying a 6% MRP with the proposed new definition (relative to a 5 year CGS) is equivalent to reducing the MRP by 20bp based on the current

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[5] See first paragraph on page 130 of the draft decision.

[6] In particular, we note that Deloitte has advised the AER that the current global financial crisis has caused long term corporate debt markets to dry up. This means that new debt issues are invariably at shorter terms. However, if this were used as a basis for reducing the assumed term of debt issues then, similarly, the other NER parameters would have to reflect conditions in a financial crisis. Most particularly, the MRP would need to be increased from 6% to around 12% as we discuss below.

definition of the MRP (relative to 10 year CGS). In our view, this is demonstrably a *de facto* reduction in the MRP and cannot reasonably be justified on the basis that there is no 'persuasive evidence' not to proceed with the reduction. The AER's discussion of the need for persuasive evidence for change[7] elsewhere in the draft decision appears to give weight to the *status quo*. However, in the current context this is turned on its head. In effect, the AER is arguing that there is no persuasive evidence that would prevent it from altering the *status quo* (by altering the value of the MRP for a constant definition of the MRP)

ii. The AER also relies on the fact that forward looking estimates of the MRP are below 6% as part of its basis for not making the appropriate compensating increase in the MRP of 20bp. We note that the most recent of the studies relied on by the AER is now more than two years old. Were these studies repeated today using current market evidence, they would result in a market risk premium of well above 6%. With this basis removed there is no reason not to amend the MRP in a manner that preserves its economic contribution to the WACC when the term of the risk free rate is altered.

12. There are two other issues of logic where we may disagree with the AER's reasoning.

i. We do not believe that the observed debt portfolios of government business enterprises (GBEs) are relevant to consideration of what an efficient benchmark firm would actually do. The AER has stated elsewhere that its benchmark firm is a large listed firm.[8] The AER also notes that the application of the capital asset pricing model (CAPM) requires this to be the case (as it requires full diversification of the shareholder base). Clearly GBEs do not have these properties. In any event, because GBEs do not have distinct debt and equity providers (the shareholder is also the debt provider) loans to the company are, effectively, loans from the shareholder to itself. In this context, it is impossible for a debt strategy within the GBE to have any impact on the risk levels its shareholder faces – it is impossible for different debt strategies to transfer risk between debtors and shareholders when the only shareholder is the only debtor (being the financial guarantor of the debt also has this effect). As a result, observed GBE debt strategies cannot be viewed as the outworking of capital (debt and equity) market forces.

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7 Presumably reflecting the requirement for 'persuasive evidence' at clause 6.5.4(e)(4)(ii) of the NER.

8 AER, *New South Wales draft distribution determination 2009-10 to 2013-14*, 21 November 2009, p.190

ii. Subject to clarifying the AER's reasoning there is a further possible matter of finance logic where we may disagree with the draft determination. Specifically, one gains the impression that the AER believes that it is efficient to issue short term debt (which has lower interest rates) provided that the transaction costs of issuing short term debt are not higher by an offsetting amount. We do not agree with this. The principle of conservation of risk suggests that any lower interest rates available from issuing short term debt will be fully offset by a higher cost of equity – this known as the Modigliani-Miller theorem.[9]

3.2. The AER draft decision relies on an incorrect factual assessment

13. The AER relies on the assumption that regulated businesses issue debt with a maturity of 5 years (or less) rather than 10 years in order to reach its conclusion. On page 119 the AER states:

> *"Further, there is no evidence to suggest that network businesses seek to match the maturity of assets and liabilities as a matter of preference. The current regulatory regime effectively compensates network businesses for the* ***issuance*** *of long term (i.e. 10 year) debt. Therefore if energy network businesses have a natural preference to issue long term debt, we would expect the weighted average debt portfolio to be around ten years or greater, given that the spread on ten year bonds is compensated via regulated prices. However the empirical evidence from Deloitte does not support this – as at the end of financial year 2007, Deloitte estimates the weighted average term of debt portfolios for regulated energy network businesses at around five years or less. Importantly, Deloitte indicates that the weighted average debt maturity profiles provided in its report are typical of normal (i.e. pre-crisis) market conditions."* [Emphasis added.]

