Proposed Revisions
DBNGP Access Arrangement

2016 – 2020 Regulatory Period

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Response to Australian Competition Tribunal Decisions

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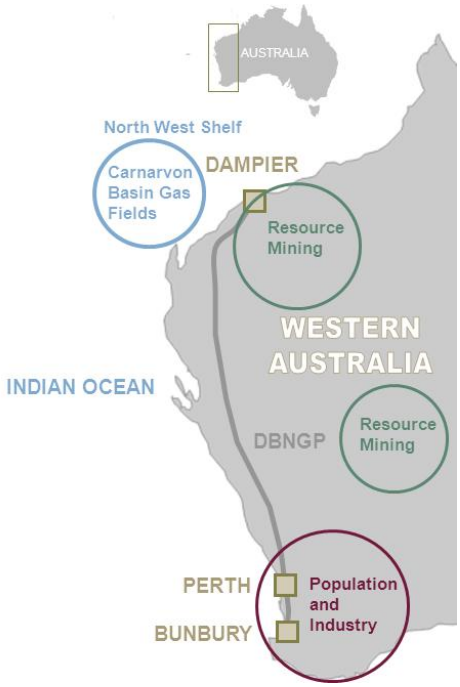
DBP Transmission (DBP) is the owner and operator of the Dampier to Bunbury Natural Gas Pipeline (DBNGP), Western Australia's most important piece of energy infrastructure.

The DBNGP is WA's key gas transmission pipeline stretching almost 1600 kilometres and linking the gas fields located in the Carnarvon Basin off the Pilbara coast with population centres and industry in the south-west of the State



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1. INTRODUCTION

1.1 On 26 February 2016, the Australian Competition Tribunal (the **Tribunal**) handed down its decisions in Proceedings ACT 1 to 8 of 2015. Those proceedings involved various applications for review of decisions of the AER made under the National Electricity Law or the National Gas Law (**Tribunal Decisions**).[1] The "lead" reasons for the Tribunal Decisions are contained in *Applications by Public Interest Advocacy Centre Ltd and Ausgrid* [2016] A CompT 1. Paragraph references below are to paragraphs within that decision, unless otherwise specified.

1.2 The Tribunal Decisions were handed down four days after the date by which DBP was required to submit its amended access arrangement proposal (**Amended AA Proposal**). DBP foreshadowed in its Access Arrangement Information, filed with DBP's Amended AA Proposal, that it may file additional submissions in response to matters which may be raised in the Tribunal Decisions, and reserved its right to do so (section 13, page 20 of the Access Arrangement Information). This submission contains DBP's additional submissions in light of the Tribunal Decisions, insofar as they may be relevant to matters under consideration by the ERA in relation to DBP's Amended AA Proposal.

1.3 The aspects of the Tribunal Decisions that bear directly upon DBP are gamma and the return on equity. This submission addresses each of these issues, noting that the approach of the service providers and the AER in relation to the return on debt (and its updating during the access arrangement period), and hence the matters for consideration before the Tribunal, fundamentally differed from the approaches to debt adopted by the ERA and DBP in the Draft Decision and Amended AA Proposal (respectively).

1.4 In respect of the **return on equity**, the Tribunal finding does not provide automatic support for the ERA's approach of using the SL-CAPM approach with a beta of 0.7 and an MRP of 7.6 percent. This is because new or different information is before the ERA, including analysis which the ERA has itself conducted, and has emerged since the time of the regulatory decisions the subject of the Tribunal Decisions.

1.5 In respect of **gamma**, the Tribunal rejected the approach of using equity ownership shares, used by both the AER and ERA, and instead favoured market-based assessments. Its direction to the AER was to use a gamma of 0.25. Given this and the fact that there is no new or different information before the ERA, DBP maintains that this is the correct value for gamma. The Tribunal also directed the AER to consider the implications of its proposed gamma on other aspects of the rate of return. Based upon the expert advice of Frontier, DBP suggests that, should the ERA continue with its approach to the estimation of the return on equity that it adopted in the Draft Decision, the only aspect of the rate of return that might be affected by the use of a different gamma value is the market risk premium (**MRP**) in the return on equity. However, the consequential change is likely to be so small that it sits well within the margins of error of the estimation of this parameter. This mirrors similar findings of the AER in 2011.

[1] *The relevant applicants in ACT 1- 8 of 2015 were : Public Advocacy Centre Ltd; Ausgrid, Endeavour Energy, Essential Energy (together, Networks NSW), Actew AGL Distribution, Jemena Gas Networks (NSW) Limited. There were also interveners in each of those proceedings*.

2. RETURN ON EQUITY

2.1 The relevant aspects of the Tribunal's decision on the return on equity are its approach to determining the overall return on equity and the downward bias of the SL-CAPM. The Tribunal addresses this – as do DBP and the ERA - by adjusting beta within the framework of the SL-CAPM. This submission does not focus on the Tribunal's findings in respect of the MRP (the other parameter in the SL-CAPM framework discussed by the Tribunal) because the ERA has used different information to the AER in determining the MRP. Accordingly, the Tribunal's findings on this parameter do not directly bear upon the ERA's Final Decision.

2.2 The discussion pertaining to equity below is divided into two parts:

(a) The context of the Tribunal Decisions and the limitations on the application of the Tribunal's reasoning in the context of DBP's Amended AA Proposal.

(b) The new or different information before the ERA, in comparison with the information considered by the Tribunal.

Context of the Tribunal Decisions

2.3 The findings of the Tribunal in respect of the return on equity are summarised in Box 1.

Box 1: Summary of Tribunal decision with respect to return on equity

The Tribunal found no error in the AER's decision on return on equity. Neither Networks NSW nor PIAC established any error.

Therefore the AER's decision on return on equity will stand, subject to variations consequential to the Tribunal's findings on other issues (e.g. consequential on the gamma decision).

The Tribunal observes that determination of the return on equity is particularly complex and involves many judgements. It notes that there are competing expert views. It found that, while there may have been competing views and reasons why a different decision could have been reached, there was no error in the AER's decision to adopt the course that it did.

Specifically, the Tribunal found:

- there was no error in the AER's decision to apply its foundation model approach;
- the AER's approach to accounting for weaknesses of the SL CAPM was open to it, and did not involve error, even though alternative approaches might also have been available;
- the AER's estimate of the equity beta of 0.7 did not involve reviewable error;
- the AER's adoption of a 6.5% MRP did not involve reviewable error.

2.4 Having regard to the nature of a limited merits review, the Tribunal had access only to the materials before the AER, including the respective contentions of the applicants and the AER, in determining whether any reviewable error had been established.

2.5 When considering the implications of the Tribunal's approach to the cost of equity for DBP's Amended AA Proposal, there are three contextual issues of primary importance:

(a) *First*, the Tribunal's task primarily involved the consideration of a multiple models approach versus an approach based on a single model.

The Tribunal did not find sufficient, or sufficiently compelling, evidence that moving to a multiple models approach would give a more "correct" outcome than maintaining the AER's "Foundation Model" approach, based on the SL CAPM: [702], [712-18]. DBP is critical of the ERA's approach in essentially maintaining and relying on one model - the SL-CAPM - without proper inquiry as to whether the application of that model meets the ARORO. Further, DBP reaches different conclusions to the ERA in respect of different models (see Submission 56, [6.5 - 6.27]). However, DBP's return on equity results are not driven by the multiple models approach advanced by the service providers in the Tribunal Proceedings. DBP does not contend for an approach based on a weighted average of several models. Indeed, as CEG point out (Submission 56, Appendix F), on one level, DBP and the ERA

follow a similar approach of adjusting beta within the SL-CAPM framework to account for the downward bias of the SL-CAPM. They do so by considering information from the Black CAPM, an approach that DBP adopted so as to minimise departure from the ERA's Guideline. The difference in that regard is that the ERA purports to use the "theoretical implications" of the Black CAPM (Draft Decision Appendix 4 - DDA4, [256], p 58) and adjusts beta in an opaque fashion without testing the results. In contrast, DBP uses empirical information from the Black CAPM, adjusts in a transparent fashion, and tests its results.

(b) *Secondly*, the Tribunal's analysis of the issue of low beta bias must be understood in its context.

The Tribunal accepted that the SL CAPM exhibits a downward bias: [661], [726], [731], [749], [772] and [779]. It further accepted that it was appropriate for the AER to respond to that bias. However, the Tribunal concluded that the AER did not err in choosing a beta of 0.7 from the range it did (based on the Henry work). The Tribunal's finding in that regard was reached on a consideration of the submissions and evidence before the AER, including competing expert opinion: [735], [750 - 763]. However, it did not find, and nor was its conclusion tantamount to a finding, that 0.7 is in fact the best estimate of beta. Rather, it concluded that its selection was not in error, based on the evidence and submissions before the Tribunal: e.g., [762 & 763]. Importantly, there was a relatively limited degree of empirical evidence before the Tribunal to enable it to determine questions as to the extent of the bias inherent in SL CAPM (the AER's chosen Foundation Model) or other models and the quantum of correction that may be appropriate to compensate for that bias.

