# Response to Consultation Paper

# Guidelines for the Rate of Return for Gas Transmission and Distribution Networks

## Date Submitted: 6 March 2013

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## 1. EXECUTIVE SUMMARY

1.1 The Australian Energy Market Commission's (**AMEC**) 2012 rule change determination establishes a common rate of return framework for all energy service providers under both the National Gas Rules and the National Electivity Rules and is a significant departure from the preceding framework for the determination of the rate of return.

1.2 It is DBP's view that the new rate of return determination framework is to be used by the regulators to make a well-informed judgment on allowed rate of return by considering a much wider range of evidence than previously occurred under the old Rule 87. A '"multiple model'' approach will partly remedy the limitations of the mechanistic implementation of the old rule.

1.3 Throughout this submission DBP will refer to the Australian Pipeline Industry Association (**APIA**) submission made in response the AER's Issues Paper (provided as attachment 1). Attached to the APIA submission is a report prepared by the Brattle Group on estimating the rate of return on equity for regulated companies and accompanying views of Professor Stewart Myers.

1.4 Separately, DBP engaged the Brattle Group to provide advice on the determination of the rate of return on debt for the purpose of this submission (provided as attachment 4).

1.5 DBP also engaged SFG Consulting to provide an update on the best estimate of the value of imputation credits (provided as attachment 5), while now not required for the determination of the rate of return is a subject of the guidelines as per Rule 87(14)(b).

1.6 Most importantly, both Brattle reports examining the determination of the rate of return on equity and debt and the views of Professor Stewart Myers conclude, consistent with the AEMC's observation, that there is no one single model that can provide the best estimate for either equity or debt. They are all firmly of the view that multiple models and methods are required.

1.7 In light of the AEMC's reasoning and the advice received from the Brattle Group and Professor Myers, DBP submits that an approach that is most likely to meet the allowed rate of return that:

(a) uses a wide range of relevant estimation methods, financial models, market data and other evidence (rate of return informative material);

(b) qualitatively weight each piece of rate of return informative material according to its merits at the time of determination; and

(c) uses the weighted evidence to provide a transparent and clear decision on the allowed rate of return.

1.8 Key to meeting the allowed rate of return objective, the regulator must now ensure that the rate of return is determined for the benchmark efficient entity with a similar degree of risk as that which applies to the service provider in respect to the provision of reference services. This is a markedly different requirement to the preceding rule.

1.9 DBP is concerned that the ERA's approach in the Consultation Paper may not lead to a rate of return that is compliant with the requirements of the NGL and NGR. The ERA appears to be adopting a position that only minor refinements to the approach it has adopted to date are needed. DBP addresses this in further detail in section 4 of this submission.

1.10 Rather than being a determinative instrument it is DBP's view that the AEMC intended the guidelines :

(a) Provide both flexibility and certainly without an overly rigid prescriptive approach. Their role is to provide service providers, investors, and consumers with certainty on methodologies of the various rate of return components and how the ERA is likely to assess the relevant financial models, estimation methods, market data and other evidence in meeting the allowable rate of return objective.

(b) Not explicitly lock-in any methods of rate of return determination, or specific parameters and parameter values, from which departure would not be permitted. Their purpose is to "narrow the debate" at the time of a specific regulatory determination.

(c) Provide the ERA the opportunity to specify how it might deal with unpredictable changes in market conditions at the time of specific regulatory determination.

## 2. INTRODUCTION

2.1 Rule 87 of the National Gas Rules (NGR) partly governs determination of the rate of return to be used in setting the total revenue and reference tariffs for covered (regulated) gas pipeline systems. Significant changes to Rule 87, made by the Australian Energy Market Commission (AEMC) in response to rule change requests from the Australian Energy Regulator (AER) and the Energy Users Rule Change Committee, came into effect on 29 November 2009.

2.2 New Rule 87(13) requires that the regulator – in Western Australia, the Economic Regulation Authority (ERA) – make and periodically review rate of return guidelines following a procedure (the **rate of return consultative procedure**) set out in new Rule 9B.

2.3 In accordance with the requirements of the rate of return consultative procedure, the ERA has issued a consultation paper, *Guidelines for the Rate of Return for Gas Transmission and Distribution Networks* (dated 21 December 2012) (**Consultation Paper**), and has invited submissions on matters raised in the paper.

2.4 This submission is made in response to the Consultation Paper.

2.5 The Australian Energy Regulator (**AER**) is also consulting on new guidelines it is required to make under the NGR. It has called for submissions in response to an issues paper.

2.6 The Australian Pipeline Industry Association (**APIA**) made a submission to the AER (**APIA Submission**)[1]. That submission has also been provided to the ERA and addresses many of the issues that are raised by the ERA in its Consultation Paper. Given DBP is a member of the APIA and was involved in the preparation of the APIA Submission, DBP will refer to the APIA Submission in many instances in this submission. A copy of the APIA Submission is attached to this submission as Attachment 1 for ease of reference. In addition, DBP will refer to reports prepared by the Brattle Group **(Brattle Equity Report**) and Professor Stewart Myers (**Myers Report**) for the APIA in relation to the rate of return on equity. A copy of each of these reports is attached to the APIA Submission.

2.7 The rule change which came into effect on 29 November is a major change. Rule 87 previously comprised just two subrules. Rate of return determination is now governed by some 19 subrules (and two new related rules, 9B, the rate of return consultative procedure, and 87A, which requires estimation of the cost of corporate income tax consistent with the rate of return measure adopted in rule 87).

2.8 More importantly, Rule 87 now requires an approach to rate of return determination which is significantly different from the approach previously taken by both service providers and regulators in the assessment of the rate of return for each access arrangement. The most significant of these differences are that the new rule:

(a) recognises that rate of return determination cannot be reduced to "application of a formula";

(b) requires the focus to be on estimating a rate of return for each service provider that is commensurate with the efficient financing costs of a benchmark efficient entity with a similar degree of risk as that which applies to the service provider in the provision of reference services;

(c) calls for examination of the evidence from relevant financial models and estimation methods, and from financial markets, and for the weighing of that evidence to arrive at a rate of return which meets an explicit allowed rate of return objective, together with the revenue and pricing principles (**RPP**) of section 24 of the National Gas Law (NGL), and the national gas objective (**NGO**) of section 23.

2.9 The ERA has set out, in the Consultation Paper, its understanding of the requirements of (new) Rule 87, and has asked a series of questions about how those requirements should be addressed in the guidelines the ERA is to make and publish in accordance with Rule 87(13). In this

1 APIA Response to Issues Paper – the AER's development of Rate of Return Guidelines, 20 February 2013

submission, DBP provides responses to most of the questions which the ERA has asked with a view to facilitating the development of the rate of return guidelines. In addition, there are some preliminary issues that DBP raises before responding to these questions.

2.10 Accordingly, this submission is structured as follows:

(a) DBP establishes definitions of undefined terms used in the NGR and the Consultation Paper (these are outlined in the immediately following paragraphs of this section of the submission).

(b) DBP then outlines its understanding of why the AEMC has chosen to make major changes to Rule 87 (see section 3 of this submission).

(c) In sections 4 & 5, DBP outlines concerns with the approach the ERA appears to be adopting in relation to the preparation of the rate of return guidelines.

(d) Having regard to the AEMC's objectives for changing the rate of return regime in the NGR, DBP outlines, in section 6, a practical approach to determining the overall rate of return under the new regime.

(e) DBP then addresses specific questions raised in the Consultation Paper: responses are provided in Attachment 3 to this submission.

2.11 As is outlined in the APIA Submission[2], there are a number of undefined terms used in the NGR concerning rate of return that appear to be used in different ways by different stakeholders in discussions about the Rate of Return Guidelines. For clarity, throughout this submission DBP takes the following meanings to apply to each of the following terms. These are the same definitions used in the APIA Submission but have been repeated here for ease of reference.

(a) METHODOLOGY: The process by which the rate of return on equity and rate of return on debt are determined. There is a separate methodology for each. Multiple methodologies may be identified in the Guideline, but only one can be used for each of the rate of return on equity and rate of return on debt at each determination. In the case of the rate of return on equity, in DBP's view there is debate around the use of a 'single model with crosschecks' methodology and a 'multiple models' methodology.

(b) MODEL: A single, theoretical approach to determining rate of return on equity. Models are combined (or not) in an agreed way to form a methodology.

(c) METHOD: A single approach, often empirical, other than a model to determining the rate of return on equity or debt.

2.12 The requirements of the NGR are that the regulator will have regard to 'relevant estimation methods, financial models, market data and other evidence'. DBP considers it would be very useful and further reduce confusion if a collective term for this type of information is agreed. Like APIA, DBP suggests '**rate of return informative material'**, whilst wordy, is a suitable term.

2 APIA Submission, page 7

## 3. THE AEMC'S RULE CHANGE – OBJECTIVES FOR CHANGE

3.1 DBP considers that it is important to understand the reasoning of the AEMC that lead to the changes being made to the rate of return provisions in the NGR. While many of these points have already been made in the APIA Submission, it is important for them to be reiterated in this submission.

***The allowed rate of return objective is paramount importance***

3.2 In its Rule Determination, the AEMC observed that a simple formulaic approach to rate of return determination had been set out in Chapter 6A of the National Electricity Rules (**NER**), while a more flexible framework had been included in the NGR.[3] The original rate of return framework of the NGR, the AEMC contended, had been better aligned with achieving the NGO and the RPP. This was not because Rule 87(2) prescribed a superior estimation process. It was because rule 87(1) specified an overall objective for the rate of return that directly aligned with achieving the NGO and the RPP.

3.3 However, in its Rule Determination, the greater flexibility available in the framework of the NGR had not been used by regulators. Rate of return decision making under the NGR had become infected by the inflexible approach of Chapter 6A of the NER, and that had been reinforced by recent decisions by the Australian Competition Tribunal (**ACT**). The ACT had interpreted Rule 87 in a way that reduced the range of information which could be taken into account in determining the rate of return.[4]

3.4 In its decisions in *ATCO* and *DBP*, the ACT had rejected the applicants' contentions that giving primacy to rule 87(1) of the NGR would achieve the requirements of the NGO and the RPP.[5] The ACT concluded that, although old Rule 87(1) set out the objective for rate of return determination, it did not provide guidance on how that objective was to be achieved. The ACT concluded that, in the interests of regulatory consistency, such guidance should be provided, and that it was provided by old Rule 87(2). In these circumstances, the ACT reasoned that criticisms of the approach which the regulator had taken to applying old Rule 87(2), in particular the approach of using a single model to estimate each of the rate of return on equity and rate of return on debt, were misplaced especially if the approach and each model were well accepted.