14. The AER is correct that the current regulatory regime compensates regulated businesses for the *"issuance of long term (ie, 10 year) debt"*. However, the draft decision makes an error when it states that "*Therefore if energy network businesses have a natural preference to issue long term debt, we would expect the weighted average debt portfolio to be around ten years or greater, given that the spread on ten year bonds is compensated via regulated prices."*

15. If regulated businesses *issue* ten year debt then we would expect that the weighted average term to maturity of outstanding debt would be five years. That is, if a firm issues ten year debt which it refinances at the end of each ten years

[9] Modigliani, F.; Miller, M. (1958). "The Cost of Capital, Corporation Finance and the Theory of Investment". *American Economic Review* **48** (3): 261–297.

then the average term to maturity of that debt (over its life) will be five years. Thus, an observed average remaining life (term to maturity) of debt of 5 years is consistent with firms *issuing* debt that has a term to maturity of 10 years.

16. An example can illustrate this. Imagine a firm with $10m in outstanding debt consisting of ten bonds each of which had ten years to maturity when issued. Further, imagine that one of these bonds falls in each of the next ten years (consistent with the firm issuing one of the bonds in each of the last ten years). This debt portfolio will consist of one bond with one year to maturity, one bond with two years to maturity, one bond with three years to maturity and so on up to ten. The average term to maturity of this portfolio will be five years but the average term to maturity *at the time of issue* was ten years. That is, the average term to maturity *at issue* is double the average term to maturity at a given point in time.

17. Of course, if the debt issuance had not been evenly spread over time in the above example it would not necessarily follow that the term to maturity at issue was double the term to maturity. For example, if the firm had one $10m bond issued 20 years ago and an average term to maturity today of five years the term to maturity would be 25 years and not ten years. Similarly, if the firm issued a single $10m bond yesterday and its remaining term to maturity was five years then, clearly, its term to maturity at issue would be five years and one day.

18. However, on average it will be true that the term to maturity at issue will be double the term to maturity of an existing debt portfolio. This reflects the fact that, on average, we will observe debt with an average remaining life of half the initial life of the debt. Thus, with a large enough number of observations we can be reasonably confident that doubling the observed term to maturity at a given time will accurately estimate the term to maturity at the time of issue.

19. It follows that the correct interpretation of the Deloitte evidence (assuming no errors in the collection of data) is not that firms issue five year debt but that they issue ten year debt.

3.2.1. The Deloitte evidence

20. Deloitte report that across all privately owned regulated utilities the following break-down of term to maturity of existing debt portfolios applies.

Table 1: Deloitte estimates of time to maturity for existing debt of private regulated businesses

Time to maturity	Total debt* ($m)	Percentage of total debt
Less than 1 year	2,651	13%
1 to 5 years	8,868	44%
More than 5 years	8,812	43%
Sum	**20,331**	**100%**

** As reported in table 6.3 of the AER draft decision.*

21. According to Deloitte, 13% of outstanding debt had a remaining term to maturity of less than one year while 44% of debt had a remaining term to maturity of between one and 5 years and 43% had a remaining term to maturity of more than 5 years. We note that some problems may exist in relation to the interpretation of this data.[10]

22. However, it is not possible to derive an accurate estimate of the average time to maturity for the total debt portfolio without point estimates of the average time to maturity of debt in each of the three categories. It may be reasonable to assume that debt in each of the bounded categories has an average remaining term equal to the midpoint of the range (½ a year in the zero to one year category and three years in the 1 to 5 year category). However, in the category of 'more than five years' there is no upper bound provided.

23. Deloitte sourced its data from 2007 financial statements and, in general, these statements do not provide any extra information on the exact maturity of debt. However, Australian Pipeline Trust (APT) does provide such information in Table 38 on page 63 of its 2007 financial statement. This table provides a list of all senior debt issues and their exact maturity. Of the 11 issues with a remaining term of greater than five years the lowest remaining term to maturity was 6 years while the highest was 15 years (with other observations being 8, 10, 11 and 12

10 For example, we are advised that, for Envestra at least, the data presented in Table 8 of the Deloitte report is not a debt maturity profile, but rather the contractual undiscounted principal and interest cash flows. This is disclosed in the relevant Annual reports. For example, in the Envestra 2008 Annual Report Note 2(c)(ii) (page 42) the less than 1 year amount of $16.4m attributed to Capital Indexed Bonds is an estimate of the interest amount payable over the next financial year and does not include any repayment of principal upon maturity. Thus, interest on long dated bonds are, misleadingly, captured in the shorter duration time periods. This is a mistake because the issue at hand is the time to maturity of the bond – note the average duration of all payments on that bond.

years). The weighted average remaining term to maturity was 11 years, suggesting an average term to maturity at issue of materially more than 11 years.