(c) *Thirdly*, the Tribunal does not appear to have been called upon to decide as to the correctness of the AER's approach to checking whether the return on equity, derived from its application of the Foundation Model approach, contributed to achieving the ARORO for the purposes of Rule 87(5) NGR.

This concerns the character of the comparison the Tribunal was asked to make. In the relevant regulatory decisions, the AER presented a framework based upon the SL-CAPM as a foundation model with limited testing of outputs against market data. The applicant service providers presented a multiple models approach that also lacked any systematic testing of model outcomes. In light of two imperfect models, the Tribunal determined that the applicants had not established error in the AER's approach sufficient to warrant the substitution of one flawed model by another flawed model, where there was no ability to quantify respective flaws. This is not the case for DBP in its Amended AA Proposal. Rather than relying solely upon the arguments of experts in support of one flawed model or another, DBP tests the outputs of all models using an objective, transparent test. Should the ERA decide not to accept DBP's Amended AA Proposal and DBP apply for a review of that decision, the Tribunal would thus face a different task in assessing DBP's approach than it did in the recent challenge.

New and different information before the ERA

2.6 As noted above, the ERA has before it different information than that which informed the Tribunal Decisions. In DBP's submission, when proper regard is had to the different information and evidence before the ERA, it is apparent that:

(a) the ERA will err if it maintains or implements a return on equity using the approach that it has advanced in the Draft Decision, so as to derive an indicative return on equity of 7.28%; and

(b) the ERA will err if it maintains a range of beta estimates of between 0.3 and 0.8 and if it selects a beta estimate of 0.7 from within that range.

2.7 The new or different information available pertains to estimates of beta itself (both from the ERA and from CEG), information about the appropriate bias adjustment (from DAA and from the ERA itself) and information about tests of model outputs, from DBP and using suggestions from the ERA.

2.8 That information may be summarised as follows:

(a) *On the ERA's own analysis, 0.5 is not the "median" or "best estimate" for beta* - the ERA's own estimates of beta point to a median or "best" answer which is around 0.7, meaning that the bias-adjusted beta can no longer be 0.7.

(b) *New information on beta itself* - DBP has made submissions and led evidence as to the new value for beta, based on three-year betas, which suggest the value for beta should be 0.95 (before any adjustment for bias).

(c) *The ERA's approach to selecting beta based on confidence intervals is flawed* - DAA provides an opinion (Appendix K to DBP's Submission 56) that basing the bias adjustment on the confidence interval of beta (as the ERA does much more explicitly than the AER) is flawed and unlikely to account properly for the downward bias in the SL-CAPM.

(d) *The ERA's own analysis necessitates a minimum adjustment to accommodate for the low beta bias* - the ERA in having (rightly) acknowledged that it must have regard to the low beta bias inherent in SL CAPM but (wrongly, in DBP's submission) choosing a beta of 0.7 in purporting to do so, has arrived at a conclusion which is directly contradicted by its own Black CAPM calculations. The ERA has not considered the ramifications of its own Black CAPM calculations on required bias adjustments, when it ought to have done so.

(e) *The need to test the outcomes derived from a model* - The final piece of different information is the meaningful testing of model outputs. If outputs are never tested, then it is understandably difficult to reconcile the differing views concerning, and results demonstrated by, particular models in seeking to discover the "correct" answer (Tribunal Decision [750]). In an endeavour to overcome that difficulty, DBP has advanced the following:

(i) DBP's own model adequacy test.

(ii) DBP's implementation of the ERA's own empirical test for models - its "cross validation" approach.

(iii) Testing consistency with debt in a robust manner.

2.9 Each of these matters is considered in turn, below.

The ERA's 2015 updated beta assessment points to a median of 0.7

2.10 At the time of the AER decisions the subject of the Tribunal Decisions, the most recent information about beta came from the Henry (2014) report, prepared for the AER. One might argue, as several applicants did, about the range of estimates and the degree to which they were arbitrary. However, the technical analysis of Henry (2014) to determine beta ranges was not itself challenged.

2.11 Nor has DBP directly challenged the technical analysis of Henry (2014). However, Henry's estimates are no longer the most recent estimate of beta, and the ERA has updated its own estimates of beta in 2015, using data until October 2015. In its Draft Decision for DBP (DDA4, [223], page 52) the ERA suggests that the new confidence interval is now between 0.41 and 0.81 with the median estimates of beta falling between 0.6 and 0.65 (not 0.5). This, however, is apt to mislead,[2] because the ERA's approach to calculating its average artificially lowers the range for beta and does not accord with the Henry approach considered by the Tribunal.

2.12 Specifically, the ERA makes four estimates for the individual firms and then two different portfolio estimates. The upper and lower bounds of 0.81 and 0.41 (respectively) are formed by averaging across the six upper bounds of confidence intervals for the LAD regression estimates and the six lower bounds of the LAD regression estimates (the LAD estimates exhibit the widest range - see DDA4 Table 29, page 194). By contrast, Henry (2014) does not mix portfolio and individual

[2] *Further, when comparing the ERA's new results to Henry (2014) or indeed the ERA's calculations in the Guidelines the ERA omits Envestra and HDF, but Henry (2014) does not, and neither does the ERA in its Guidelines. This means that the datasets are different. Whether removing these two stocks is correct or not, the consequence of doing so is to reduce beta relative to what it would have been if they had remained in the set (see Submission 56, Tables 19 and 20).*

estimates in this way, and reports his ranges as the minimum and maximum of the confidence intervals for each set of regressions, rather than the averages across lower and upper bounds.

2.13 Three of the four firms examined by the ERA (APA, AST and SKI) give similar results to the portfolio results, generally, but one (DUET) gives results which are substantially below the other three firms, and the portfolios. By forming the averages in the way that it has, the ERA has effectively given disproportionate weight to DUET, and has dragged down its averages accordingly.

2.14 In Table 1 below, we consider just the two portfolio results, the equal-weighted portfolio and the (market) value-weighted portfolio. This avoids the over-weighting of DUET in the final set of results,[3] and we note that the other three individual firm estimates are generally similar to the portfolio results shown in Table 1. Table 1 is drawn directly from the ERA's own Tables 28 to 30 (DDA4, p193-6).

Table 1: Recent ERA estimates of beta

Column heading style	Lower bound	Mean	Upper bound
OLS			
Equal weight	0.538	0.674	0.812
Value weight	0.562	0.694	0.824
LAD			
Equal weight	0.499	0.757	0.907
Value weight	0.548	0.755	0.877
MM			
Equal weight	0.551	0.704	0.850
Value weight	0.577	0.718	0.857
T-S			
Equal weight	0.511	0.672	0.824
Value weight	0.539	0.687	0.826
ARIMAX			
Equal weight	0.522	0.654	0.786
Value weight	0.539	0.678	0.808
GARCH			
Equal weight	0.563	0.681	0.799
Value weight	0.575	0.70	0.825

*Source: DDA4, Tables 28,29 &30. *note that the ARIMAX and GARCH estimates are not bootstrapped. All other estimates are the bootstrapped mean (simply called "Boostrap beta-hat" by the ERA and the bootstrapped 2.5th and 97.5th percentiles*

2.15 Amongst the 12 portfolio estimates, five are at or above the supposed bias-adjusted beta the ERA has used of 0.7. The lowest is fewer than five basis points below the bias-adjusted beta the ERA used. In the Tribunal Decisions, in responding to PIAC's allegation that the AER should have used the "best" estimate from Henry (2014), the Tribunal noted at [772]:

> *The Tribunal has accepted that, in principle, the AER was entitled to adopt the process as laid out in the RoR 2013 Guideline. Indeed, PIAC's submissions support that, including the use of the foundation model concept and the selection of the SL CAPM as the foundation model. Once the AER, on that basis (and reasonably in the view of the Tribunal) selected a provisional range of 0.4-0.7 for equity beta, it was also entitled to have regard to the expert advice that the SL CAPM had, in the circumstances, a low equity beta bias. It was entitled to have regard to other models, and a range of other data. Indeed, it was required to do so.*

2.16 The Tribunal's finding may be relevant to the approach adopted by the ERA. If it is really to have regard to the low beta bias of the SL-CAPM, the ERA should (at least) choose some other point

[3] *The difference between the equal and value-weighted results is due to the fact that DUET, a relatively small company, has a bigger weight in the former than the latter*.

from its range than the mean or best estimate. The ERA has not done so. As DBP explained at [6.182] to [6.186] of its Submission 56, and as Table 1 above shows, the ERA has essentially made no adjustment for the low beta bias of the SL-CAPM.

New information on beta itself

2.17 The second category of information, which differed from that before the Tribunal, is the information concerning the period of time over which beta ought to be calculated, as set out in the report of CEG (Appendix F of Submission 56).

2.18 The ERA's results from Table 1 are based upon five years of weekly returns, whereas Henry (for the AER) considered various timeframes. However, if a shorter time period is used, beta changes quite substantially. This was not the case in 2014, in the study before the AER and the Tribunal, when the one, three and five year beta estimates were approximately the same. Having regard to the most recent three years of data, beta rises to approximately 0.95, before any adjustment for bias is made.