3.5 This was not, the AEMC advised, its view of the way in which rate of return determination should be approached.[6] The AEMC was of the view that rate of return determination should focus on producing an overall rate of return which was consistent with the objectives of the regulatory regime. The interpretation which had been provided by the ACT in *ATCO* and *DBP* meant that the AEMC could not be confident that, without amendment, the NGR framework would be applied by regulators in a way that provides rates of return which best met the NGO and RPP.

3.6 The ACT's conclusion, the AEMC reasoned, presupposed that, for determining each of the rate of return on debt and the rate of return on equity, a single model, by itself, could achieve all that was required by the rate of return objective of old Rule 87(1). However, according to the AEMC, this was not the case: rate of return determination could not be reduced to a simple formulaic approach that included the use of a single model for determining each of the rate of return on debt and the rate of return on equity so as to produce an outcome that achieved the objective of 87(1) or, for that matter, the NGO.[7] A simple formulaic approach, the AEMC maintained, placed undue emphasis

3 Australian Energy Market Commission, *Rule Determination, National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012, National Gas Amendment (Price and Revenue Regulation of Gas Services) Rule 2012,* 29 November 2012 (**Rule Determination**), page 41.

4 Rule Determination, page 41.

5 *Application by WA Gas Networks Pty Ltd (No 3) [2012] ACompT 12* (***ATCO***), and *Application by DBNGP (WA) Transmission Pty Ltd (No 3) [2012] ACompT 14* (***DBP***).

6 Rule Determination, page 42.

7 Rule Determination, page 57.

on individual parameter values, and did not inquire into whether the overall rate of return produced could best achieve the National Electricity Objective (**NEO**), the NGO and the RPP.[8]

3.7 According to the AEMC, there was a need to bring the focus of rate of return determination in the NER and the NGR back to the NEO, the NGO and the RPP. To this end, the AEMC has included an overall objective for the allowed rate of return in the new Rule 87.[9] By including the allowed rate of return objective of Rule 87(3) (**ARORO**), the AEMC intended that the regulators and the appeal body focus on whether the overall estimate of the rate of return met the objective for the allowed rate of return, which was closely linked to the NEO, the NGO and the RPP.[10]

3.8 In making economic regulatory decisions under the NGL, the AER and the ERA are required to ensure that the decision is likely to contribute to the NGO and in so doing, must take into account the RPP[11]. The AER and the ERA were, the AEMC advised, expected to follow good administrative decision making practice and, in this context, that required a full and considered explanation for decisions and adherence to due process, rigour and objectivity required under administrative law principles. The regulators should, in these circumstances, be striving for the best possible estimates of the benchmark efficient financing costs in order to give greater confidence to all stakeholders that the ultimate rate of return that is estimated is one that best meets (in the case of the gas regime) the NGO. This, in turn, required an estimation process of the highest possible quality.[12] A range of financial models, estimation methods, market data and other evidence had to be considered, and the regulatory regime needed to give the regulator the discretion to be able to give appropriate weight to all of this evidence.[13]

3.9 The AEMC was of the view that any relevant evidence, including that from a range of financial models, methods and evidence, should be considered in determining whether the overall rate of return objective was satisfied.[14] Requiring the regulator to have regard to relevant information on estimation methods, financial models, market data and other evidence, and allowing the regulator greater scope to achieve an overall rate of return objective, combined with a strengthened requirement to achieve that objective, was more likely to achieve the NEO and the NGO than the current approaches to rate of return determination.[15]

3.10 Whether a particular estimate of the rate satisfied the allowed rate of return objective would, the AEMC recognized, invariably require some level of judgment. The exercise of this judgment was to be made with reference to all relevant financial models, estimation methods, market data and other evidence that could reasonably be expected to inform the regulator's decision.[16]

3.11 In these circumstances, service provider concerns about the regulators continuing to make exclusive use of the SLCAPM in determining the rate of return on equity were, according to the AEMC, unfounded. The AEMC's intention was to ensure that the regulators take relevant models, estimation methods and other evidence into account when estimating the required rate of return on equity.[17]

3.12 This has been reflected in the drafting of the new rate of return provisions in the NGR. Not only must the allowed rate of return be determined such that it achieves the ARORO[18], each of the rate of return on equity and rate of return on debt must contribute to the achievement of the ARORO[19].

3.13 Further, Rule 87(5) provides that, in determining the ARORO, regard must be had to certain factors as set out at Rule 87(5)(a) – (c). What is clear from this drafting is the following:

8 Section 7A of the National Electricity Law (**NEL**) sets out revenue and pricing principles very similar to those of section 24 of the NGL.
9 Rule Determination, page 43.
10 Rule Determination, page 38.
11 Section 28 of the NGL
12 Rule Determination, pages 43, 55-56.
13 Rule Determination, pages 43-44.
14 Rule Determination, page 48.
15 Rule Determination, page 49.
16 Rule Determination, page 67.
17 Rule Determination, page 57.
18 NGR 87(2)
19 NGR 87(6) and 87(8)

(a) The requirement that "regard must be had to" certain matters means that the ERA is required to take those specified matters into account as fundamental elements of making the determination. This was outlined in detail in a submission by the APIA to the AEMC on 4 October 2012, made as part of the AEMC's deliberations on the rate of return rule change. A copy of that submission is attached as Attachment 2.

(b) In having regard to "relevant estimation methods, financial models, market data and other evidence", the ERA cannot merely consider, but then dismiss, all rate of return informative material, other than a single model (eg in the case of the rate of return on equity - the SLCAPM). This is for a number of reasons, including:

(i) The regulator must determine an allowed rate of return which best achieves, or seeks to best achieve, the ARORO. This will occur if stakeholders have the greatest confidence that the outcome is correct. It is well accepted amongst practitioners that the use of all available evidence will give greatest confidence that the outcome is correct. This has been most eloquently stated by Professor Stewart Myers:

"*Use more than one model when you can. Because estimating the opportunity cost of capital is difficult, only a fool throws away useful information. That means you should not use any one model or measure mechanically and exclusively.*"[20]

In the case of the rate of return under the NGR, this means that it will best promote not only the ARORO but also the NGO.

(ii) Adopting an approach which promotes greater certainty in the decision making process is a stated objective of the AEMC (see for example, the AEMC's Rule Determination at pages 45 and 55-56).

(iii) In the case of estimating the rate of return on equity, a single model such as the SLCAPM cannot, without more, achieve the ARORO. The SLCAPM does not address all risks which apply to a service provider in the provision of reference services.[21]

3.14 Having outlined this, DBP is concerned that the Consultation Paper manifests an intention of the ERA to prepare rate of return guidelines and ultimately determine the rate of return for each service provider in a way that adopts the same approach to rate of return determination as it has done to date under the old Rule 87, or at best, by way of only a minor refinement. An example of this is the assumption by the ERA in the Consultation Paper that the sole methodology for estimating the rate of return under the new Rule 87 is to apply the WACC methodology. DBP does not accept this position. This concern is elaborated upon by DBP in section 4 of this submission.

***Certainty is achieved in a way which preserves flexibility***

3.15 A focus on outcome in new Rule 87, rather than detailed prescription of the rate of return determination process, also provided the flexibility that was needed to deal with changing market conditions and new evidence.[22]

3.16 As is outlined in the Brattle Equity Report, this need to provide for flexibility is best exemplified by the reliability of results from the application of the SLCAPM in situations where interest rates on government bonds are unusually low but where there is significant market volatility.[23]

3.17 While flexibility was desirable, that flexibility did not extend to ignoring important inter-relationships between key parameters likely to be used in rate of return estimation. Rule 87(5)(c) requires that the regulator and service providers have regard to these inter-relationships.[24]

20 S.C Myers "On the Use of Modern Portfolio theory in Public Utility Rate Cases: Comment", Financial Management, Autumn 1978, p 67. See also Myers Report, pages 12-13.

21 On the origins, implementation and characteristics of the SLCAPM, see Brattle Equity Report, pages 12-19.

22 Rule Determination, page 44.

23 Brattle Equity Report, pp 59-62

24 Rule Determination, pages 44-45.

3.18 In *ATCO* and *DBP*, the ACT had concerns that a focus on the objective in old Rule 87(1) would remove the prescription of old Rule 87(2), lead to idiosyncratic regulatory decisions, and contribute to greater uncertainty about rate of return determination. The AEMC acknowledged this greater uncertainty, but was of the view that it should be balanced against the potential benefits. Limited prescription and a focus on the outcome of the process of rate of return determination would, the AEMC contended, better achieve the NEO and the NGO. The certainty which the application of the old Rule 87(2) had provided through more or less well defined steps in a process of rate of return determination had been removed, but it was replaced by certainty of outcome.[25]

***Nominal post tax rate of return***

3.19 One issue on which the AEMC was prescriptive in its new framework was the form which the allowed rate of return was to take: the rate of return was to be a nominal post-tax rate of return. Rule 87(4)(b) requires that the allowed rate of return be determined on a nominal vanilla basis consistent with the estimate of the value of imputation credits to be made as part of the requirements of Rule 87A.

3.20 Rule 87(4)(b) has the effect requiring a post-tax approach to total revenue determination. A post-tax approach to total revenue determination would, the AEMC advised, address the issue of service provider overcompensation for the cost of tax when the rate of return is estimated as a pre-tax weighted average cost of capital calculated using the statutory corporate tax rate.[26] A post-tax approach explicitly recognized the benefits to the service provider of accelerated depreciation of some assets for tax purposes.

3.21 A post-tax approach was, the AEMC noted, already consistently applied under the NER. Incorporation of that approach into the regime of the NGR would:

(a) streamline the access arrangement review process;

(b) provide gas pipeline service providers with certainty about the basis of rate if return determination;

(c) allow convergence in modeling approaches across sectors; and

(d) Improve the ability to compare returns across sectors.[27]

3.22 The AEMC intended continued use of the definition of WACC that was found in the NER, and which was used in the AER's Post Tax Revenue Model (**PTRM**).[28] The AEMC did not mandate use of the PTRM, which was a model of regulated revenue determination initially designed for the electricity sector, and which necessarily incorporates a great deal more than a rate of return calculation.