24. Without any contrary evidence, this supports an assumption that the average remaining term to maturity of debt in the 'more than five years' category may be substantially more than five years. For illustrative purposes let us adopt the assumption that, in 2007, all firms in the sample have the same average term to maturity as Australian Pipeline Trust did for debt of 'more than five years' to maturity. If we combine this with the assumption the average maturity in the other categories is approximated by the midpoint of each category then we get the following average result.

Table 2: Estimate of the weighted average remaining time to maturity

Time to maturity	Total debt* ($m)	Percentage of total debt	CEG point estimate (years)	Weighted average
Less than 1 year	2,651	13%	0.5	
1 to 5 years	8,868	44%	3	
More than 5 years	8,812	43%	11	
Sum	**20,331**	**100%**		**6 years**

Source: Deloitte and CEG analysis

25. This table states that, based on the assumption that APT is representative of the average remaining time to maturity for debt in the 'greater than five years' category, the best estimate of the average remaining time to maturity for all debt is six years. As described above, this needs to be doubled to provide an estimate of the average time to maturity of debt at issue. Double six years is twelve years which is more than ten years and is broadly consistent with the JIA estimate of 11.4 years.

26. This estimate relies on the strong assumption that APT is representative. Nonetheless, the available evidence clearly points to an average maturity at the time of issue well in excess of five years. Even if we assume that all debt in the 'more than five years' category has exactly six years to maturity (an assumption that is likely to be incorrect based on available evidence and one that will put an extreme bias in the results towards a shorter estimate of the time to maturity), the weighted average estimate would be four years. Double this (to get an estimate of average time to maturity at issue) would result in an eight year estimate. That is, even with this extreme assumption, the estimated time to maturity at the time of issue is still closer to ten than five years.

27. We have also been provided with the following data from the Joint Industry Associations (JIA) that corroborates this conclusion. We are informed that these figures have been reconciled to the 2007 statutory accounts.

Table 3: JIA estimate of the average time to maturity

Distribution Business	Ownership	Amount	Average Term to maturity	Average term at issuance
CitiPower & Powercor	Private	2,532.0	5.65	10.40
ETSA utilities	Private	2,353.5	7.11	10.81
SPAusnet	Private	3,662.8	4.47	7.27
Envestra	Private	1,960.9	10.91	14.39
Average	**20,331**	**100%**	**6.55**	**10.14**

Source: JIA

3.2.2. Relevance of evidence from GBE's

28. The draft decision may be taken to support a view that evidence on the debt portfolios of government business enterprises (GBEs) is equally as valid as evidence of the debt portfolios of private businesses:

> *"The AER considers that the analysis undertaken by the JIA on the debt maturity profile of energy network businesses contains some important omissions that may bias the results. Specifically the JIA data does not include:*
>
> - *short term debt on issue, and*
> - *the debt profile of government-owned energy network businesses."*
>
> …
>
> *"The AER considers there are strong reasons to support the inclusion of data on all debt on issue (i.e. both long term and short term) as well as data from all regulated energy network businesses (i.e. both private and government). The inclusion of this data is clearly relevant to the analysis of debt portfolios for a benchmark regulated energy network business."* [Page 122]

29. While we agree with the AER in relation to the first dot point above, it is our view that evidence of the actual debt portfolios of GBEs should be discounted to the extent that it is materially different to the evidence from private firms. Firstly, the AER's benchmark efficient regulated business is a privately owned and publicly listed firm. This position is clearly set out in the AER's 21 November 2008 NSW Draft Distribution Determination:

> *"It is assumed by the AER that in setting a benchmark allowance for equity raising costs it is regulating a hypothetical efficient benchmark firm.* ***The efficient benchmark firm should be a large listed firm*** *and while firms may operate under different structures to this, compensation should not be provided for any deviation from the benchmark."* [Page 190]

30. This is also, as the AER points out in the same decision, the basis on which the CAPM is used to estimate the required return for shareholders (where the CAPM assumes investors hold diversified positions in each business). The benchmark regulated firm is clearly not a GBE.