2.19 CEG point out that the three-year timeframe is not arbitrary, but is supported by the statistical properties of the data used to calculate beta. In simple terms, data from before three years ago appears to reflect a different "state of the world" compared to the present, which in statistics is known as a "structural break".[4]

2.20 Beta should not be calculated based upon stale data derived before the structural break. Consistent with the conclusion of CEG, the calculation of beta based on a three-year timeframe following the structural break is likely to provide a superior estimate of beta for the next five years.

Basing adjustments on confidence intervals

2.21 The ERA bases its "reasonable range" for beta on the 95 percent confidence interval of its most recent beta estimates, the 95 percent confidence interval of its 2013 work and the reasonable range found by Henry (2014). This was substantially derived by considering confidence intervals (DDA4 [227], page 53). The Tribunal was not called upon to decide as to the appropriateness of confidence intervals to address bias. The ERA now has before it information which suggests that relying upon confidence intervals to address the problem of low beta bias is not an appropriate response. As DAA (Submission 56, Appendix K, [46]) point out:

> *It appears that the justification for SL-CAPM-B and SL-CAPM-C is to overcome bias.*[5]
>
> *If so, it is a badly flawed approach as it confuses the potential bias due to an inappropriate model with the uncertainty or error in estimation as measured by the confidence interval when the model is correct.*
>
> *The falsity of this approach is evident if the situation of an arbitrarily large sample size is considered – the confidence interval would become arbitrarily small resulting in an insignificant "correction", but the bias which is not related to the sample size would remain the same.*

2.22 In essence, confidence intervals tell one something about the precision of a parameter estimate (such as of beta) within a given model. However, it tells one nothing about the performance of that model itself. A model can perform very poorly but still have very precisely estimated parameters. The issue of low-beta bias is not a problem in the estimation of beta per-se. As DAA point out, that can be improved simply by increasing sample size. The issue is rather that the outputs of the

[4] *We note that the ERA has motivated its choice of five years for its own estimates partly on consideration of structural breaks (Guidelines Explanatory Statement [783]), which suggests this new information from CEG ought to motivate a reconsideration of whether five years does indeed sufficiently reduce the possibility of structural breaks in the data.*

[5] *DBP notes that SL-CAPM-B refers to the ERA's adjustment for bias, whilst SL-CAPM-C refers to an adjustment made by DBP in its AA proposal which considered the 99th percentile of the confidence interval of beta; essentially a more extreme correction of the same type as made by the ERA.*

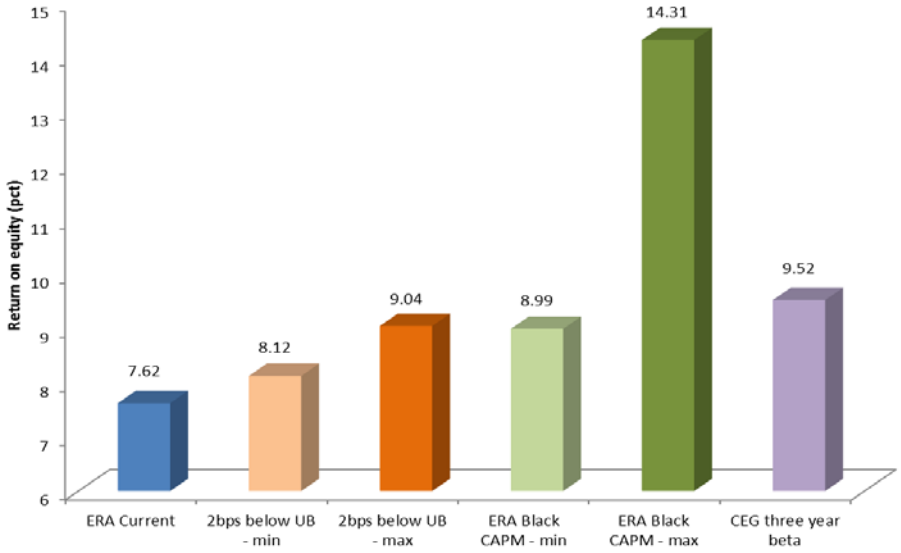
model produce results which are systematically wrong; too low where the beta of a stock is below one and too high when the beta of a stock is above one.

The ERA's own analysis necessitates a minimum adjustment for low beta bias

2.23 As noted above, the AER (and hence the Tribunal) had before it less fulsome empirical material on which to consider an appropriate adjustment for the low beta bias in SL-CAPM. The difficulty the ERA has recognised in calculating and compensating for the low beta bias was similarly acknowledged by the AER: [755].

2.24 However, the ERA has several pieces of information available to it, which were not before the AER or the Tribunal, to which it may have regard in considering an appropriate adjustment for the downward bias in the SL-CAPM. Moreover, some of that information was produced by the ERA itself, but not apparently used to determine the return on equity or an appropriate value for beta. The range of options available to the ERA, given information from models currently before it is outlined in Figure 1.

Figure 1: Potential sources of ranges for considering rates of return



Source: DBP calculations

2.25 Not all of the information is equally valuable. It may be summarised as follows:

(a) *The ERA's current approach* - the left-most blue bar (included as a point of reference) represents the current ERA approach in the Draft Decision. With a five-year CGS of 2.3 percent and a market risk premium of 7.6 percent, this gives rise to a return on equity of 7.62 percent when a beta of 0.7 is used. This is problematic, as it allows no bias adjustment (see paragraphs 2.12 to 2.16).

(b) *An approach based on confidence intervals* - the two orange bars represent the adjustments that would be made by considering the confidence intervals (the approach favoured by the ERA) shown in Table 1, above. The orange bar on the left represents the smallest of the upper bounds of the confidence intervals shown in Table 1 and the one on the right shows the highest of the upper bounds. Either approach necessitates an adjustment to the return on equity determined in the ERA's Draft Decision. In the Guidelines, the ERA chose an upper bound two basis points below the top end of the 95 percent confidence interval (see ATCO Draft Decision [744 - 747] for detailed discussion). DBP does the same, recognising that the ERA might not necessarily exercise its judgement in the same way. However, for the reasons separately articulated above (see paragraphs 2.21 to 2.22) DBP considers that

confidence intervals should not be used to find a suitable correction for the downward bias of the SL-CAPM.

(c) *An approach based on the zero beta premium* - the two green bars represent potentially the most useful information. They represent the smallest and largest values for return on equity that result from applying the ERA's smallest and largest estimates of the zero beta premium (see DDA4 Table 25) to the median across all portfolios under the OLS estimation of the SL-CAPM by the ERA (0.685 - see Table 28 DDA4) using the algebra for the betastar transformation.[6] This, as CEG point out (Submission 56, Appendix F), is the mathematically correct way to transform empirical information from the Black CAPM into an SL-CAPM framework. Moreover, as CEG also point out (ibid), doing so is no different to adjusting beta within an SL-CAPM framework using the "theoretical implications" (DDA4, [256], page 58) of the Black CAPM, except that it is more transparent. It thus represents a minor deviation from the Guidelines.

(d) *Beta based on 3 years* - The purple bar at the extreme right represents the estimate of CEG using the last three years of data (see paragraphs 2.19 to 2.20, above). Since it is a mean estimate, and not a bias-adjusted estimate, it cannot be used directly to inform the appropriate bias-adjusted beta, but has been included for comparative purposes.

2.26 While, in DBP's submission, certain pieces of information are of more value than others (in particular, in DBP's view, only the green bars showing information from the Black CAPM are directly applicable) any real regard to the above material would require a real adjustment to the ERA's present estimate of beta. The ERA's approach in the Draft Decision, depicted by the blue bar including a beta estimate of 0.7, is contradicted by, and is inconsistent with, the various other empirical materials that are either before, or have been produced by, the ERA. All of that information represents (to varying degrees) empirical material before the ERA, which was not before the Tribunal and which will assist in the assessment that the ERA must make concerning the magnitude of adjustment required.

2.27 This is not, however, the end of the process:

(a) *First*, this submission (above) considers only new information that the ERA has itself developed.

(b) *Secondly*, the range of outcomes that the Black CAPM suggests might not suffer from downward bias is very wide. It is accordingly necessary to narrow this range before applying regulatory judgement and finding the final answer (see discussion below).

(c) *Thirdly*, having regard to the fact that all models may exhibit flaws (see Submission 56, [6.34] and [6.35]), it is necessary to test model outputs, rather than just relying upon one model as the benchmark of truth.

2.28 It is to this third point that we now turn our attention, as this represents new information available to the ERA that was not before the Tribunal, which can assist the ERA to identify the most appropriate bias-adjusted beta within its chosen SL-CAPM framework.

Testing the outcomes of models

2.29 The ERA has before it extensive empirical evidence and analysis that was not before the Tribunal. That material can assist in overcoming the difficulties observed by the Tribunal in relation to the best approach to be adopted in the face of competing expert views and other material: e.g., [728] and [735].