3.23 What is now clear however from this prescription of the use of a nominal post tax rate of return is that the issue of the value of imputation credits is no longer a part of the methodology for determining the rate of return. This is confirmed by the insertion of new Rule 87A, combined with the new Rule 87(4)(b). Although it is noted that the rate of return guidelines still require discussion about the estimation methods, financial models, market data and other evidence the ERA proposes to take into account in estimating the value of imputation credits referred to in Rule 87A[29].

25 Rule Determination, page 49.
26 Rule Determination, page 47.
27 Rule Determination, page 47.
28 Rule Determination, page 63.
29 Rule 87(14)(b) NGR

***The ARORO***

3.24 For the NGO to be achieved, the ARORO needed to ensure that the rate of return allowed to a service provider reflected the efficient financing costs of a benchmark efficient entity with similar circumstances and degree of risk to the service provider in respect of the provision of reference services. This requirement was necessary, the AEMC advised, to ensure that service providers could earn revenues sufficient to attract investment into electricity networks and gas pipeline systems in the long term interests of energy consumers while minimising the costs to those consumers. Rule 87(3) therefore requires that the allowed rate of return be consistent with the rate of return required by a benchmark efficient firm with similar risk characteristics to the service provider in question in respect of the provision of reference services.[30]

3.25 This is an important and significant change from the regime under the old Rule 87 – the central task of the ERA under the new rule is to ensure that the rate of return is one that is "commensurate with the efficient financing costs of a benchmark efficient entity with a similar degree of risk as that which applies to the service provider in respect of the provision of reference services." The ERA must also ensure that the rate of return guidelines required under Rule 87(14) set out the methodologies that the ERA proposes to use so as to result in a determination that is consistent with the ARORO.

3.26 The concept of efficiency and the characteristics of the benchmark efficient firm are not, however, defined in Rule 87. The AEMC was of the view that they, and the benchmark characteristics that relate to service provider risk, were best left to regulator determination.[31]

3.27 This was, in part, considered necessary by the AEMC because the concept of a benchmark efficient service provider and the risks that a benchmark service provider may face can change over time.[32]

3.28 Although it is noted that there is an established set of judicial precedent to define the concept of efficiency in the field of regulatory economics, the concept of the "efficient financing costs of a benchmark efficient entity with a similar degree of risk as that which applies to the service provider in respect of the provision of reference services" is not so supported.

3.29 What is clear, however, is that seeking to define parts of this concept in isolation of the rest of the concept runs the risk of not delivering a rate of return that best achieves the ARORO. For example, "efficient financing costs" are, as the Consultation Paper indicates, the lowest costs of financing reliable service provision at the standards required by the regulatory regime.

3.30 However, what the ERA needs to do is to assess the "efficient financing costs of a benchmark efficient entity with a similar degree of risk as that which applies to the service provider in respect of the provision of reference services." This is the ARORO.

3.31 So, it may well be the case that the "efficient financing costs" for one service provider are not the same as those of another service provider if the risks each service provider faces in the provision of reference services are dissimilar in degree. It may also well be the case that the "efficient financing costs" of all service providers are not the "lowest" costs because the benchmark efficient entity with a similar degree of risk as that which applies to each service provider does not enable the "lowest cost" of capital to be used.

3.32 DBP is of the view that establishing "the efficient financing costs of the benchmark efficient entity with a similar degree of risk as that which applies to the service provider in respect of the provision of reference services" may be quite difficult. Ascertaining the lowest costs of financing reliable service provision in any specific circumstances will generally be a matter of judgment because it will not be feasible to identify all of the possible costs of a benchmark efficient entity with a similar degree of risk as that which applies to the service provider in respect of the provision of reference services, and to choose the lowest among those possible costs.

30 Rule Determination, pages 23, 43.

31 Rule Determination, page 65.

32 Rule Determination, page 65.

3.33 Having said that, the starting point for establishing the benchmark efficient entity is the degree of risk of the service provider in the provision of reference services. More precisely, it is the degree of risk of the service provider in the provision of the reference services provided using the service provider's pipeline system. The risks involved are not generic risks of the type to which pipeline service providers might generally be exposed. Rule 87(3) should be read in the context of the RPP of section 24 of the NGL. Section 24(2) requires that the service provider be provided with a reasonable opportunity to recover at least the efficient costs which the service provider incurs in providing reference services. This will be the case only if the risks involved in providing reference services are risks involved in providing reference services using the pipeline with which the service provider provides pipeline services. Furthermore, section 24(5) of the NGL requires that a reference tariff allow for a return commensurate with the regulatory and commercial risks involved in providing the reference service to which that reference tariff relates. Again, the risks in question are the specific risks to which the service provider is exposed in its provision of reference services using the pipeline with which the service provider provides pipeline services.

3.34 It would be wrong therefore for the ERA to continue with its current practice (as is outlined in paragraph 58 of the Consultation Paper) to assess risks, at least in the context of estimating the rate of return on equity, by reference to a set of Australian energy utilities and to the beta of the CAPM estimated using data for those utilities. It would also be wrong for the ERA to continue with its current practice for the rate of return on debt – that is to assess risk from the debt margin of an observed sample (Consultation Paper, paragraph 59).

3.35 Rule 87 now requires that, before data for a set of Australian energy utilities is used to estimate a CAPM beta which might be taken as a measure of risk, the utilities in that set must be shown to be entities with a similar degree of risk as that which applies to the service provider in respect of provision of reference services. A similar issue arises in respect of the rate of return on debt. Before a debt margin is calculated from an observed sample of debt issues, the issuers of that debt must be shown to be entities with a similar degree of risk as that which applies to the service provider in respect of provision of reference services.

3.36 The characteristics of the benchmark efficient entity of rule 87 must now be established explicitly by reference to entities with a similar degree of risk as that which applies to the service provider in respect of provision of reference services. That the risks of potentially comparable entities are similar, in degree, to those of the service provider can no longer be assumed as was the case when the benchmark was considered to be a set of Australian energy utilities with traded shares.

3.37 Nor is reliance on a single indicator of risk – credit rating – for the purpose of establishing the benchmark adequate as was previously assumed when choosing an observed sample of debt issues. Credit ratings are imperfect indicators of risk.[33] As noted by the Brattle Group in a report prepared for DBP in relation to the rate of return on debt (**Brattle Debt Report**), a copy of which is provided as Attachment 4:

> *Determining what constitutes a benchmark efficient entity of similar risks or finding a sample of entities with a similar risk profile is not trivial. In particular, the use of the yield on a generic index selected by credit rating is not sufficient, because entities within a given rating differ with respect to their coverage ratios, capital structures, cash flow variability, level of capital expenditures, and fundamental demand / supply conditions. All of these factors affect the rate of return on debt that the entity will face.*[34]

3.38 A prior assessment of the degree of risk of the service provider in the provision of reference services must be made for the purpose of establishing the benchmark efficient entity. A classification of risks is required for:

33 Credit ratings are indicators of default risk. They are derived by mapping company attributes into a discrete number of rating classes, and the rating classes are, in turn, mapped to probabilities of default on the basis of historical data. The relationship between rating classes and probabilities of default is essentially a statistical relationship. The relationship is not a causal relationship; it does not have clear conceptual foundations. Research has shown that bonds within a given (Standard & Poor's, or Moody's) rating class cannot be assumed to be of the same default risk. See Edwin J. Elton, Martin J. Gruber, Deepak Agrawal and Christopher Mann (2004), "Factors affecting the valuation of corporate bonds", Journal of Banking & Finance, 28: 2747-2767.

34 Brattle Debt Report, page 10

(a) assessing the degree of risk of the service provider; and

(b) identifying entities with similar degrees of risk ("comparables"), for which data are independently available, and which can be used to establish the benchmark.

3.39 This issue of ensuring similarity between the degree of risk of the service provider, and the degrees of risk of "comparables" for which data are independently available, and which might be used in rate of return determination, is an issue which has been addressed by regulators in other jurisdictions.[35]

3.40 In the United States, the Federal Energy Regulatory Commission (FERC) has relied on the discounted cash flow (dividend growth) model for estimation of rates of return on equity for regulated interstate gas transmission pipelines.[36] In individual pipeline "rate cases", the FERC estimates the rate of return on equity by applying the discounted cash flow model to a set of "proxy companies" which has, historically, comprised:

(a) companies with shares which are publicly traded;

(b) companies which are recognised as natural gas pipeline companies with shares recognised and tracked by investment information services such as Value Line; and

(c) companies in which pipeline operations are a high proportion of business measured in terms of assets or operating income.

3.41 An after-tax weighted average cost of capital approach has been used by the National Energy Board in Canada to compare the rates of return of sample companies considered to be of similar risk to the regulated entity.[37] Although the CAPM was used for estimating the rate of return on equity, the Board adopted a wider view of risk when establishing a fair rate of return for a regulated entity for which tariffs were to be reset. In assessing the sample companies considered to be of similar risk to the regulated entity in question, and in setting the regulated entity's rate of return, the National Energy Board examined quantitative and qualitative evidence pertaining to five types of risk:

(a) supply risk: risk that the physical availability of economical natural gas volumes could affect a pipeline's income-earning capability;

(b) market risk: the business risk that stems from the overall size of the market and the market share that a pipeline is able to capture;

(c) competitive risk: the business risk that results from competition for customers at both the supply and market ends of a pipeline system;

(d) operating risk: risk to the income-earning capability that arises from technical and operational factors; and

(e) regulatory risk: risk to the income-earning capability of the assets that arises due to the method of regulation of the company.

3.42 These examples of regulatory practice from the United States and Canada indicate the ways in which risk can be classified for the purpose of assessing the degree of risk of a particular service provider in the provision of reference services, and for identifying the comparables with similar degree of risk to be used in establishing the benchmark efficient entity of rule 87.

3.43 Once the benchmark efficient entity with a similar degree of risk as that which applies to the service provider in respect of the provision of reference services has been established, it can be used to guide the evaluation and setting of the rate of return on equity, the rate of return on debt, the gearing, and the allowed rate of return.