31. Moreover, it is not possible to meaningfully interpret the debt positions of the GBEs. The GBE's in the sample all have a single shareholder – being the relevant state government – and source all their debt from that shareholder (or, which is equivalent, have any external debt guaranteed by the shareholder).[11] When a single entity is the supplier of both debt and equity there is no meaningful distinction between debt and equity. In this situation a loan from the shareholder to the GBE is effectively a loan from the single shareholder to itself (as the only owner of the GBE). An increase in debt does not expose the shareholder to increased risk because the shareholder is the also the provider of the debt – such that any increased volatility of equity returns is completely offset by higher certainty associated with debt returns. For the same reason the particular structure of debt provided to the GBE has no impact on the shareholder's total risk exposure.

32. For this reason, one cannot interpret the debt position of GBE's as representing the outcome of market forces and management's response to these forces in an attempt to maximise shareholder value. It is therefore not reasonable to rely on the observation that GBE's have less long term debt than privately owned

[11] As a matter of finance, this is true notwithstanding internal transfer payments such as competitive neutrality fees. These fees are relevant for a proper account of GBE profits such that they are comparable to reported profits for private businesses. They do not change the fact that there is a single shareholder and debt provider.

businesses in order to provide an insight into what an efficient benchmark firm (with a distinction between shareholders and debt providers) would do.[12]

3.2.3. Conclusion

33. The available evidence strongly supports the view that the privately owned regulated businesses firms tend to issue debt that, on average, has a term to maturity closer to ten years than five years. It should be presumed that this reflects the outworking of competitive forces in capital markets. That is, total risk adjusted costs are minimised by issuing debt of a maturity that is longer than five years.

34. Given this fact, application of the logic set out in the AER draft decision leads to the conclusion that moving to a five year term in the NER would result in under-compensation for the efficient costs incurred by a benchmark firm. The size of the under-compensation, based on current debt yields, has in effect been estimated by the AER itself (though it incorrectly identified this as over-compensation) at 40bps when it noted that:

> *"A term of the risk free proxy which matches the length of the regulatory period (i.e. 5 years) better reflects the financing strategies of regulated energy network businesses.*
>
> *Relative to a term assumption consistent with the length of the regulatory period (i.e. 5 years), the current 10 year term assumption is expected to result in net overcompensation on average, given the risk faced over the regulatory period. In other words, the use of a 10 year term assumption is expected to violate the 'present value principle'. The empirical evidence indicates that the extent of overcompensation on the cost of debt is expected to be around 40 basis points on average."* [Page 134]

[12] Even if one took the view that GBE management can be assumed to ignore the fact that the shareholder and lender are the same entity, it still does not follow that their debt portfolio would reflect the outcome of market signals. At best, the GBE's debt portfolio would reflect the outcome of price signal's that reflected the cost of debt to them as set by the debt management arms of the State Governments. It would be impossible for any such signals to fully mimic the full set of market signals a privately owned firm (with distinct debt and equity providers) would be subject to.

3.3. Adjustment to the MRP

3.3.1. AER reasoning

35. The draft decision accepts that the historical MRP relative to 5 years CGS will be 20bp higher than the historical MRP relative to 10 year CGS. The draft decision states:

> *"Based on the estimates from Officer and Bishop, the AER considers that 20 basis points may be a reasonable estimate of the difference in historical excess returns based on 10 year government bonds compared with 5 year bonds. Historical excess returns relative to a 10 year risk free rate should therefore be interpreted in the context that that they may underestimate historical excess returns relative to a 5 year risk free rate proxy by approximately 20 basis points."* [Page 155.]

> *"The AER notes that historical excess returns, 'grossed-up' for a utilisation rate of 0.65, and interpreted accordingly to the 20 basis points likely difference if they had been estimated relative to 5 year CGS, and over a range of estimation periods that the AER considers appropriate (1883-2008, 1937-2008, 1958-2008) fall within the 6 to 7 per cent range (specifically, 6.1 to 6.7 per cent), with some more recent estimates below this range*." [Page 179.]

36. However, the AER cites evidence that historical MRP estimates may overstate the forward looking MRP and cite evidence from discounted cash flow models that support an MRP of 6% or lower and survey evidence that supports an MRP of 6%. On this basis the AER states that it sees no *persuasive basis* for changing the MRP estimate from 6%.