[6] *This uses the ratio of Z/MRP, rather than the absolute value of Z (the zero-beta premium); the relevant formula is (1-Z/MRP)*Beta+(Z/MRP). The reason for using the ratio, apart from the structure of the formula, is that the MRP is different in each of the ERA's zero-beta premium models, and applying the betastar formula using a Z with an MRP that was not consistent with the one used in the model that determines Z would give incorrect results. The ratio, in effect, normalises Z. Note that the upper bound uses the ration Z/MRP = 2.87, from the ERA's work. It finds two higher ratios (5.57 and 4.17) but an expert report undertaken by HoustonKemp an appended to DBP's Amended AA Proposal (Appendix H) suggests several problems in the ERA's Black CAPM estimation, and we suspect these two figures, much higher than any other estimate in the literature, are outliers created by problems in modelling. Using them would obviously extend the upper end of the range quite considerably.*

2.30 In particular, DBP presented two tests in its original AA proposal, and implemented a third test suggested by the ERA when it updated these tests in response to the Draft Decision (see Submission 56, Chapter 11). All of this is new information, not considered by the Tribunal, and all assists in addressing the question of bias adjustment in a much more robust fashion than hitherto has been the case.

2.31 The first test presented by DBP was its model adequacy test (see Chapter 5 of DBP's Submission 12 submitted with DBP's Original AA Proposal). The Tribunal had before it some evidence of a similar nature in NERA (2015) [721 - 722]. However, that evidence was limited to a comparative assessment of the performance of the SL-CAPM and the Black CAPM, demonstrating the downward bias in the former, whereas DBP uses its model adequacy test to evaluate the outputs of all models it considers, including its betastar adjustment.[7]

2.32 In response to a suggestion from the ERA in its Draft Decision, that using cross validation to empirically test the performance of models would be a superior approach, DBP examined the ERA's approach (Submission 56, [6.124 – 6.129]) and then undertook an empirical application of that test (Submission 56, Chapter 11).

2.33 The results from that testing (as with the model adequacy test) represent new or different evidence to which the ERA must have regard, and which suggests a bias adjustment much larger than the adjustment made by the ERA (see paragraphs 2.19 to 2.20).

2.34 However, a model adequacy test, as the name suggests, only shows which model results to reject, and does not provide a final answer. The final answer is, DBP maintains, a matter for regulatory judgement. However, before judgement is exercised, it is possible to narrow the range of suitable estimates still further by considering information from the cost of debt, (see Tribunal Decision [812]. DBP does so in a formal manner, by applying its consistency test (see Original AA Proposal Chapter 6 and [6.143 - 6.144] and Appendix C of Submission 56), whilst the AER (see Jemena Final Decision pp 3.471-72) and the ERA (see DDA4, [424-5], pp88-9) use only regulatory judgement.

[7] *Note that DBP's betastar adjustment is not identical to that discussed in paragraph 2.29. Rather than estimate many different versions of the Black CAPM, as the ERA did, we did one estimation, used the algebra referred to in paragraph 2.29 above to determine a betastar, determined its confidence interval, and then tested different points on that confidence interval, using the model adequacy test to find where betastar estimates became biased downwards and upwards. However, it is not necessary to find betastar in this way to implement the test. One could, for example, follow the ERA approach of making multiple estimates of the Black CAPM, using the betastar implied by each, and testing the results using the model adequacy test. The short time between the Draft Decision and DBP's response to it precluded us from using the information the ERA produced in its Draft Decision from the Black CAPM in this way, but that is not to say that similarly robust results could not be produced from doing so before the Final Decision.*

3. GAMMA

3.1 In relation to gamma, the Tribunal made the following direction [1(c)]:

> *the AER is to make the constituent decision on estimated cost of corporate income tax (gamma) in accordance with these reasons for decision, including by reference to an estimated cost of corporate income tax based on a gamma of 0.25.*

3.2 In making this direction, the Tribunal:

(a) rejected the AER's assertion that imputation credits ought to be valued at their face value. Instead, the Tribunal concluded that they should be valued based upon the behaviour of those claiming them ([1081]) or, in other words, their market value ([1094]);

(b) observed that equity ownership rates likely overstate the value of imputation credits [1093] and that tax statistics and equity ownership studies can at best establish an upper bound for theta (and thus gamma) [1095], which means that market studies are the best way to establish the value of imputation credits [1096];

(c) rejected the adjustments made to the SFG estimate of theta to reflect the valuation of dividends as suggested by Lally [1102];

(d) concluded that the distribution rate should be based on past practice where all equity was used, rather than the newly introduced measure of listed equity [1106];

(e) observed that the maximum value for theta, based on tax statistics is 0.45 [1108] giving a gamma estimate of between 0.25 and 0.32 using the original distribution rates [1109]; and

(f) noted that the AER will need to consider inter-relationships between the different building blocks and gamma [1112 – 1113], but that only the direct impacts of changing gamma should be considered [1116 – 1117].

3.3 The ERA has adopted the same approach as the AER. Accordingly, the Tribunal's observations are likely to apply to ERA's assessment of gamma in the Final Decision. Thus, the ERA should, in DBP's submission, modify its approach so that it accords with the Tribunal's reasoning. It ought to adopt a gamma of 0.25, which is also the value contended for by DBP (Submission 56, [9.13]).

3.4 To the extent that the ERA relies upon other market-based evidence, such as its own dividend drop-off studies, it faces two issues. *First*, since the Tribunal finds the upper limit for theta must be 0.45, any estimates from market-based studies above this level must be discarded. Thus, only the bottom half of the range suggested by the ERA in its Guidelines (Explanatory Statement [959]) is relevant. *Secondly*, DBP reiterates the concern relating to non-standard econometric approaches used by the ERA in its dividend drop-off studies (see Appendix A) which give rise to results that are not robust. We would suggest, therefore, to the extent that the ERA does rely upon its own dividend drop-off studies, that it rely only upon the components of this work that uses standard econometric approaches. This leads the ERA to obtain the same result as SFG for theta; 0.35.

3.5 The ERA is also charged by the Tribunal to consider the impacts of a change in gamma on other aspects of its decision. As Frontier point out (see Appendix A), the only area where it might have an impact is on the estimation of the MRP; the risk-free rate is based on a government bond and beta is a covariance with the market, unchanged by proportionate changes in the levels of stock and market returns occasioned by a change in gamma. However, the ERA's process of creating a range based upon a variety of sources of information and then choosing an answer from within that range by considering indicator variables which are not impacted by gamma, means that the relatively small change in gamma would have no appreciable effect on the ERA's estimate of MRP. Indeed, as Frontier point out (see Appendix A), when considering a point estimate of the MRP formed by an "Ibbotson Approach" (which the ERA uses only to form the lower bound of its range) in light of a much larger change in gamma than contemplated in the recent Tribunal decision, the AER determined that no change in MRP should be made. There would thus appear to be little reason to expect any change in the ERA's estimate of the MRP flowing from the recent Tribunal decision on gamma.

APPENDIX A: FRONTIER REPORT ON GAMMA

Issues in relation to the regulatory estimate of gamma

REPORT PREPARED FOR DBP

March 2016

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Issues in relation to the regulatory estimate of gamma

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Final

1 Executive Summary

1.1 Context

1 Frontier Economics (**Frontier**) has been retained by DBP to consider a number of issues in relation to the estimation of the value of dividend imputation tax credits, gamma. Specifically, the terms of reference require us to consider the following questions:

a. What form of study of market data is likely to provide the most robust assessment of theta within the range suggested by the Tribunal? In answering this question, please give attention to the different ways in which different methodologies are implemented; for example, differences in the ways the ERA and SFG implement the dividend drop-off model.

b. Which estimation of distribution rates is correct, and thus what ought the estimate of gamma be?

c. What other aspects (if any) of the rate of return might be affected by a change in gamma, and how material is that change likely to be?

1.2 Summary of conclusions

1.2.1 Dividend drop-off evidence

2 In our view, there are a number of reasons to prefer the SFG studies to the ERA study:

a. The SFG approach has been subjected to intense scrutiny. All data and computer code was supplied to the AER. All issues that the AER has identified have been considered by the Tribunal. The Tribunal has endorsed and adopted the results. By contrast, the ERA study has not been subjected to any scrutiny;

b. The SFG studies employ the standard, Tribunal-approved and AER-approved approach of correcting prices for market movements over the ex-dividend day; and

c. The SFG theta estimates have been shown to be stable and reliable in the face of a battery of stability and robustness checks, whereas the ERA expresses concerns about the stability and reliability of its own results.

3 In any event, there is little evidence to support the ERA's mid-point estimate of 0.45 from within its range of 0.35 to 0.55:

a. The ERA's own estimates are overwhelmingly below 0.45 (see Figure 1: above), and a significant proportion of those estimates are below 0.35;

b. The ERA study reports a theta estimate of 0.34 when the standard ex-day market correction is applied;

c. The ERA estimate increases only to 0.4 when the standard ex-day market correction is removed; and

d. The SFG (2013) estimates indicate that, if anything, the 0.35 estimate is towards the upper end of the reasonable range.

1.2.2 The distribution rate

4 In summary, we note that:

a. The distribution rate for all companies is approximately 70%;

b. The distribution rate for all listed companies, other than the top 20, is also approximately 70%; and

c. The top 20 listed companies differ from the benchmark efficient entity in their ability to distribute imputation credits via profits that have been sourced offshore.

5 Consequently, our view is that the best estimate of the proportion of imputation credits generated by the benchmark efficient entity that is distributed to investors is 70%.

6 Combining a distribution rate of 70% with a theta estimate of 35%, produces a gamma estimate of 0.25. We remain of the view that the best currently available estimate of gamma is no higher than 0.25.