35 See Brattle Equity Report, Section IV

36 See Brattle Equity Report, pages 69-71.

37 See Brattle Equity Report, pages 71-72.

3.44 Establishing the benchmark efficient entity required by rule 87 will require prior determination of a risks assessment framework, careful comparisons and reasoning drawing on both quantitative and qualitative evidence of risk. The result cannot be assumed, the process will not be simple and formulaic, and it will require the exercise of judgment. In addition, the benchmark efficient entity will need to be established independently for each individual service provider, and will need to be re-examined to ascertain whether the degree of risk which applies to the service provider in the provision of reference services has changed each time access arrangement revisions are proposed.

3.45 Assessing the degree of risk of the service provider in the provision of reference services, and establishing the benchmark efficient entity as a hypothetical entity with a similar degree of risk, will be tasks central to the process of rate of return determination. They will involve careful thinking about types of risk, about relevant comparables, and about the way in the benchmark efficient entity is to be "constructed". These issues must be addressed before estimates can be made of rates return on equity, rates of return on debt, and gearing, for the calculation candidate rates of return. These are major issues central to the methodologies that the ERA proposes to use in estimating the allowed rate of return, and to understanding the way in which the regulator intends to apply those methodologies in the determination of a rate of return on equity and a rate of return on debt in a way that is consistent with the allowed rate of return objective. They are issues which must be addressed in the guidelines required by rule 87(13).

3.46 Another issue that should be noted is that "efficient financing costs" are not determined solely (or even mainly for that matter) by reference to the weighting to be given to each of the rate of return on debt and the rate of return on equity.

3.47 The Brattle Debt Report advises:

> *the overall cost of capital of a company is the weighted average of the cost of debt and the cost of equity. As the leverage increases, larger weight is placed on the cost of debt. Therefore, risk of default increases and the cost of debt (and equity) increases. This change in relative weight generally does not change the overall cost of capital (absent taxes) and says nothing about the efficiency of an entity.*[38]

***Guidelines will set out methodologies for determining the rate of return***

3.48 The AEMC was of the view that the regulator and the industry should have the opportunity to discuss the above matters periodically and to make incremental changes as required. Guidelines revision provided the forum for these discussions.[39]

3.49 The concept of a guidelines process is a new concept in the NGR. There are therefore a number of key issues from the AEMC reasoning that help to understand what should be the content and purpose of the guidelines.

3.50 Firstly, and as outlined by the APIA Submission (at page 14), the guidelines now required by the new Rule 87(13) are important to providing both flexibility and certainty without an overly rigid prescriptive approach.[40] Their role is to provide service providers, investors and consumers with certainty on the methodologies of the various rate of return components and how the ERA is likely to assess the relevant financial models, estimation methods, market data and other evidence in meeting the ARORO.[41]

3.51 Secondly, the guidelines are not intended to explicitly lock-in any methods of rate of return determination, or specific parameters and parameter values, from which departure would not be permitted. Their purpose is to "narrow the debate" at the time of a specific regulatory determination or access arrangement revisions decision.[42]

38 Brattle Debt Report, page 19.
39 Rule Determination, page 65.
40 Rule Determination, page 46.
41 Rule Determination, page 57.
42 Rule Determination, page 58.

3.52 Thirdly, the guidelines also provide the ERA with the opportunity to specify how it might deal with unpredictable changes in market conditions at the time of a specific regulatory determination or access arrangement revisions decision.

3.53 The processes of preparing and revising the guidelines will also provide stakeholders with an opportunity to engage with the regulator to determine how the rate of return will be estimated at the time of a specific regulatory determination or access arrangement revisions decision.

3.54 Fourthly, the guidelines are not, the AEMC advised, to be the determinative instrument for calculating the rate of return. Rate of return determination is about making the best estimate of the rate of return at each regulatory determination or access arrangement revisions process.[43]

3.55 Fifthly, because the NGR requires the guidelines to outline the methodologies that the ERA proposes to use in estimating the allowed rate of return, including how those methodologies are proposed to result in the determination of a return on equity and return on debt in a way that is consistent with the ARORO[44], the content of the guidelines will need to outline the range of rate of return informative material that are likely to assist in such rates of return.

3.56 However because of the nature of the ARORO, DBP is of the view that the AEMC's reasoning supports the position that the guidelines should only focus on the overall rate of return methodologies in developing the guidelines, and not on the specific parameter values for each methodology.

3.57 DBP submits that, unless the ERA either produces a separate guideline for each service provider or undertakes a detailed assessment which concludes that multiple service providers have similar degrees of risk in the provision of reference services as that of a single benchmark efficient entity (in which case the same guidelines will be able to be issued for each such service provider but separate guidelines will need to be produced for all other service providers), the ERA can not develop specific parameter values for each model referenced in the guidelines and then rely on those parameter values when assessing each relevant access arrangement revisions proposal.

3.58 To do so will be inconsistent with the ARORO.

3.59 DBP considers the extent of pre-determination (and therefore the content of the guidelines) should be limited to the following:

(a) Clarification of what is the benchmark efficient entity (or at least, what are the characteristics of a benchmark efficient entity) and whether there is one benchmark efficient entity for all WA service providers under the NGR or whether there are multiple benchmark efficient entities each with a different degree of risk in respect of the provision of reference services. If there are multiple benchmark efficient entities, then the guidelines will need to outline each one (or separate guidelines will need to be prepared).

(b) An analysis of the degree of risk involved in the provision of reference services by each service provider will be required. This will require, in turn, either an assessment by the ERA of the differences in risks between each reference service that is provided by each service provider, or the identification by the ERA of particular types of risks which it will take into account when determining a service provider's rate of return. The detail as to whether an individual service provider is subject to particular risks, and how such risks will be accounted for, should be left to specific access arrangement determinations.

(c) Description of the process of determining the allowed rate of return through a multiple model methodology. Processes for each of the rate of return on equity, the rate of return on debt and the overall rate of return will need to be described separately.

(d) Identification of the rate of return informative material to which the ERA will have regard as part of the access arrangement determinations (see the AEMC Rule Determination, pp 57 and 69).

43 Rule Determination, page 59.

44 Rule 87(14) NGR

(e) Identification of the relevant rate of return informative material that can be used in determining the rate of return will need to be outlined. This would provide appropriate clarification as to the ERA's thinking on the application of Rule 87(5)(a). In this regard, DBP refers the ERA to the Brattle Equity Report and the Brattle Debt Report for the list of factors that influence the utility of each rate of return informative material.

(f) In so doing, the ERA will need to outline the extent to which each type of rate of return informative material has the capacity to take into account the risks involved in the provision of reference services. This will involve the ERA establishing the recognised biases, strengths and weakness of rate of return information materials identified.

(g) Establishment of the technique, rules or framework that will apply to the regulator's judgment in weighing the various rate of return informative material to determine the rate of return – i.e. the ERA must nominate how it intends to use the entire rate of return informative material. This should include an outline of:

(i) why the ERA chose the relevant rate of return informative material (this is what was intended by the AEMC in its final Rule Determination at page 70). As part of this process, the ERA will need to discuss any models or other information which it has had regard to but which it will not use and give reasons (as was intended by the AEMC in its final Rule Determination at page 70);

(ii) the relative weight (though not necessarily expressed quantitatively), to be placed on model estimates and how market data is to be used to ascertain lower bounds and/or provide reasonableness checks (this was envisaged by the AEMC in its final Rule Determination at page 70). This is a critical consideration, because it requires the ERA to articulate how numerous different sources (models, market data and other information) may be combined to ultimately provide one figure in a manner which is "as open and transparent as possible".[45] As the AEMC noted:

There will need to be discussion in the guideline of the relevant interrelationships between financial parameters that the regulator considers are relevant to the estimation of the return on equity and of debt. This would provide appropriate clarification as to the ERA's thinking on the application of Rule 87(5)(c).

3.60 DBP notes that the AEMC considered, as part of its final Rule Determination, that the guidelines should provide a sufficient level of prescription to "make a good estimate of the rate of return for particular businesses at particular points in time".[46] While the AEMC suggests that this may be done "by providing indicative ranges of the rate of return or through the way the approach is explained", this is not consistent with the way the provisions of rule 87 have been drafted. It is difficult to see how the ERA could provide any meaningful guidance unless it obtains and considers specific substantive information from each regulated service provider (which it would otherwise only consider as part of each access arrangement determination) so that it may consider the relevant characteristics of the (benchmark efficient equivalent) service provider.[47]

45 Rule Determination, page 71.

46 Rule Determination, pages 57 and 71.

47 By way of example only, a stakeholder will not be aware of DBP's cost of debt in the preceding years as that information will presumably not be disclosed as part of the Guidelines process. If, in the access arrangement determination, the regulator ultimately determines DBP's cost of debt using the trailing average approach, then DBP's cost of debt will be critical to the rate of return ultimately determined.

## 4. CONSULTATION PAPER INDICATES ERA HAS FAILED TO UNDERSTAND THE TASK REQUIRED OF IT UNDER THE NGR

4.1 In light of the matters outlined in the preceding section of this submission, a major change is required to the ERA's approach to estimating the rate of return.

4.2 However, DBP is concerned that the ERA's position in the Consultation Paper may not lead to a rate of return that is compliant with the requirements of the NGL and NGR.

4.3 The ERA appears to be adopting a position of minor refinement to the approach it has adopted to date. This is borne out in the following parts of the Consultation Paper:

(a) Paragraph 11, which signals a review of the ERA's current approach to rate of return determination, rather than assessment of what is required under the new rule:

*As noted, the development of the RoR guidelines provides an opportunity for the ERA to review its approach to setting the RoR for future decisions relating to these access arrangements;*

(b) Paragraph 15, which advises:

*The starting point for the ERA will be its RoR assessments that are set out in its recent decisions relating to access to gas pipelines and networks in Western Australia;*

(c) The assumption made in section 2 that the benchmark efficient entity is the "benchmark" previously identified by the AER and the ERA as being consistent with the requirements of (old) rule 87 (which it was not), an assumption made without adequate consideration of the requirements of rule 87(3) for a benchmark efficient entity with a similar degree of risk as that which applies to the service provider in resp3.ect of the provision of reference services;

(d) The assumption made in section 6 that the SLCAPM is capable of providing an estimate of the rate of return on equity which contributes to the achievement of the allowed rate of return objective, an assumption appropriate under (old) rule 87 but which must now be validated before it can be used in rate of return determination;

(e) The assumption made in section 7 that the bond yield approach can be used for estimating a debt risk premium which can, in turn, be added to a risk free rate of return to provide an estimate of the rate of return on debt, an assumption which had no strong foundations under (old) rule 87 and which must now be validated before it can be used in rate of return determination especially because the new rule now explicitly admits alternative models and estimation methods.