3.3.2. Persuasive evidence for change from the status quo

37. The AER logic argues that there is no 'persuasive evidence' for altering the MRP. However, while the AER is not proposing to alter the value of the MRP (retaining it at 6%) it is proposing to alter the definition (defining it relative to 5 year CGS rather than 10 year CGS). In summarising the basis for its decision on page 180 it states:

> *"Based on this information, the AER does not consider there is sufficient persuasive evidence to justify a departure from the previously adopted MRP of 6 per cent, and that this figure is likely to be a reasonable estimate of a forward looking rate of return commensurate with prevailing conditions in the market for funds. Accordingly, the AER considers that there is no*

persuasive evidence to depart from a MRP of 6 per cent, and that a MRP of 6 per cent is consistent with the National Electricity Objective."

38. Under the new definition (the excess market return relative to *5* year CGS yields rather than *10* year CGS yields) the AER agrees that the MRP should increase by around 0.20% to maintain the status quo in terms of the overall effect on the cost of equity (as per the above quote from page 155). Consequently, for a constant MRP measured relative to 10 year CGS (the old definition) the MRP measured relative to 5 year CGS must increase. However, the AER argues that it does not need to make this adjustment to maintain the *status quo* (given the new definition) because there is no 'persuasive evidence' for altering the MRP.[13]

39. In effect, the AER is arguing against maintaining the *status quo* on the grounds that there is no persuasive evidence to do so. That is, the AER is arguing for a reduction in the cost of equity on the grounds that there is no persuasive evidence not to reduce the cost of equity.

40. It is not clear to us that this is a natural way to interpret the need for persuasive evidence. We demonstrate by analogy the problems this logic would create if applied elswhere by the AER. (In any event, there is persuasive evidence (as summarised above) that the NER MRP is too low and, therefore, that a *de facto* reduction in this parameter (by changing its definition without amending its value) should not be proceeded with.)

3.3.3. Analogy with estimating nominal wages

41. By way of analogy, imagine if the AER were tasked with estimating nominal wage growth for the businesses to include in the allowed revenues for the future regulatory period. Now imagine that it did this by observing a market wage premium (MWP) that employees of the regulated business achieved in excess of the increase in the consumer price index (CPI) over the long run (similar to what it does for the MRP). This MWP is nothing more than the forecast real increase in wages relative to CPI. Also assume that the AER uses CPI to escalate all costs and revenues within the regulatory period (as is largely the case).

42. Applying the logic underpinning the draft decision in this analogy would have the AER changing the definition of the CPI used throughout its decision. This might be because the AER believed it had found a better proxy for general cost increases – which it believed increased more slowly than the previous measure of CPI. However, adding the same MWP to the *new* and *lower* CPI in order to

[13] Ibid, p.180

estimate the nominal wage bill will underestimate nominal wage growth. The reason is that the observed MWP has been measured relative to the *old* CPI. Adding it to the new CPI measure will lower the estimated growth in nominal wages – despite there being no basis to assume that the estimated growth in nominal wages will be lower.

43. Notwithstanding the appropriateness of the new measure of CPI in other aspects of the decision, if it were used as the basis of estimating (forecasting) nominal wages growth then it would systematically under-compensate the businesses for staff costs. Just as the MRP is defined relative to a particular measure of the risk free rate, the MWP, as defined, is relative to a particular measure of CPI.

44. If an alternative measure of CPI were used as the basis of the forecast, one that was generally agreed would yield a lower estimate because of the exclusion of services with fast growing prices, the estimate of wages growth based on simply adding the MWP to this estimate would be biased downwards. It may be possible to observe a different measure of the MWP by observing historic wage outcomes relative to this alternative measure of CPI, but within the context of this analogy, this measure of the MWP would be higher than the (unadjusted) one used by AER.

3.3.4. Forward looking estimates of the MRP are currently materially above 6%

45. The AER relies on the fact that forward looking estimates of the MRP are below 6% as the basis for setting the MRP below the historical average observed MRP (which the draft decision puts at 6.1% to 6.7% as per the quote at paragraph 35 above). The AER refers to three studies in support of the view that the forward looking MRP is at or below 6%. These are Davis (1998), Lally (2002) and AMP (2006).[14] These studies estimate a forward looking MRP of, respectively, 4.5% to 7.0%, 4.5% to 5.7% and 4.8% to 5.3%.[15]

46. In a companion report[16] we have updated this analysis and find that the forward looking MRP is currently around 12%, ie, significantly in excess of 6%.