1.2.3 The relationship between gamma and the market risk premium

7 Our primary conclusions about the relationship between the estimates of gamma and the market risk premium are:

a. The ERA's historical excess return estimates of the MRP appear to be already based on a theta of 0.35;

b. The ERA's Wright estimate of the MRP is materially above the allowed MRP of 7.6 regardless of what theta is adopted;

c. Many of the DGM estimates on which the ERA relies are based on a theta of 0.35;

d. If the AER's DGM estimate were based on a theta of 0.35 rather than 0.6, it would fall by 40-50 basis points, but would still be materially above the ERA's allowed MRP of 7.6%;

e. The conditioning variables that inform the ERA's MRP estimate are independent of the estimate of theta;

f. The ERA's range for the MRP is 5.5% to 9.7%. This range has a width of 420 basis points. By contrast, if theta is changed even from 0.6 (which is, for example the AER's explicit estimate of

theta) to 0.35, the various estimates of the MRP that are considered by the ERA either do not change or change by 10 or 20 or 30 basis points. That is, any change in the estimate of theta is swamped by the range of estimates produced by the different estimation methods to which the ERA has regard.

8 For all of the reasons set out above, our view is that there is no basis for the ERA to alter its allowed MRP due to a reduction in the estimate of theta from 0.6 to 0.35.[1]

[1] We note that the ERA has not explicitly adopted a theta of 0.6 but we use that figure here for two reasons. First, the Tribunal has recently considered the AER's estimate of gamma and made a judgment in relation to it, so it is useful to understand what the AER has done in order to properly interpret the Tribunal's judgment. Second, we conclude below that a revision of theta from 0.6 to 0.35 would not warrant a change in the MRP estimate. To the extent that the ERA might base its current gamma estimate on a lower estimate of theta, the required adjustment would be even more immaterial and would certainly warrant no change to the MRP estimate.

2 The best dividend drop-off market value estimate of the value of distributed imputation credits (theta)

2.1 Overview

9 We have been asked to address the following question:

> What form of study of market data is likely to provide the most robust assessment of theta within the range suggested by the Tribunal? In answering this question, please give attention to the different ways in which different methodologies are implemented; for example, differences in the ways the ERA and SFG implement the dividend drop-off model.

10 The material in this section of the report is a revised version of material that we have previously submitted to the ERA in reports commissioned by DBP and ATCO Gas.

11 Whereas other approaches have been used to derive the implied market value of distributed credits,[2] we focus on dividend drop-off studies because:

a. They have been most commonly used in the regulatory setting;

b. The literature has converged to an accepted set of methodologies;

c. Recent up-to date estimates are available; and

d. The available estimates are relatively precise.

12 In its Rate of Return Guideline, and subsequent decisions, the ERA has referred to two recent drop-off analyses – the SFG (2013) and ERA (2013) studies. The SFG study was performed at the direction of the Tribunal in the 2011 *Gamma* case. The methodology was approved by the Tribunal and the Tribunal adopted the results in full. The ERA study is in two parts:

a. In the first part of the study, the ERA essentially follows the SFG methodology and corroborates the SFG results; and

b. In the second part of the study, the ERA omits a key element of the accepted methodology and (unsurprisingly) finds somewhat different results. In particular, the ERA uses raw returns instead of market-relative returns. The standard approach in these studies is to assume that, but for the dividend, each stock would have followed whatever the broad market return was on the relevant day. By contrast, the ERA produces a set of estimates based on the assumption that the stock price would have been

[2] For example, the implied value of credits can be derived from an examination of the simultaneous prices of futures contracts and the shares on which they are based, or by comparing the return on equity of companies that distribute different amounts of imputation credits. Examples of these approaches include Cannavan, Finn and Gray (2004) and Lajbcygier and Wheatley (2012).

unchanged, even though the broad market might have been up or down 2% on that day. The ERA's rationale for this approach is that the error that is introduced by this mis-estimation will be picked up in the regression residual. If this claim were true, it would be unnecessary to take any care when estimating variables because any mis-measurement would be "already in the error term."[3] This would seem to be at odds with the great care that is taken in statistics and econometrics to measure variables as accurately as possible, and with the uniformly accepted view that proper estimation of variables improves the reliability of the resulting estimates.

2.2 The relative merits of the SFG and ERA studies

2.2.1 External verification

13 In its Rate of Return Guideline, the ERA considered two dividend drop-off studies when estimating theta as the value of distributed credits – the SFG study and the study by Vo, Gellard, and Mero (2013) (the ERA study). In our March 2013 submission to the ERA for ATCO Gas, we compared the relative merits of these two studies. We noted that the Australian Competition Tribunal considered the merits of the SFG study and concluded that:

> The Tribunal is satisfied that the procedures used to select and filter the data were appropriate and do not give rise to any significant bias in the results obtained from the analysis. Nor was that suggested by the AER.[4]

and:

> In respect of the model specification and estimation procedure, the Tribunal is persuaded by SFG's reasoning in reaching its conclusions. Indeed, the careful scrutiny to which SFG's report has been subjected, and SFG's comprehensive response, gives the Tribunal confidence in those conclusions.[5]

14 The Tribunal went on to conclude that:

> The Tribunal is satisfied that SFG's March 2011 report is the best dividend drop-off study currently available for the purpose of estimating gamma in terms of the Rules.[6]

and:

> No other dividend drop-off study estimate has any claims to be given weight vis-à-vis the SFG report value.[7]

---

[3] ERA ATCO Gas Draft Decision, p. 211, Paragraph 951.

[4] Application by Energex Limited (Gamma) (No 5) [2011] ACompT 9 (12 May 2011), Paragraphs 18-19.

[5] Application by Energex Limited (Gamma) (No 5) [2011] ACompT 9 (12 May 2011), Paragraph 22.

[6] Application by Energex Limited (Gamma) (No 5) [2011] ACompT 9 (12 May 2011), Paragraph 29.

[7] Application by Energex Limited (Gamma) (No 5) [2011] ACompT 9 (12 May 2011), Paragraph 38.

15 By contrast, we are unaware of any external verification of the ERA study. Whereas the ERA states that its study has been subjected to scrutiny,[8] the key point is not that there has been some scrutiny, but that the scrutiny has identified a number of errors and shortcomings in the study+ and the ERA has not addressed those shortcomings.

2.2.2 The differences between the SFG and ERA results

16 In our March 2014 submission to the ERA[9] for ATCO Gas, we noted that the SFG study performs a standard market adjustment of all returns. The standard approach in dividend drop-off studies is to assume that, but for the dividend, the stock price would have followed the movement in the broad market over the ex-dividend day. That is, if the broad market index increases by 2% over the ex-dividend day, it is assumed that, but for the dividend, the particular stock would also have increased by 2%. We are unaware of any paper in a peer-reviewed journal that does not make such an adjustment.

17 The ERA study also reports results where this standard approach has been applied, confirming the results from the SFG studies. In particular, the SFG studies conclude that an appropriate value for theta is 0.35. The ERA study reports that, when the standard market correction is applied, the average estimate of theta is 0.34. The estimate using robust regression and Model Specification 4 (which the ERA considers to be the most reliable estimate) is 0.33.[10]

18 The ERA study goes on to estimate theta *without* the standard market adjustment. These calculations are based on the implausible notion that on days when the return on all other stocks averages 2%, the expected return on the stock in question is 0%.

19 The ERA provides two reasons for persisting with its unique approach of assuming that a given stock would have an expected return of 0% on days when all other stocks averaged a return of say +2%, for example. The first is that it is easier. However, applying the standard market adjustment is not difficult and the ERA itself was able to include results estimated on that basis. The second reason is that it is acceptable to mis-measure variables, because regression analysis includes an error term.[11] As noted above, if this claim were true, it would be unnecessary to take any care when estimating variables in any economic modelling anywhere because any mis-measurement would be "already in the error term."[12] This would seem to be at odds with the great care that is taken in statistics and econometrics to measure variables as accurately as possible, and

[8] DBP Draft Decision, Appendix 5, Paragraph 112.

[9] SFG (2014 Gamma ERA).

[10] Vo, Gellard and Mero (2013), Table 5.

[11] ERA ATCO Gas Draft Decision, p. 211, Paragraph 951.

[12] ERA ATCO Gas Draft Decision, p. 211, Paragraph 951.

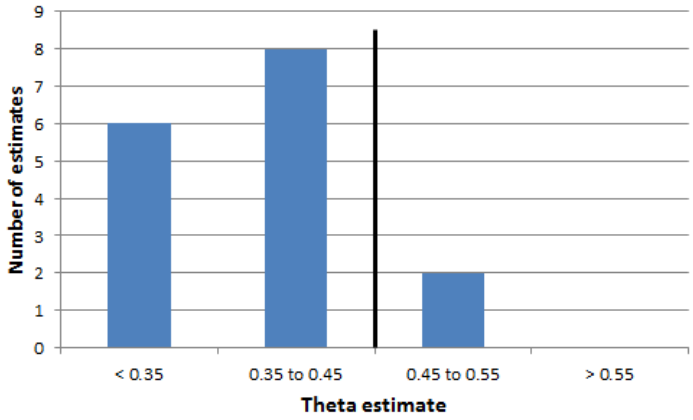
with the uniformly accepted view that proper estimation of variables improves the reliability of the resulting estimates.