4.4 Nowhere in the Consultation Paper has the ERA considered or posed a question that would assist in the understanding of what is intended by benchmark efficient entity with a similar degree of risk as that which applies to the service provider in respect of the provision of reference service, a pivotal concept of the ARORO. Rather the ERA seems to be relying on its approach employed under the old rule 87 framework; this is evident in its use of "benchmark service provider" which DBP does not consider to be a term relevant to the new Rule 87 or ARORO (See ERA Question 7). DBP addresses this concern in further detail at paragraphs 3.24 to 3.47 of this submission.

4.5 In relation to the point made above in paragraph 4.3(a), it would be of grave concern to DBP were the ERA to simply rely on its prior consideration of all models, methodologies, market data and relevant evidence relating to the rate of return on equity. It would be of even greater concern for DBP were the ERA to then solely use the SLCAPM to determine the rate of return on equity on the basis that it has previously considered all relevant models, methodologies, market data and relevant evidence.

4.6 This is because, to the extent that a model, method, data set or piece of evidence has been previously considered by the ERA, this consideration was not undertaken for the purposes of assessing whether they were models, methods, data and evidence that were proposed to result in the determination of a return on equity and on debt in a way that was consistent with the ARORO.

4.7 Previous assessments which have found particular models to be inadequate because they were not "well accepted" are irrelevant under the new Rule 87. "Well acceptedness" is not a criterion under the new rule.

4.8 The AEMC was explicit in the final Rule Determination that a finding that a model is well accepted presupposes the ability of a single model, by itself, to achieve all that is required by the ARORO. The AEMC concluded that any relevant evidence on estimation methods, including that from a range of financial models, should be considered to determine whether the overall rate of return objective is satisfied and that a single model could not, by itself achieve consistency with the objective.[48]

4.9 Accordingly, the ERA must, as part of the guidelines process, consider anew all rate of return informative material for the purpose of assessing how that material might result in a determination of a rate of return on equity and a rate of return on debt in a way that is consistent with the ARORO.

4.10 It is for this reason that DBP and the APIA have commissioned the Brattle Group to prepare both the Brattle Equity Report and the Brattle Debt Report. Both reports go into detail to outline relevant rate of return informative material and how it might be used in the determination of the rate of return on equity and on debt in a way that is consistent with the ARORO.

48 Rule Determination, p 40

## 5. ISSUES WITH THE ERA'S APPROACH IN THE CONSULTATION PAPER

5.1 In addition to the issue raised in the prior section of this submission, DBP has three other issues with the ERA's approach in the Consultation Paper. They are:

(a) The lack of alignment between the AER and the ERA's guidelines development processes;

(b) The level of consultation being undertaken by the ERA; and

(c) The ERA's timetable for completing the guidelines process.

***Alignment between AER and ERA processes***

5.2 It is becoming increasingly apparent that there is a growing disconnect between the ERA's timetable for the development of its guidelines and that for the AER's guidelines. The extent of the disconnect is such that there is a real likelihood that the ERA will issue its draft guideline before the AER's position is known.

5.3 This raises the real prospect that there could be fundamentally different approaches adopted by the ERA and the AER in their respective guidelines. Should this occur, there are significant concerns for investors who invest in various jurisdictions in Australia as it could lead to a disincentive to invest in one jurisdiction over another.

5.4 DBP considers that, to the extent the ERA is inclined to proceed with issuing its draft guidelines before the AER has stated its position, the ERA's process includes a step before the release by the ERA of its final guideline in which the ERA outlines its response to the AER's draft guidelines and calls for submissions from stakeholders on the ERA's response, particularly where the response is that the ERA intends to change its position from that outlined in the draft guideline.

5.5 There are several reasons for doing this:

(a) It reduces the risk that there could be skewed investment incentives between Australian jurisdictions.

(b) It is consistent with regulatory best practice and the stated desire of the AEMC to ensure consistency in regulatory frameworks and their application (while recognising legitimate jurisdictional differences).

(c) It ensures that all stakeholders are afforded procedural fairness.

(d) There is not likely to be significant delays to the ERA's overall timetable given the AER also needs to issue its final guideline ahead of the next reviews under the NEL, which are due to commence in early 2014.

***Level of consultation***

5.6 Given the importance of these guidelines to all stakeholders and to other entities such as ratings agencies and debt and equity financiers, DBP urges the ERA to undertake more effective consultation and for this consultation to be held as early as possible.

5.7 DBP is of the view that more effective consultation on key issues will engender greater confidence in stakeholders that the final guideline is consistent with the allowed rate of return objective, the revenue and pricing principles and the national gas objective. This should be undertaken in the form of workshops focusing on key issues such as:

(a) The notion of the benchmark efficient entity with a similar degree of risk as that which applies to the service provider in respect of the provision of reference services;

(b) Relevant evidence and models and methodologies for rate of return on debt and rate of return on equity; and

(c) How to use the relevant evidence to estimate the rate of return.

5.8 However, the there is no firm commitment from the ERA in its currently published timetable to hold workshops (other than if the ERA unilaterally considers them to be required). It is also noted that if workshops are to be held, they will occur in April or May.

5.9 DBP submits that the holding of workshops in April / May is too late in the process given that the draft guideline is currently scheduled to be issued in June. The ERA should take a leaf out of the AER's book and engage in effective consultation now.

5.10 This will not only engender greater confidence in the final outcome (particularly if a consensus position can be reached on key issues); it will also reduce the risk that positions adopted by stakeholders are not misinterpreted (by other stakeholders or by the ERA).

5.11 To the extent that there is an ability, as part of the wider consultative process, for industry and the ERA to reach a consensus position on matters relevant to the guidelines, this should also reduce the overall timetable for the process.

5.12 DBP notes that NGR do not set out a prescriptive process for the regulator to follow in the development of the guidelines.

***Timing***

5.13 In the Consultation Paper, the ERA outlines a number of reasons as to why it is important to have the guidelines finalised as soon as possible and, importantly, no later than 29 November 2013.

5.14 While DBP accepts that it is important to ensure there is a timely completion of the process, it would be of concern to DBP if completing a process just to meet a self imposed deadline compromises the ability to maximise stakeholder confidence in the guidelines.

5.15 The importance of the guidelines to investors can not be underestimated. DBP will need to refinance over $400 million of debt in the first half of 2014. Potential financiers and ratings agencies will be placing significant weight on the outcome of the guidelines process. Accordingly, there must be confidence that the outcomes reflect not only a correct application of the requirements but also reflect the best achievement of the ARORO.

5.16 With that in mind, DBP considers that the reasons outlined by the ERA in the Consultation Paper for having the guidelines finalised as soon as possible do not really justify this position being taken by the ERA.

5.17 Firstly, the ERA states that shippers on the DBNGP "have the option of reverting to reference tariffs at [1 January 2016]" and as such, the ERA is of the view that it would be important to avoid anything that might delay the finalisation of the next access arrangement revisions process for the DBNGP. While the shippers under the standard shipper contract actually have a right, as opposed to an option, for the tariffs to revert to the nearest equivalent reference tariff on 1 January 2016, this is not conditional on the next access arrangement revisions process being completed by that time. There is already an access arrangement in force for the DBNGP. The contractual right of shippers will therefore be exercisable regardless of the status of the access arrangement revisions approvals process due to be undertaken in 2015.

5.18 The second reason the ERA gives is that it is mindful that it has limited resources and so, would rather avoid delays in the guidelines process that may lead to it having to run three concurrent access arrangement reviews. There are four points to make in response to this as to why this is not a legitimate justification for completing the guidelines process as soon as possible.

(a) Firstly, the timing of the access arrangement review processes for the main three covered pipeline systems in WA has always resulted in them overlapping. So, the ERA's resourcing should always be ready for this.

(b) Secondly, one of the reasons for the establishment of a rate of return guidelines process is to provide stakeholders with more certainty as to how the rate of return is to be estimated in the access arrangement approvals process – in fact, the rules require the guidelines to be applied in the access arrangement approvals process unless there is reason for why they

shouldn't be so applied. This should mean that the access arrangement approvals process should take less time.

(c) Thirdly, the NGR provide that the ERA should complete its access arrangement approvals process within 12 to 13 months. It is not clear therefore why the ERA wants to allow potentially up to 19 months to assess proposed revisions to the Access Arrangement for the ATCO distribution systems.

(d) Finally, the ERA is funded directly by industry. There should be no reason therefore why the ERA should experience a limitation in resources, particularly when the ERA has plenty of advance notice of the timing of access arrangement approvals processes.

## 6. A PRACTICAL WAY TO ACHIEVING A RATE OF RETURN THAT BEST ACHIEVES THE ALLOWED RATE OF RETURN OBJECTIVE

6.1 In light of the reasoning outlined by the AEMC in its Rule Determination (which is summarised in the earlier section of this submission), DBP considers a rate of return that achieves the ARORO will be best delivered by adopting the following multi-stepped approach:

(a) Firstly, the ERA must estimate the rate of return on equity and the rate of return on debt. For the purposes of estimating each of the rate of return on equity and debt, the ERA must:

(i) Use a wide range of relevant models, methods, data and evidence – a wide range of rate of return informative material;

(ii) Weigh each piece of rate of return informative material according to its merits at the time of determination; and

(iii) Assess whether the estimate that has been arrived at for each of the rate of return on equity and rate of return on debt each contribute to the achievement of the ARORO. This means that each estimate should be subject to a "reasonableness check" against the ARORO.

(b) Secondly, the ERA needs to "circle back" (as the methodology was referred to by the ACT in 2012 DBP Competition Tribunal proceedings) and ensure that the overall rate of return achieves the ARORO. In so doing, the ERA will again need to use a wide range of rate of return informative material and weigh each piece of rate of return informative material to assess whether the estimated rate of return best meets the ARORO and the NGO.