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[14] Davis, K., *The weighted average cost of capital for the gas industry*, March 1998

Lally, M., *Determining the risk free rate for regulated companies*, August 2002

AMP Capital Investors, *The equity risk premium – is it enough?* Oliver's insights, May 2006

[15] It is worth noting that AMP defined the MRP relative to the ten year CGS yield. Thus, the AER's discussion of this paper should really add 20bp to its estimates when considering the MRP relative to the 5 year bond rate. This would make this range 5.0 to 5.5%.

[16] CEG, Forward looking estimates of the equity premium, January 2009.

47. For example, the method used by AMP Capital Investors was to estimate the forward looking cash MRP according the following equation:

MRP	=	Market dividend yield	+	Long term nominal GDP growth	-	The ten year CGS rate

48. In May 2006 AMP estimated the market dividend yield to be 3.6%, long term nominal GDP growth to be 6% and the 10 year bond rate to be 5.8%. This gave an MRP of 3.8%. However, this is a cash MRP and needs to be scaled up for the value of imputation credits in order to be comparable with the AER estimate of 6%. AMP estimated that this would add a further 1.0% to 1.5% to the value of imputation credits.

49. However, if this calculation were to be repeated in December 2008 the dividend yield would need to be updated to 7.0%[17] and the ten year CGS would need to be updated to 4.2%. If the same long term GDP growth assumption is retained then the implied cash MRP is 8.8%. If we add 1.0% to 1.5% to this for the value of imputation credits then the total forward looking MRP (cash and imputation credits) is estimated at 9.8% to 10.3%.

50. However, adding only 1.0% to 1.5% implies a relatively low value of gamma – between 0.33 and 0.50 If, instead, we use the AER's current estimate for gamma of 0.65, the current cash dividend yield needs to be scaled up by a factor of at least 1.28.[18] This increases the dividend yield (inclusive of imputation credits) from 7.0% to 9.0%. The associated MRP increases from 8.8% to 10.8%. Moreover, long term historical average real GDP growth (from 1959 until 2008) has been 4.1%. If we add a forward looking inflation component of 2.5% (the middle of the RBA's target range) we get an estimate of future long term nominal GDP growth of 6.6%. This adds a further 0.6% to the MRP estimate – increasing it 11.4%.

51. Put simply, the best estimate of the current forward looking MRP in the market is demonstrably and materially above 6.0%. While we recognise that such studies

[17] See Reserve Bank of Australia Bulletin statistical table F.7.

[18] The scale up factor is calculated as 0.65*0.3/0.7 – where 0.65 is the AER's estimate of the value of gamma and 0.3 is the corporate tax rate and 0.7 is one minus the corporate tax rate. While this assumes that all dividends are fully franked, it is actually conservative because it only attributes a 0.65 value to imputation credits *once distributed* with dividends. The use of gamma in the PTRM attributes a 0.65 value to all imputation credits – including those generated in a given year but not distributed. Given the RBA reports December 2008 dividend yields for the market (7.0%) that are materially less than earnings yields (9.4%) our approach effectively fails to value the imputation credits on around one quarter of earnings that are not being distributed.

are sensitive to a range of assumptions, we do not believe that there is any set of assumptions that could credibly support the estimation of a forward looking MRP of 6% given current dividend and earnings yields.

52. This is true even if one modifies the AMP method to include the assumption that investors are expecting a deep recession in the next few years as discussed in our companion report.[19] We demonstrate that in order to arrive at an estimate for the MRP of 6% based on December 2008 dividend and CGS yields one would need to believe that the market expects the most likely[20] future path for real dividends involves:

- immediately more than halve (fall by 60%) from their 2008 level;
- stay at that new low level for four years;
- then rise at a 4.1% pa real (6.6% nominal) - which is consistent with the long term average for real GDP growth plus inflation of 2.5%.

53. It is relevant to note that in this scenario real dividends only recover their 2008 levels in 2037 (29 years later). Moreover, there is no 'bounce back' in dividends following the 60% reduction in dividends in 2009. That is, the disastrous 2009 drop in dividends is permanent. We are unaware of any analysts' earnings projections that come anywhere near this forecast.

54. It should also be noted that this is not a 'one off' result for December 2008. Applying the same approach using November data gives an MRP of 10.1%, 9.1% in October and 7.7% in September.

55. Figure 1 below provides a time series for the forward looking average cost of equity on the market.[21] It compares this with a time series for the NER cost of equity which includes a 1.6% reduction in the regulatory cost of equity in the month of December 2008 – to reflect the effect of the draft decision if implemented.