2.2.3 The ERA's conclusions from its dividend drop-off study

20 Even when no market correction is applied, the ERA reports an average theta estimate of 0.40 and a robust regression estimate from its preferred Model Specification 4 of 0.32.

21 In fact, there is very little evidence to support the ERA's mid-point estimate of 0.45 at all. The ERA's estimates of theta are summarised in Figure 1: below. This figure summarises the ERA's point estimates for all different model specifications and estimation methodologies (with and without the standard ex-day market correction) except for the OLS estimates, which the ERA deems to be inappropriate.[13] The figure shows that the vast majority of estimates fall below the ERA's mid-point estimate (marked as a line). Moreover, whereas a material number of estimates fall below the bottom of the range (less than 0.35) there are no estimates above the top end of the range (0.55). The ERA's estimates (putting aside the econometric problems involved in producing some of them) are more consistent with a range of 0.35 to 0.45.

Figure 1: Distribution of ERA theta estimates



Source: Vo et al (2013), Table 5.

22 Another issue raised in the ATCO Gas Draft Decision is what the ERA refers to as a "large divergence in empirical estimates of the utilisation rate using dividend drop off studies."[14] However, this is an inaccurate characterisation of the evidence. The SFG study uses all available data and a range of accepted methods, all of which support the proposed estimate of 0.35 with reasonable precision. We have also submitted an expanded set of stability analyses to the ERA which demonstrate that our results are strongly robust to the inclusion or removal of influential observations. However, the ERA persists with its claims that dividend drop-off estimates are sensitive to "the most influential

[13] Vo, Gellard and Mero (2013), p. 9.

[14] ERA ATCO Gas Draft Decision, p. 443, Paragraph 92.

observations."[15] The data and estimation methods used by SFG produce results that are *not* sensitive to influential observations. The only evidence of such sensitivity comes from the ERA study when raw returns are used, contrary to the accepted practice in the literature. Logically, if the ERA's analysis is unable to produce reliable results it should be given little weight – it should not be used to cast aspersions on *all* drop-off analyses.

2.2.4 Conclusions in relation to dividend drop-off evidence

23 In our view, there are a number of reasons to prefer the SFG studies to the ERA study:

a. The SFG approach has been subjected to intense scrutiny. All data and computer code was supplied to the AER. All issues that the AER has identified have been considered by the Tribunal. The Tribunal has endorsed and adopted the results. By contrast, the ERA study has not been subjected to any scrutiny;

b. The SFG studies employ the standard, Tribunal-approved and AER-approved approach of correcting prices for market movements over the ex-dividend day; and

c. The SFG theta estimates have been shown to be stable and reliable in the face of a battery of stability and robustness checks, whereas the ERA expresses concerns about the stability and reliability of its own results.

24 In any event, there is little evidence to support the ERA's mid-point estimate of 0.45 from within its range of 0.35 to 0.55:

a. The ERA's own estimates are overwhelmingly below 0.45 (see Figure 1: above), and a significant proportion of those estimates are below 0.35;

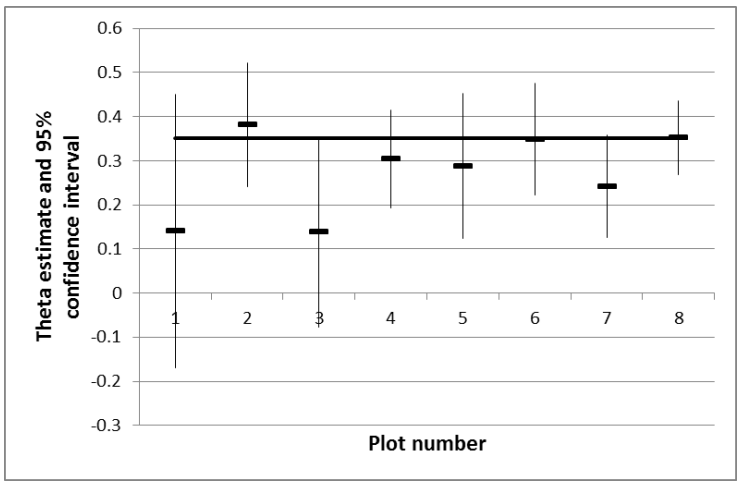
b. The ERA study reports a theta estimate of 0.34 when the standard ex-day market correction is applied;

c. The ERA estimate increases only to 0.4 when the standard ex-day market correction is removed; and

d. The SFG (2013) estimates indicate that, if anything, the 0.35 estimate is towards the upper end of the reasonable range. See for example Figure 2: below, which is reproduced from SFG (2013), Figure 5.

[15] ERA ATCO Gas Draft Decision, p. 443, Paragraph 92.

Figure 2: Summary of point estimates and confidence intervals for theta by model specification and estimation technique



For each estimate, the narrow line represents the 95% confidence interval for theta and the solid black marker represents the point estimate. The solid black horizontal line represents the recommended point estimate of 0.35.
Plot 1: Model specification 1, OLS estimation; Plot 2: Model specification 2, OLS estimation;
Plot 3: Model specification 3, OLS estimation; Plot 4: Model specification 4, OLS estimation;
Plot 5: Model specification 1, RR estimation; Plot 6: Model specification 2, RR estimation;
Plot 7: Model specification 3, RR estimation; Plot 8: Model specification 4, RR estimation.

25 In our view, there is no reasonable basis for adopting a dividend drop-off estimate of theta above 0.35.

3 The distribution rate

3.1 Overview

26 In its Rate of Return Guideline, the ERA adopted a distribution rate of 70% based on tax statistics evidence that, on average 70% of credits that are created end up being attached to dividends and distributed to investors.

27 However, in its recent decisions, the ERA has given some weight to the standard 70% estimate and some weight to an 80% estimate based on an analysis of listed equity only performed by Handley (2014).[16]

28 Thus, the question to be addressed is whether one, or the other, or both of these estimates should be used as the distribution rate when determining the estimate of theta.

29 The material in this section of the report is a revised version of material that we have previously submitted to the ERA in reports commissioned by DBP and ATCO Gas.

3.2 A firm-specific parameter

30 The ERA has not made any detailed statements about the precise definition of the distribution rate. However, it is apparent that the ERA has followed the AER in its treatment of gamma and in its recent final decisions, the AER notes that:

> …the distribution rate is a firm specific parameter.[17]

31 The AER also notes that there is broad agreement that when estimating the distribution rate, we are seeking an estimate of the proportion of credits that would be distributed by the benchmark efficient entity:

> There appears to be agreement between the service providers, SFG and us that the distribution rate is the proportion of imputation credits generated by the benchmark efficient entity that is distributed to investors.[18]

32 There is also agreement on this point from Lally (2013 AER):

> …within the Officer (1994) model, the distribution rate is a firm specific parameter rather than a market average parameter.[19]

[16] DBP Draft Decision, Appendix 5, Paragraph 126.

[17] TransGrid Final Decision, Attachment 4, p. 20.

[18] TransGrid Final Decision, Attachment 4, p. 65.

[19] Lally (2013 AER), p. 41.

3.3 The relevant characteristics of the benchmark efficient entity

33 In its 2009 WACC Review the AER stated that the benchmark efficient entity should not be interpreted as a large listed firm:

> …the AER does not agree that a benchmark efficient NSP be defined as a large, stock market listed NSP and is a settled concept.[20]

34 Consistent with this view, the AER's 2013 Rate of Return Guideline defines the benchmark efficient entity without reference to size or listing status:

> The AER's proposed conceptual definition of the benchmark efficient entity is a pure play, regulated energy network business operating within Australia. [21]

35 Similarly, the ERA defines the benchmark efficient entity without regard to size or listing status:

> An efficient 'pure-play' regulated gas network business operating within Australia without parental ownership, with a similar degree of risk as that which applies to the service provider in respect of the provision of reference services.[22]

36 Thus, both regulators share the view that the benchmark efficient entity should not be defined as a large listed company, but generically as a "network business."

3.4 The regulatory estimation approach

37 Both regulators have decided that the distribution rate should not be estimated with reference to comparator firms (as it does for other firm-specific parameters such as beta and gearing). The AER states that this is because that may provide an incentive for regulated firms to manipulate their dividend payout policies to obtain a higher regulatory estimate of gamma.[23] As unlikely as this seems, the current question is *which* broader data set should be used to estimate the distribution rate. The AER and ERA both consider two possibilities: all tax-paying companies, and all public companies.

38 SFG (2015) demonstrate that the two data sets produce effectively identical estimates, but for the 20 largest listed companies, which have materially higher payout ratios.

39 NERA (2015) use Australian Tax Office data to estimate distribution rates for various types of companies from 2000-2012. Their results are summarised in Table 1 below.

---

20 AER 2009 WACC Review, pp. 80, 105.

21 AER Rate of Return Guideline, p. 7.

22 ERA Rate of Return Guideline, Explanatory Statement, Paragraph 114.

23 AER Rate of Return Guideline, Explanatory Statement, p. 164.

Table 1: Distribution rate 2000-2012 by company type

Firm type	Distribution rate
Top 20 ASX listed	0.840
Public, but not top 20 ASX listed	0.693
All public	0.755
Private	0.505
All companies	0.676

Source: NERA (2015), Table 3.4, p. 23.