(c) In all circumstances, the ERA must use the weighted evidence to provide a transparent and clear decision on the allowed rate of return.

6.2 That the use of all relevant available rate of return informative material must occur in order to meet the ARORO is supported by expert economic advice obtained by DBP and the APIA.

6.3 In relation to the estimation of the rate of return on equity, DBP refers to the advice in the Brattle Equity Report. The Brattle Group has confirmed that this is the correct approach to adopt for the return on equity as it will give greater confidence as to the rate of return being estimated. Relevantly, the Brattle Equity Report makes the following points in relation to use of all available rate of return informative material in estimating the rate of return generally and the rate of return on equity:

(a) Practitioners, regulators and textbooks commonly look to several models or data sources before reaching conclusions on the rate of return on equity; and

(b) All models have relative strengths and weaknesses, with the result that there is no one model that is the most suitable for estimating the rate of return on equity at any given time or for any given company.[49]

6.4 The Brattle Group has also confirmed that this is the correct approach to adopt for the return on debt as it will give greater confidence as to the rate of return being estimated.[50]

6.5 The advantages of such an approach are:

(a) It delivers a robust rate of return that avoids the false precision of a single model.

(b) The use of multiple models and other relevant evidence means the effects of biases and weakness of any single model are reduced.

49 Brattle Equity Report, pages 1,8.

50 See “What should we expect from models or methods”, Brattle Debt Report, pages 7-9

(c) The consequences of discretionary decisions required in estimating the rate of return of a single model (or any errors that occur) are muted as the influence of any one model is not too great.

(d) If the guidelines effectively establish the principles and articulate the criteria under which the regulator will make decisions (so long as they align with the requirements in the rules and the NGL) it will result in transparent, consistent and logical use of regulatory discretion and judgement.

(e) It better manages the effects caused by the fact that all individual models can be, and often are, subject to instability over time.

***The use of regulatory judgement***

6.6 A multiple model methodology will require the use of regulatory judgement and discretion throughout the decision making process. This is not something that can, or should, be avoided in making complex decisions on the rate of return and other matters of economic regulation. The transparent application of well-informed, logical regulatory judgement consistently across determinations will lead to a regulatory environment all stakeholders can have confidence in.

6.7 To DBP's mind, the use of regulatory judgement is a two stage process. First, the regulator must apply understanding, perspective and insight to the evidence before it with logic and reasoning. Second, a decision must be reached and explained in a logical, clear and transparent manner. This is not a new concept – this is exactly what occurs when a judge makes a decision at the conclusion of a legal proceeding. Throughout the process of exercising judgement, the regulator must be mindful of consistency. A series of well-articulated decisions will build consistency, with stakeholders reasonably being able to predict a regulator's judgement in a decision based on the discussion in previous decisions.

6.8 The guidelines have a major role to play in ensuring this occurs. In DBP's view, the primary purpose of the guidelines is to set out the principles, criteria and 'rules' under which the AER will exercise its judgement. In finalising these matters in the guideline through a genuinely consultative process, presumably those principles, criteria and 'rules' will be based on a logical approach that all stakeholders agree on and understand.

***A first proposal***

6.9 Putting a multiple model methodology into practice will be challenging. In order to make a decision that is appropriate both in the quality of its finding and its resource intensity, it is clear some boundaries and criteria will have to be established to enable the consideration of a wide range of evidence and its weighting. Below, DBP provides its first thoughts on how the practical implementation of a multiple model methodology could be achieved.[51] The details of each stage would be discussed and finalised during the guidelines process.

6.10 Central to the process DBP sets out is Rule 87. Rule 87 already provides criteria to guide rate of return determination; the NGL and the NGR do not call for, or require, criteria which lie outside the regulatory regime.

51 Key elements of this proposal are the same as the key elements of a first proposal which APIA made to the AER. See APIA submission, pages 17-19.

***Step 1***: Relevant rate of return informative materials is used to make initial estimates of the rate of return on equity and debt in accordance with Rule 87(5). The rate of return informative material to be used is likely to be, but will not necessarily be, based on that outlined during the guideline process and published in the guideline. It is important that the material is able to meet the criteria in Rule 87.

***Step 2:*** Each model delivers a range of values for each of the rate of return on equity and debt – based on uncertainties in the various parameters that are inputs to the models and having regard to requirements for consistency, and to parameter interrelationships, in accordance with the requirements of rule 87(5). As a consequence, it will also lead to multiple estimates of a nominal vanilla weighted average cost of capital. The process will lead to multiple possibilities for the allowed rate of return.

***Step 3:*** The rate of return informative material must be weighted having regard to its key characteristics. In relation to equity and debt, there is no one single way to estimate each of the rate of return on equity and on debt, and determination of the overall rate of return will require the exercise of judgement by the estimator. The multiple possibilities must be assessed and, from them, a rate of return must be determined which achieves the allowed rate of return objective of rule 87(3). The allowed rate of return may or may not be one of the multiple possibilities. To help guide the weight to be given to each of the rate of return informative materials, there must be a consideration of:

- the degree to which the information from the rate of return informative material overlaps versus providing additional information;
- the economic and financial environment that gave rise to the estimates; and
- the context in which the rate of return informative material is being used.

DBP refers to the Brattle Group's recommendations on how this weighting process should be done in connection with the rate of return on equity. Details are outlined in section IV of the Brattle Equity Report. This will be discussed in more detail in response to Question 4 of the Consultation Paper (see Attachment 3).

***Step 4:*** The regulator must then assess if further adjustment is warranted based on the unique risks of each service provider and the unique characteristics of each model. DBP refers to this as 'risk positioning'. Risk positioning must be conducted under principles which are determined during the guideline process and published in the guideline.

In the case of the rate of return on equity, the factors that may be considered have been assessed by the Brattle Group in the Brattle Equity Report. They are risks to which the service provider may be exposed, and have been conveniently categorised by the National Energy Board in Canada as follows:

- Supply risk
- Market (downstream) risk
- Regulatory risk
- Competitive risk
- Operating risk[52]

### *Estimating the rate of return on equity*

6.11 Rules 87(6) and 87(7) provide further guidance on estimation of the rate of return on equity. Rule 87(6) indicates that the estimate of the rate of return on equity which is required is for an access arrangement period. It is, therefore, not a historical rate of return on equity but a forward looking rate of return. In consequence, it is likely to be estimated using a model.

6.12 Rule 87(7) ensures that any use of a model does not give undue weight to the historical market data which are likely to be used in its estimation: when estimating the rate of return on equity, regard must be had to prevailing conditions in the market for equity funds.

52 Brattle Report, page 72

6.13 However it is estimated, and irrespective of the data which are used, the rate of return on equity must be estimated in such a way that it contributes to achievement of the allowed rate of return objective (rule 87(6)).

***Estimating the rate of return on debt***

6.14 Rules 87(8), (9), (10), (11) and (12) provide more detailed guidance on estimation of a rate of return on debt for use in determining the allowed rate of return.

6.15 In accordance with rule 87(9), return on debt estimation may result in a rate of return on debt which is:

(a) the same in each year of an access arrangement period; or

(b) different for different regulatory years in the access arrangement period.

6.16 Irrespective of whether estimates of the rate of return on debt are the same or different for the different regulatory years in an access arrangement period, rule 87(8) requires that the rate of return for a regulatory year be estimated in a way that contributes to the achievement of the allowed rate of return objective.

6.17 Rule 87(8) indicates that the estimates of the rate of return on debt which are required are for an access arrangement period. They are, therefore, not historical rates of return on debt but forward looking rates of return. In consequence, they are likely to be estimated using a financial model.

6.18 The methodology used to estimate the rate of return on debt – the financial model used and the way in which that model is employed to provide a specific estimate or estimates – may be designed, in accordance with rule 87(10), to produce an estimate which reflects:

(a) the return that would be required by debt investors in a benchmark efficient entity if it raised debt at the time, or shortly before the time, when a regulatory decision on an access arrangement revisions proposal was to be made;

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

(c) a combination of the returns referred to in (a) and (b) above.

6.19 If the rate of return on debt is estimated using a method which produces an estimate which reflects (b) above, then a decision on an access arrangement revisions proposal which incorporates this method must specify a formula through which the service provider's total revenue is automatically adjusted (rule 87(12)).

6.20 Rule 87(11) requires that, in estimating the rate of return on debt, regard be had to the following four factors:

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

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

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

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

6.21 Rules 87(10) and 87(11) have no parallels in the scheme of rule 87 which guides rate of return on equity estimation. Estimating the rate of return on debt is a more complex and nuanced process.

***Gearing***

6.22 The nominal vanilla WACC required by rule 87(4) is a simple weighted average of the estimated rate of return on equity and the estimated rate of return on debt, where the weights are to be the assumed proportions of equity and debt in the total financing. These proportions, which are summarised in the gearing, indicate the extent of financial risk. Since the WACC to be calculated using the gearing is to be a candidate rate of return, the financial risk represented by the gearing should be the financial risk of the benchmark efficient entity with a similar degree of risk as that which applies to the service provider in respect of the provision of reference services.

***Allowed rate of return***

6.23 In accordance with rule 87(3), any of the multiple possible rates of return which is to be taken as the allowed rate of return must, be commensurate with the efficient financing costs of a benchmark efficient entity with a similar degree of risk as that which applies to the service provider in respect of the provision of reference services.

6.24 One way of assessing a rate of return possibility for whether it is the allowed rate of return required by rule 87(2) is via assessment of its component parts: are the estimate of the rate of return on equity, the estimate of the rate of return on debt, and the gearing individually commensurate with service provider efficient financing costs so that, when combined, the resulting WACC is commensurate with the efficient financing costs of a benchmark efficient entity with a similar degree of risk as that which applies to the service provider in respect of the provision of reference services? This assessment will be assisted by the availability of multiple relevant models and estimation methods, against which considered comparisons can be made. It may also be assisted by direct comparisons with market data and other relevant evidence (for example, the rate of return on debt for a gas distribution business, estimated using the debt model, might be compared with the returns to lenders from recent debt issues to distribution pipeline businesses with a similar degree of risk as that which applies to the service provider in respect of the provision of reference services).