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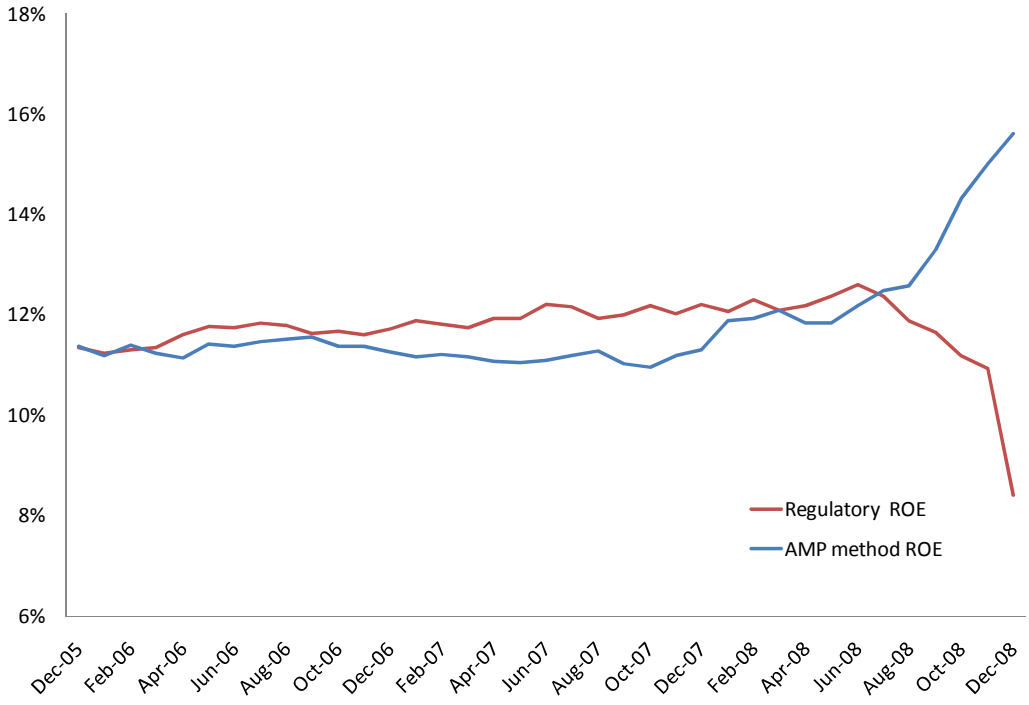
[19] CEG, *Forward looking estimates of the equity premium*, January 2009. See section 3.2

[20] In the mean expected sense of the term 'likely'. Or, one would have to believe a scenario with an identical present value of future dividends was most likely.

[21] This figure is taken from Figure 4 in CEG, *Forward looking estimates of the equity premium*, January 2009. See that report for more details on its derivation.

Figure 1: Recent movements in the regulated return on equity (including draft decision)



Source: RBA data, CEG analysis

56. This figure illustrates the combined effect of historically unprecedented low CGS figures *and* the proposed changes to the NER parameters in the AER's draft decision. It contrasts this with an estimate of the average return on equity actually required by investors in the equity market today. As demonstrated in our companion report,[22] the finding that the current regulatory return on equity is not sensitive to particular assumptions or methods adopted.

57. On this basis we have two important conclusions on the adjustment to the MRP when moving from 10 year to 5 year term for the risk free rate:

- There no persuasive evidence for not adjusting the MRP upwards by 20bp (from 6.0 to 6.2%) to reflect the changed definition of the MRP associated with a mover to a 5 year risk free rate; and

[22] CEG, *Forward looking estimates of the equity premium*, January 2009. See section 3.2: sensitivity analysis.

- There is persuasive evidence for doing so – based on both the AER's estimate of the historical average MRP of 6.1% to 6.7% and prevailing forward looking MRP estimates are above 6.2%.

58. As importantly, the fact that forward-looking MRP estimates are well above the historical average means that the AER would appear to have persuasive evidence that it is appropriate to increase the MRP estimate *at least* to the middle of the historical average range – which, based on the AER draft decision conclusions, is 6.4% relative to a 10 year CGS.