40 Thus, the distribution rate for listed firms is approximately 70%, for all but the 20 largest listed firms and it is lower for unlisted firms. Consequently, the question is whether "the proportion of imputation credits generated by the benchmark efficient entity that is distributed to investors"[24] is best estimated with reference to the 20 largest listed firms, or with reference to other firms.

41 Handley (2015 JGN) confirms that the distribution rate is a firm specific parameter and confirms the NERA estimates set out above. The ERA relies on the work of Handley in relation to the distribution rate.[25]

3.5 The role of the top 20 listed firms

42 In our view, when estimating the distribution rate there are two reasons to be concerned about the weight that is afforded to the top 20 listed firms:

a. The ERA (and AER) has specifically stated that the benchmark efficient entity should not be assumed to be a large listed company, as set out above; and

b. The top 20 listed firms differ from the benchmark entity in that their foreign sourced profits enable a higher distribution rate.

43 On the second point, SFG (2015) note that the 20 largest listed firms are very large multinationals. For example, BHP has equity that is valued at more than 30 times the equity in the regulated asset base of even a large service provider.[26] Even the 20th listed company is orders of magnitude larger than the service providers that are regulated by the ERA or AER.[27]

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24 TransGrid Final Decision, Attachment 4, p. 65.

25 DBP Draft Decision, Attachment 5, Paragraph 126.

26 A service provider with a $10 billion RAB would be considered to be large. Such a service provider would have $4 billion of equity. BHP has a market capitalisation of over $122 billion.

27 For example, Amcor has a market capitalisation of approximately $16 billion.

44 SFG (2015) also note that the 20 largest listed firms have a material amount of foreign sourced profits which enable them to distribute a higher proportion of imputation credits. Specifically, multinational firms are able to attach imputation credits to dividends that they distribute out of foreign sourced profits (since *any* dividend can have credits attached to it). Foreign profits enable any firm to distribute more imputation credits than it would otherwise have been able to.

45 This differentiates the top 20 listed firms from the benchmark entity, which is purely domestic by definition.[28]

46 In its recent final decisions, the ERA "notes SFG's concerns," but nevertheless proceeds to have regard to the Handley estimate that is driven by a small number of very large multinationals which are wholly unrepresentative of the benchmark efficient entity which has no foreign-sourced income to assist in the distribution of credits.[29]

3.6 Summary and conclusions

47 In summary, we note that:

a. The distribution rate for all companies is approximately 70%;

b. The distribution rate for all listed companies, other than the top 20, is also approximately 70%; and

c. The top 20 listed companies differ from the benchmark efficient entity in their ability to distribute imputation credits via profits that have been sourced offshore.

48 Consequently, our view is that the best estimate of the proportion of imputation credits generated by the benchmark efficient entity that is distributed to investors is 70%.

49 Combining a distribution rate of 70% with a theta estimate of 35%, produces a gamma estimate of 0.25. We remain of the view that the best currently available estimate of gamma is no higher than 0.25.

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[28] The ERA defines the benchmark efficient entity to be "operating within Australia." ERA Rate of Return Guideline, Explanatory Statement, Paragraph 114.

[29] DBP Draft Decision, Attachment 5, Paragraph 126.

4 The relationship between gamma and the return on equity

4.1 Overview

50 The process adopted by the ERA is to:

a. Estimate the required return on equity inclusive of the estimated value of imputation credits, producing an allowed revenue that includes the estimated value of imputation credits; and then

b. Reduce the allowed revenues by the estimated value of imputation credits.

51 The ERA uses the Sharpe-Lintner CAPM to estimate the required return on equity, inclusive of the estimated value of imputation credits. This is done by estimating the SL CAPM parameters – the risk-free rate, equity beta and market risk premium. The first two of these are independent of the estimate of gamma, whereas the MRP depends, to some extent, on the estimate of gamma.

52 Specifically, the approach of the ERA is to estimate the market risk premium (MRP) inclusive of the estimated value of imputation credits. This, in turn, is done by "grossing up" the various estimates of the MRP to reflect the estimated value of imputation credits.

53 Thus, other things equal, a higher estimate of the value of imputation credits will produce a higher estimate of the MRP for use in the SL CAPM. The focus of this section is to demonstrate the process by which MRP estimates are grossed-up for imputation credits. The subsequent section then quantifies this effect.

54 For completeness, we note that debt holders receive no imputation credits, so the allowed return on debt is independent of the estimate of gamma.

4.2 Grossing up historical excess returns

55 The ERA considers two different estimates of the MRP that are based on historical stock returns:

a. The arithmetic average of historical excess returns – the so-called Ibbotson approach; and

b. The arithmetic average of historical real returns, adjusted for expected inflation – the so-called Wright approach.

56 Both of these approaches require an historical series of annual stock returns across the broad Australian market. A number of broad market indexes are available that incorporate dividends and capital gains. These indexes require the addition of the estimated value of imputation credits for the years since imputation was introduced in 1987.

57 To gross-up post-1987 stock market returns to reflect the estimated value of imputation credits, the ERA adds the following estimate of the return that investors receive from imputation credits:[30]

$$c_t = F \times d_t \left(\frac{T_t}{1-T_t} \right) \times \theta$$

where:

- θ is the value of distributed imputation credits consistent with the Authority's estimate of gamma;
- d_t is the dividend yield in year t;
- F is the proportion of dividends which are franked; and
- T_t is the corporate tax prevailing in that year.

58 For example, for theta set to 0.6, a dividend yield of 4%, 75% of dividends franked, and a corporate tax rate of 30%, the return from imputation in each year since 1987 would be:

$$c_t = 0.75 \times 0.04 \left(\frac{0.3}{1-0.3} \right) \times 0.6 = 0.77\%.$$

59 This additional return would then be added to the index return that incorporates dividends and capital gains only.

60 Other things equal, higher grossed-up historical returns will produce a higher estimate of the MRP.

4.3 Grossing up dividend growth model returns

61 The ERA also considers a number of different dividend growth model (DGM) estimates of the MRP. These estimates take a set of forecasted dividends and derive the discount rate that equates the present value of those future dividends with the current stock price. The forecasted future dividends must be grossed-up to reflect the estimated value of imputation credits.

62 For example, the ERA has regard to the AER's DGM estimates, which are based on the following adjustment for imputation credits:[31]

$$Div_{with-imp} = Div_{ex-imp} \left(1 + \frac{\rho \times \theta \times \tau}{1-\tau} \right)$$

where:

- $Div_{with-imp}$ is the dividend including the estimated value of imputation credits;

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[30] DBP Draft Decision, Appendix 4, Paragraph 282.

[31] See, for example, JEN Preliminary Decision, p. 3-403.

- Div_{ex-imp} is the dividend excluding the estimated value of imputation credits;
- ρ is the proportion of dividends that are franked (the ERA used F for this quantity above);
- τ is the corporate tax rate; and
- θ is the estimated value of distributed imputation credits.

63 For example, for theta set to 0.6, an ex-imputation dividend yield of 4%, 75% of dividends franked, and a corporate tax rate of 30%, the with-imputation dividend yield would be:

$$Div_{with-imp} = 0.04\left(1+\frac{0.75\times 0.6\times 0.3}{1-0.3}\right) = 4.77\% .$$

64 Other things equal, a higher grossed-up dividend yield will produce a higher estimate of the MRP.

4.4 Adjustments to forward-looking indicators/ conditioning variables

65 When estimating the MRP, the ERA also has regard to a number of forward-looking indicators or conditioning variables.[32] The ERA compares the current levels of each variable with their historical distributions to provide a qualitative indication of whether the current risk premium is likely to be higher or lower than the historical average.

66 None of these variables are grossed-up for imputation credits, so any change in the estimated value of imputation credits would have no impact on how this evidence is assessed.

4.5 No other parameters affected by a change in gamma

67 As set out above, the MRP is the only WACC parameter for which the ERA's estimate is in any way influenced by the estimate of gamma.

[32] DBP Draft Decision, Appendix 4, starting at Paragraph 318.

5 Quantifying the adjustment for imputation credits

5.1 Estimates of theta

68 In their recent decisions, the ERA and AER have both adopted a gamma of 0.4, where gamma is set as the product of the distribution rate (the proportion of created credits that are distributed to investors attached to dividends) and theta (the aggregate value of distributed credits to investors across the market):

$$\gamma = F \times \theta .$$

69 The AER has been explicit in its decisions that its MRP estimates are based on a theta of 0.6.[33] We note that the ERA has not explicitly adopted a theta of 0.6 but we use that figure here for two reasons. First, the Tribunal has recently considered the AER's estimate of gamma and made a judgment in relation to it, so it is useful to understand what the AER has done in order to properly interpret the Tribunal's judgment. Second, we conclude below that a revision of theta from 0.6 to 0.35 would not warrant a change in the MRP estimate. To the extent that the ERA might base its current gamma estimate on a lower estimate of theta, the required adjustment would be even more immaterial and would certainly warrant no change to the MRP estimate.