6.25 Another way of proceeding is via assessment of the candidate rate of return itself for whether it is the allowed rate of return required by rule 87(2). This assessment is more likely to be made by direct comparisons with market data and other relevant evidence than by comparison with the results obtained from particular models and estimation methods. Although potentially more difficult, this assessment of the candidate rate of return itself for whether it could be taken as allowed the rate of return seems to have been the intention of the AEMC when it amended rule 87. As noted earlier in this submission, the AEMC saw the structure of rule 87 as focusing the regulator and the appeals body on the question of whether an overall estimate of the rate of return achieved the allowed rate of return objective, which was closely linked to the NGO and the RPP.[53]

6.26 DBP notes, though, that even if a possible rate of return – a nominal vanilla weighted average cost of capital – can be shown to achieve the allowed rate of return objective, rule 87(6) requires, independently, an assessment of whether the estimate of the rate of return on equity used to calculate that weighted average contributes to the allowed rate of return objective. Furthermore, rule 87(8) requires, independently, an assessment of whether the estimate of the rate of return on debt used to calculate the weighted average cost of capital contributes to the allowed rate of return objective.

6.27 If assessment of a possible rate of return for whether it is the allowed rate of return required by rule 87(2) is to be via assessment of its component parts, the following will need to be established:

(a) any estimate of the rate of return on equity which is used to calculate the nominal vanilla WACC of rule 87(4) must be shown to be an estimate made for a benchmark efficient entity with a similar degree of risk as that which applies to the service provider in respect of the provision of reference services;

(b) any estimate of the rate of return on debt which is used to calculate the nominal vanilla WACC of rule 87(4) must be shown to be an estimate made for a benchmark efficient entity

53 Rule Determination, page 38.

with a similar degree of risk as that which applies to the service provider in respect of the provision of reference services; and

(c) any estimate of the gearing which is used to calculate the nominal vanilla WACC of rule 87(4) must be shown to be an estimate made for a benchmark efficient entity with a similar degree of risk as that which applies to the service provider in respect of the provision of reference services; and

(d) the possible rate of return itself must be shown to be the efficient financing cost for a benchmark efficient entity with a similar degree of risk as that which applies to the service provider in respect of the provision of reference services.

6.28 Beyond this, rule 87 provides no guidance on how the benchmark efficient entity is to be established. This seems to have been intentional. In its Rule Determination the AEMC noted that the concept of efficiency and the characteristics of the benchmark efficient firm were not specified in rule 87. The AEMC was of the view that they, and the benchmark characteristics that relate to service provider risk, were best left to regulator determination.[54] This was, in part, necessary because the concept of a benchmark efficient service provider and the risks that a benchmark service provider may face can change over time.[55] Furthermore, the AEMC was of the view that the regulator and the industry should have the opportunity to discuss these matters periodically and to make incremental changes as required. Guidelines revision provided the forum for these discussions.[56]

***Response to questions in consultation paper***

6.29 Attachment 3 to this submission contains a detailed response to questions raised by the ERA in the Consultation Paper.

6.30 It should be noted that DBP has not responded in detail to all questions. This does not mean that DBP either does not have a position on the issues raised in the question or agrees with the position outlined by the ERA. Rather it means that DBP does not believe that the issues the ERA is seeking to have addressed are appropriate for inclusion in the guidelines.

54 Rule Determination, page 65.

55 Rule Determination, page 65.

56 Rule Determination, page 65.

**ATTACHMENTS**

Attachment 1 – APIA Submission to the AER Issues Paper for the development of rate of return guidelines, dated 20 February 2013

Attachment 2 – APIA Submission to the AEMC in response to the rate of return rule change requests, dated 4 October 2012

Attachment 3– DBP's response to specific questions raised in the Consultation Paper

Attachment 4 – Brattle Group Rate of return on debt Report

Attachment 5 – SFG Consulting Estimating Gamma

the australian PIPELINE industry association Ltd


# Response to Issues Paper

The Australian Energy Regulator's development of Rate of Return Guidelines

20/2/2013

the australian PIPELINE industry association Ltd


## Executive Summary

The 2012 changes to the National Gas Rules and National Electricity Rules deliver a common framework for determining the rate of return for all energy service providers that is radically altered from the preceding framework.

It is the Australian Pipeline Industry Association's view, and our interpretation of the reasoning articulated by the Australian Energy Market Commission in its Final Decision, that the new framework is to be used by the regulator to make a well-informed judgement on allowed rate of rate by considering a much wider range of evidence that previously required.

APIA has engaged the services of the Brattle Group to make recommendations as to how the task of estimating the rate of return on equity should be undertaken in accordance with the requirements of the rules. As part of this work, the Brattle Group obtained the views of Professor Stewart Myers. Copies of the reports from the Brattle Group and Professor Stewart Myers are attached in Schedules 1 and 2 respectively are referred to through APIA's submission.

Most importantly, both reports conclude, consistently with the AEMC's position, that "there is no one model that is the most suitable for estimating the cost of equity at any given time or for any given company.[1]" Use more than one model when you can. Because estimating the opportunity cost of capital is difficult, only a fool throws away useful information."[2]

[1] The Brattle Group, Estimating the Cost of Equity for Regulated Companies (2013), p 1

[2] Ibid, p 1

In light of the AEMC's reasoning and the advice received from the Brattle Group and Professor Myers, APIA advocates an approach to determining the allowed rate of return that:

- Uses a wide range of relevant evidence, data and models (rate of return informative material);
- Weights each piece of rate of return information material according to its merits at the time of determination; and
- Uses the weighted evidence to provide a transparent and clear decision on the allowed rate of return.

APIA terms such an approach a 'multiple model methodology'.

The purpose of the Rate of Return Guideline, required under rule 87 of the National Gas Rules, is to provide clarity as to how the regulator proposes to approach the task of considering a wide range of evidence.

APIA considers the content of the Guideline should cover:

- The process undertaken in determining the allowed rate of return through a multiple model methodology. The process for the Cost of Equity and Cost of Debt will need to be described separately.
- Identification of the relevant rate of return informative material that can be used in determining the rate of return. This would provide appropriate clarification as to the regulators thinking on the application of NGR 87 (5)(a).
- Establishment of the recognised biases, strengths and weakness of rate of return information materials identified.
- Establishment of the technique, rules or framework that will apply to the regulator's judgement in weighing the various rate of return informative material to determine the rate of return.

- Discussion of the relevant interrelationships between financial parameters that the regulator. This would provide appropriate clarification as to the regulators thinking on the application of NGR 87 (5)(c).

In terms of the rules or framework that will apply to relevance of information, establishment of biases/strengths/weakness and weighting of material; APIA believes clear boundaries should be established in the Guidelines within which the AER can apply its judgement consistently.

# Contents

# Introduction

The Australian Pipeline Industry Association (APIA) welcomes the opportunity to provide our view on the Australian Energy Regulator's Rate of Return Guidelines Issues Paper and the approaches that should be taken to determine an allowed rate of return under the new framework in the National Gas Rules.

APIA is the peak industry body representing the interests of Australia's gas transmission industry. The views presented in this paper are the agreed position of the owners of regulated gas transmission infrastructure.

Rule 87 of the National Gas Rules (**NGR**) governs determination of the rate of return to be used in setting the total revenue and reference tariffs for covered (regulated) gas pipeline systems. Significant changes to Rule 87, made by the Australian Energy Market Commission (**AEMC**) in response to rule change requests from the Australian Energy Regulator (**AER**) and the Energy Users Rule Change Committee, will come in to operation at 1 July 2014.

New rule 87(13) requires that the regulator – being the AER and, in Western Australia, the Economic Regulation Authority (ERA) – make and periodically review rate of return guidelines following a procedure (the rate of return consultative procedure) set out in new rule 9B.

In accordance with the requirements of the rate of return consultative procedure, the AER has published an issues paper, Better Regulation Rate of Return Guidelines (dated 18 December 2012) (**Consultation Paper**), and has invited submissions on matters raised in the paper. Submissions are to be made before close of business on Friday 15 February 2013.

Rate of return is a critical issue for both pipeline service providers, and for the users of pipeline services. A rate of return which is too high will lead to reference tariffs which are too high, and these higher tariffs have the capacity to, other things being equal, reduce downstream demand for gas to detriment of the wider economy. A rate of return which is too low will provide, in the short term, price signals which stimulate the demand for gas but which will depress investment in pipeline systems to the longer term detriment of gas consumers.

The rule change which came into effect on 29 November 2012 is a major change. Rule 87 previously comprised just two subrules. Rate of return determination is now governed by some 19 subrules (and two

new related rules, 9B, the rate of return consultative procedure, and 87A, which requires estimation of the cost of corporate income tax consistent with the rate of return measure adopted in rule 87)[3].

More importantly, rule 87 now requires an approach to rate of return determination which is different from the approach previously taken by both service providers and regulators. The new rule recognises that rate of return determination cannot be reduced to "application of a formula". It calls for examination of the evidence from relevant financial models and estimation methods, and from financial markets, and for the weighing of that evidence to arrive at a rate of return which meets an explicit allowed rate of return objective.

The AER has set out, in the Consultation Paper a series of questions about how those requirements should be addressed in the guidelines the regulator is make and publish in accordance with rule 87(13). In this document, APIA provides responses to the questions which the AER has asked with a view to facilitating the rate of return determination process now required by rule 87.

APIA's submissions on the matters raised in the Consultation Paper are made in the context of its understanding of why the AEMC has chosen to make major changes to rule 87. That understanding of the AEMC's reasons is summarised in the next section of this submission.

APIA has engaged the Brattle Group to make recommendations as to how the task of estimating the rate of return on equity should be undertaken in accordance with the requirements of the rules. As part of this work, the Brattle Group obtained the views of Professor Stewart Myers. Copies of the reports from the Brattle Group and Professor Stewart Myers are attached in Schedules 1 and 2 respectively.

The understanding on matters of rate of return that the Brattle Group and Professor Stewart Myers possess cannot be underestimated. They are international experts in matters of finance and economic regulation. Professor Myers is the co-author of the classic textbook, Principles of Corporate Finance, now in its 10th edition and used around the world.