59. That is, the AER should reconsider that part of its reasoning which relies on forward looking estimates of the MRP being below 6% in order to explain why it has not adopted a figure in the historical range of 6.1% to 6.7%. While those forward looking estimates may have been below this range at the time that they were performed, the best current estimate of the MRP is above the top of this range. These studies no longer provide support for an MRP that is less than the historical average but, rather provide support for the opposite view – an MRP that is above the historical average.

3.3.5. Forward looking estimates of the MRP in the context of the entire draft decision

60. The fact that forward looking estimates of the MRP are higher than the historical average is important not just in determining the MRP but also in assessing the entire impact of the draft decision.

61. We estimate that this impact, if applied in December 2008, would reduce the compensation for the cost of equity by 1.62% based on current parameters. This is a 19% reduction in the cash (ie, excluding assumed value of imputation credits) compensation for equity providers [23] Importantly, this is to be imposed at the same time that the market cost of equity is already well above the NER cost of equity even without this reduction being imposed.

62. To the extent that the quantum of the AER's proposed reduction in the cost of equity was justified based on past forward looking MRP estimates, it was justified

[23] The total (including the value of imputation credits) estimated cost of equity under the existing NER rules in December would be 10.2% (risk free rate of 4.2% + equity premium of 6%). However, in cash terms this must be reduced by the assumed value of imputation credits. At a gamma of 0.5 and a corporate tax rate of 0.3 this requires that 10.2% be divided by 1 + 0.5*0.3/0.7 = 1.21. This gives cash compensation for the cost of equity of 8.4%. However, under the draft decision proposals the total cost of equity falls to 8.7% (risk free rate of 3.9% based on 5 year CGS instead of 10 year CGS yields + equity premium of 4.8% which is 1.2% lower to reflect the reduction in beta from 1.0 to 0.8 while the MRP of 6% is retained). To convert this to a cash cost of equity this must be divided by 1.28 to reflect the proposed gamma of 0.65 (1.28 = 1+.65*0.3/0.7). This gives cash compensation for the cost of equity of 6.82%. The difference between 8.44% and 6.82% is 1.62 percentage points. As a percentage of 8.44% this is a 19% reduction.

in a period when the perceived riskiness of equity investment was low. It is not justified now when there has been a material change in the perceptions of the riskiness of equity investment (consistent with the increased estimates of market discount rates described above). Put simply, the reasoning in the AER's draft decision has been overtaken by events and there should now be a strong presumption in favour of increasing, not decreasing, the compensation to equity providers.

63. If this is not done then businesses may become increasingly unwilling to supply equity capital. In this context the AER may need to rely more heavily on other punitive methods to force investors to invest – such as service standard penalties. These measures are nonetheless likely to be imperfect and lead to inefficiencies in the provision of regulated services.

3.4. Conservation of risk implies no 'free lunch' in debt policies

64. We note that it is not the case that a strategy of issuing shorter term debt, in order to take advantage of lower interest rates on short term debt, can be presumed to lower total capital costs. This is true even if the transaction costs of issuing short term debt are no higher than the transaction costs of issuing long term debt.

65. The simple reason for this is that all interest rates include compensation for the 'pure' time value of money plus compensation for other risks that the debt holders are taking on – including the risk of default, the risk that interest rates will change while they hold that debt etc.

66. However, in general, risks that debt holders take on (and are compensated for in higher interest rates) are risks that equity holders have passed onto them. Thus, paying a higher interest rate on debt should generally be judged to be associated with having passed on more risk from equity holders to debt holders. The reverse is also true, any debt strategy that lowers interest rates, by definition, means that less risk is being borne by lenders and more risk is being retained by equity holders.

67. This proposition is known in the finance literature as the Modigliani-Miller theorem.[24] This is relevant because the AER has observed, based on recent evidence, that a firm could achieve a 40bp lowering of its borrowing costs by issuing 5 year debt instead of 10 year. One might then be tempted to conclude

[24] Modigliani, F.; Miller, M. (1958). "The Cost of Capital, Corporation Finance and the Theory of Investment". *American Economic Review* **48** (3): 261–297.

that firms should do this and that the AER should model an efficient firm 'as if' it does this.

68. However, under the Modigliani-Miller theorem this conclusion does not hold. For example, imagine that a regulator were to decide that, notwithstanding regulated businesses issuing 10 year debt, it would model an efficient benchmark firm as issuing 5 year debt - on the basis that this was lower cost. However, this would not lower the cost of capital because it would simply involve a completely offsetting increase in the cost of equity.