70 Thus, the AER's 0.4 estimate of gamma is consistent with the long-time standard 70% distribution rate and a theta of 0.6, rounded:

$$0.4 \approx 0.7 \times 0.6.$$

71 The Australian Competition Tribunal has recently directed the AER to re-make a number of decisions using a gamma of 0.25.[34] That lower estimate of gamma is based on the same standard 70% distribution rate and a theta of 0.35:[35]

$$0.25 \approx 0.7 \times 0.35.$$

72 In the subsequent sections, we consider whether this change in the estimate of theta will have a material effect on the estimate of the MRP. However, we first note that the ERA appears to have confused two concepts in its DBP Draft Decision:

a. The proportion of dividends that are franked (versus unfranked); and

b. The proportion of created credits that are distributed.

73 The second of these is a component of gamma, as set out in the formula above. The first has nothing to do with gamma. However, the ERA appears to have

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[33] See, for example, JEN Preliminary Decision, p. 3-362.

[34] Applications by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1, Paragraph 1227.

[35] Applications by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1, Paragraph 1103.

reverse engineered an implied estimate of theta by inserting the franked dividend proportion into the formula above instead of the inserting the distribution rate.[36] The ERA seems to have fallen into this error as a result of its use of the same symbol (F) for both quantities. Consequently, our view is that the ERA's estimates of the implied theta are unreliable. This does not affect our calculations below, which compare theta estimates of 0.6 and 0.35, each of which is computed properly and is consistent with the relevant estimates of gamma (being 0.4 and 0.25, respectively).

5.2 Previous AER comments on altering the MRP estimate for imputation

74 In the 2011 *ENERGEX Gamma* case, the Tribunal noted that there is a link between the assumed value of imputation credits and the estimate of the MRP. The Tribunal noted that:

> …in the event that the Tribunal were to set aside or vary the theta aspect of the gamma constituent decision, one possible outcome or effect on each distribution determination of such a decision could be that it would be necessary for the AER to consider whether it is necessary to make any consequential adjustment to the market risk premium (MRP).[37]

75 However, the Tribunal also noted the AER's submission that, even if the Tribunal were to materially vary the estimate of theta, the AER would not make a consequential change to its estimate of the MRP in the case at hand. In those submissions, the AER noted that its 6.5% estimate of the MRP was based primarily on historical excess returns and that even if theta was varied from 0.65 to 0.20, the historical excess return estimates would vary by only 20 basis points. The AER then concluded that:

> In the present review of the AER's distribution determinations for ETSA Utilities, Ergon Energy and Energex, a change to theta from 0.65 to 0.5, 0.4 or 0.2, if considered in isolation, would not in itself constitute persuasive evidence for departing from the MRP of 6.5% adopted in the SORI.[38]

76 That is, the AER has previously considered that a change in theta from 0.65 to 0.20 would not lead it to change its estimate of the MRP. We note that the current change in theta is much smaller in magnitude – being a change from 0.60 to 0.35. It follows that this smaller change would be even less likely to warrant a change to the MRP estimate.

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[36] See, for example, DBP Draft Decision, Appendix 4, Footnote 207, p. 62, and Paragraph 291.

[37] Application by ENERGEX Limited (No 2) [2010]ACompT 7.

[38] AER submissions of 1 October 2010, Paragraph 17.

5.3 Changes in historical returns estimates

77 The ERA sets out the basis for its historical excess returns and Wright estimates of the MRP in Table 6 of Appendix 4 of its DBP Draft Decision.[39] We have reproduced the ERA's figures in our Table 2 below.

78 For example the 12.00% figure in the first row represents the NERA estimate of the average ex-imputation return on the market. If the post-1987 figures are grossed-up for imputation credits (as set out above), the average rises to the 12.19% figure in the third row of the table. The change is relatively small, since the majority of the sample pre-dates the introduction of dividend imputation.

79 The historical excess returns estimate of the MRP is then computed as the difference between the average grossed-up market return (in Table 2 below) and the average risk-free rate over the same period (5-year bills and bonds in the case at hand).[40] The ERA concludes that, depending on the period that is examined, the average historical excess return is between 5.8% and 6.6%.

Table 2: Figures from DBP Draft Decision, Appendix 4, Table 6

	NERA	BHM	Average
Nominal returns excluding imputation yield (1883-2014)	12.00%	11.64%	11.82%
Nominal imputation credit yield (1988-2014)	0.88%	0.88%	0.88%
Grossed up nominal returns (1883-2014)	12.19%	11.83%	12.01%
Grossed up real returns (1883-2014)	8.94%	8.58%	8.76%
Expected inflation for AA4	1.90%	1.90%	1.90%
Grossed up nominal return commensurate with current inflation expectations	11.01%	10.64%	10.83%

Source: ERA –DBP Draft Decision Appendix 4 Table 6 p.63.

80 Thus, the question is how these historical excess return estimates would change if the post-1987 years were grossed-up using a theta of 0.35 instead of 0.6. The short answer is that they would not change at all because the ERA's figures appear to be already based on a theta of 0.35.

81 Using the Brailsford, Handley and Masheswaran (BHM) and NERA approaches and data, we have managed to replicate the numbers as produced by the ERA. However we note that:

a. The figures calculated for the first row (the nominal returns excluding imputation yield) appear to derive from the 1883-2015 averaging period (rather than 1883-2014 as indicated in the table); and

b. We are only able to replicate the numbers in the table by using a theta estimate of 0.35.

[39] DBP Draft Decision, Appendix 4, Table 6, Paragraph 284.

[40] DBP Draft Decision, Appendix 4, Table 8, Paragraph 310. The ERA appears to have inadvertently interchanged the "BHM" and "NERA" column labels in that table.

82 That is, the numbers in the ERA's table appear to already reflect a theta estimate of 0.35.

83 In relation to its Wright estimates, in its DBP Draft Decision, the ERA concludes that the current Wright approach estimate of the MRP is 8.87%.[41] This is based on the grossed-up real return of 8.94% in the table above. We have re-estimated the grossed-up real return using a theta of 0.35 and obtain a grossed-up real return of 8.89%. Whereas estimates may differ slightly due to the use of different market indexes and the use of different time periods, and whether the NERA correction to the older data is applied, the Wright estimate is materially above the ERA's allowed MRP of 7.6% regardless of what theta is adopted.

84 Thus, the ERA's historical excess return estimates appear to already reflect a theta of 0.35 consistent with the Tribunal's gamma estimate of 0.25, and the ERA's Wright estimates are all materially above the allowed MRP of 7.6% regardless of what theta is adopted. Consequently, changing theta to 0.35 would not have any impact on the ERA's MRP estimate.

5.4 Changes DGM estimates

85 Next we produce estimates of the MRP applying the AER approach as documented most recently in the Preliminary Decision for Jemena Electricity Networks, updated to the end of 2015. We use the methodology as outlined by the AER and apply it to data for the two months ending December 2015. The results for estimates obtained using theta estimates of 0.6 and 0.35 are displayed in Table 3 below.

86 The difference between the implied MRP under each scenario is less than 50 basis points for both the three-stage and two-stage models.

Table 3: MRP implied by AER dividend growth model

	Theta = 0.60	Theta = 0.35	Difference
Three-stage DGM estimate (Nov-Dec 2015 average)	8.51%	8.04%	0.47%
Two-stage DGM estimate (Nov-Dec 2015 average)	8.38%	7.92%	0.46%

Source: Frontier calculations based on AER methodology.

87 In summary, a reduction in theta from 0.6 to 0.35 would reduce the AER DGM estimates (one of the main DGM estimates on which the ERA relies) by between 40 and 50 basis points. However, we note that both the 3-stage and 2-stage DGM estimates remain above the ERA's final allowed MRP of 7.6%.[42]

[41] DBP Draft Decision, Appendix 4, Paragraph 287.

[42] DBP Draft Decision, Appendix 4, Paragraph 353.

88 Moreover, in its DBP Draft Decision, the ERA sets out a range of DGM estimates that it has regard to. The majority of those estimates are already based on a theta of 0.35.[43]

[43] DBP Draft Decision, Appendix 4, Table 7, Paragraph 290.

6 Summary and conclusions

89 Our primary conclusions are as follows:

a. The ERA's historical excess return estimates of the MRP appear to be already based on a theta of 0.35;

b. The ERA's Wright estimate of the MRP appears to be already based on a theta of 0.35;

c. Many of the DGM estimates on which the ERA relies are based on a theta of 0.35;

d. If the AER's DGM estimate were based on a theta of 0.35 rather than 0.6, it would fall by 40-50 basis points, but would still be materially above the ERA's allowed MRP of 7.6%;

e. The conditioning variables that inform the ERA's MRP estimate are independent of the estimate of theta;

f. The ERA's range for the MRP is 5.5% to 9.7% which is orders of magnitude higher than any adjustment for a different estimate of theta. That is, any change in the estimate of theta is swamped many times over by the range of estimates produced by the different estimation methods to which the ERA has regard.

90 For all of the reasons set out above, our view is that there is no basis for the ERA to alter its allowed MRP due to a reduction in the estimate of theta from 0.6 to 0.35.

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