[3] These rules are in addition to the requirements under the National Gas Law, including but not limited to sections 23 and 28 of the NGL

Most importantly however, both reports conclude, consistently with the AEMC's position, that "there is no one model that is the most suitable for estimating the cost of equity at any given time or for any given company.[4]" Use more than one model when you can. Because estimating the opportunity cost of capital is difficult, only a fool throws away useful information."[5] These reports will be referred to in various parts of this submission.

In subsequent sections of the submission, APIA will:

(a) discuss the usefulness of establishing some agreed definitions;

(b) set out our view of the AEMC's Rule Change and reasoning in the final determination

(c) discuss a practical approach to determining the overall rate of return in the new regime

(d) address the questions raised in the Issues Paper.

## Definitions

There are a number of terms used in the National Gas Rules concerning rate of return that appear to be used in different ways by different stakeholders in discussions about the Rate of Return Guidelines. For clarity, throughout this submission APIA takes the following meanings to apply.

**METHODOLOGY:** The process by which the Cost of Equity and Cost of Debt are determined. There is a separate methodology for each. Multiple methodologies may be identified in the Guideline, but only one can be used for each of the Cost of Equity and Cost of Debt at each determination. In the case of the Cost of Equity, in APIA's view there is debate around the use of a 'single model with crosschecks' methodology and a 'multiple models' methodology.

An example of where confusion can arise when the term 'methodology' is used otherwise is in Question 15 of the Issues Paper, which discusses 'methodologies' that should more appropriately be referred to as 'methods'

[4] The Brattle Group, Estimating the Cost of Equity for Regulated Companies (2013), p 1

[5] Ibid, p 1

**MODEL:** A single, theoretical approach to determining cost of equity. Models are combined (or not) in an agreed way to form a methodology.

**METHOD:** A single approach, often empirical, other than a model to determining the cost of equity or debt

The requirements of the rules are that the regulator will have regard to 'relevant estimation methods, financial models, market data and other evidence'. APIA considers it would be very useful and further reduce confusion if a collective term for this information is agreed. APIA suggests '**Rate of Return informative material'**, whilst wordy, is a suitable term.

## The AEMC's rule change

In its Rule Determination, the AEMC observed that a simple formulaic approach to rate of return determination had been set out in Chapter 6A of the National Electricity Rules (**NER**), while a more flexible framework had been included in the NGR. [6]

The original rate of return framework of the NGR, the AEMC contended, had been better aligned with achieving the national gas objective (**NGO**) of section 23 of the National Gas Law (**NGL**) and the revenue and pricing principles (**RPP**) of section 24. This was not because rule 87(2) prescribed a superior estimation process. It was because rule 87(1) specified an overall objective for the rate of return that directly aligned with achieving the NGO and the RPP.

However, in its Rule Determination, the AEMC observed that the greater flexibility available in the framework of the NGR had not been used by regulators. Rate of return decision making under the NGR had become infected by the inflexible approach of Chapter 6A of the NER, and that had been reinforced by recent decisions by the Australian Competition Tribunal (**ACT**). The ACT had interpreted rule 87 in a way that reduced the range of information which could be taken into account in determining the rate of return. [7]

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[6] Australian Energy Market Commission, *Rule Determination, National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012, National Gas Amendment (Price and Revenue Regulation of Gas Services) Rule 2012,* 29 November 2012 (**Rule Determination**), page 41.

[7] Rule Determination, page 41.

In its decisions in ATCO and DBP, the ACT had rejected the applicants' contentions that giving primacy to rule 87(1) of the NGR would achieve the requirements of the NGO and the RPP.[8] The ACT concluded that, although rule 87(1) set out the objective for rate of return determination, it did not provide guidance on how that objective was to be achieved. The ACT concluded that, in the interests of regulatory consistency, such guidance should be provided, and that it was provided by rule 87(2). In these circumstances, the ACT reasoned that criticisms of the approach which the regulator had taken to applying rule 87(2), and the financial models used with that approach, were misplaced especially if the approach and model were well accepted.

This was not, the AEMC advised, its view of the way in which rate of return determination should be approached.[9] The AEMC was of the view that rate of return determination should focus on producing an overall rate of return which was consistent with the objectives of the regulatory regime. The interpretation which had been provided by the ACT in ATCO and DBP meant that the AEMC could not be confident that, without amendment, the NGR framework would provide rates of return which best met the NGO and RPP.

The ACT's conclusion, the AEMC reasoned, presupposed that a single model, by itself, could achieve all that was required by the rate of return objective of rule 87(1). However, this was not the case: rate of return determination could not be reduced to a simple formulaic approach. A simple formulaic approach, the AEMC maintained, placed undue emphasis on individual parameter values, and did not inquire into whether the overall rate of return produced could best achieve the National Electricity Objective (**NEO**), the NGO and the RPP.[10] A framework relying on a relatively mechanistic approach was not well placed to achieve the NEO, the NGO and the RPP.[11]

According to the AEMC, there was a need to bring the focus of rate of return determination in the NER and the NGR back to the NEO, the NGO and the RPP. To this end, the AEMC has included an overall objective for the allowed rate of return in rule 87.[12] By including the allowed rate of return objective of rule

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8 *Application by WA Gas Networks Pty Ltd (No 3) [2012] ACompT 12* (***ATCO***), and *Application by DBNGP (WA) Transmission Pty Ltd (No 3) [2012] ACompT 14* (***DBP***).

9 Rule Determination, page 42.

10 Section 7A of the National Electricity Law (**NEL**) sets out revenue and pricing principles very similar to those of section 24 of the NGL.

11 Rule Determination, page 57.

12 Rule Determination, page 43.

87(3), the AEMC intended that the regulators and the appeal body focus on whether the overall estimate of the rate of return met the objective for the allowed rate of return, which was closely linked to the NEO, the NGO and the RPP.[13]

In making economic regulatory decisions under the NGL, the AER and the ERA are required to ensure that the decision is likely to contribute to the NGO and in so doing, must take into account the RPP[14]. The AER and the ERA were, the AEMC advised, expected to follow good administrative decision making practice and, in this context, that required a full and considered explanation for decisions and adherence to due process, rigour and objectivity required under administrative law principles. The regulators should, in these circumstances, be striving for the best possible estimates of the benchmark efficient financing costs. This, in turn, required an estimation process of the highest possible quality.[15] A range of financial models, estimation methods, market data and other evidence had to be considered, and the regulatory regime needed to give the regulator the discretion to be able to give appropriate weight to all of this evidence.[16]

The AEMC was of the view that any relevant evidence, including that from a range of financial models, should be considered in determining whether the overall rate of return objective was satisfied.[17] Requiring the regulator to have regard to relevant information on estimation methods, financial models, market data and other evidence, and allowing the regulator greater scope to achieve an overall rate of return objective, combined with a strengthened requirement to achieve that objective, was more likely to achieve the NEO and the NGO than the current approaches to rate of return determination.[18]

Whether a particular estimate of the rate satisfied the allowed rate of return objective would, the AEMC recognised, invariably require some level of judgement. The exercise of this judgement was to be made with reference to all relevant financial models, estimation methods, market data and other evidence that could reasonably be expected to inform the regulator's decision.[19]

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13 Rule Determination, page 38.

14 Section 28 NGL

15 Rule Determination, pages 43, 55-56.

16 Rule Determination, pages 43-44.

17 Rule Determination, page 48.

18 Rule Determination, page 49.

19 Rule Determination, page 67.

In these circumstances, service provider concerns about the regulators continuing to make exclusive use of the Capital Asset Pricing Model (**CAPM**) were, according to the AEMC, unfounded. The AEMC's intention was to ensure that the regulators take relevant models, estimation methods and other evidence into account when estimating the required rate of return on equity. [20]

## Certainty is achieved in a way which preserves flexibility

A focus on outcome in new rule 87, rather than detailed prescription of the rate of return determination process, also provided the flexibility that was needed to deal with changing market conditions and new evidence.[21] While flexibility was desirable, that flexibility did not extend to ignoring important inter-relationships between key parameters likely to be used in rate of return estimation. Rule 87(5)(c) requires that the regulator and service providers have regard to these inter-relationships.[22]

In ATCO and DBP, the ACT had concerns that a focus on the objective in rule 87(1) would remove the prescription of rule 87(2), lead to idiosyncratic regulatory decisions, and contribute to greater uncertainty about rate of return determination. The AEMC acknowledged this greater uncertainty, but was of the view that it should be balanced against the potential benefits. Limited prescription and a focus on the outcome of the process of rate of return determination would, the AEMC contended, better achieve the NEO and the NGO. The certainty which rule 87(2) had provided through more or less well defined steps in a process of rate of return determination had been removed, but it was replaced by certainty of outcome. [23]

## Nominal post tax rate of return

One issue on which the AEMC was prescriptive in its new framework was the form which the allowed rate of return was to take: the rate of return was to be a nominal post-tax rate of return. Rule 87(4)(b) requires that the allowed rate of return be determined on a nominal vanilla basis consistent with the estimate of the value of imputation credits to be made as part of the requirements of rule 87A.

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[20] Rule Determination, page 57.

[21] Rule Determination, page 44.

[22] Rule Determination, pages 44-45.

[23] Rule Determination, page 49.

Rule 87(4)(b) has the effect requiring a post-tax approach to total revenue determination. A post-tax approach to total revenue determination would, the AEMC advised, address the issue of service provider overcompensation for the cost of tax when the rate of return is estimated as a pre-tax weighted average cost of capital calculated using the statutory corporate tax rate.[24] A post-tax approach explicitly recognised the benefits to the service provider of accelerated depreciation of some assets for tax purposes.

A post-tax approach was, the AEMC noted, already consistently applied under the NER. Incorporation of that approach into the regime of the NGR would:

(a) streamline the access arrangement review process;

(b) provide gas pipeline service providers with certainty about the basis of rate of return determination;

(c) allow convergence in modelling approaches across sectors; and

(d) improve the ability to compare returns across sectors.[25]

The AEMC intended continued use of the definition of WACC that was found in the NER, and which was used in the AER's Post Tax Revenue Model (**PTRM**).[26] The AEMC did not mandate use of the PTRM, which was a model of regulated revenue determination initially designed for the electricity sector, and which necessarily incorporates a great deal more than a rate of return calculation.

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[24] Rule Determination, page 47.

[25] Rule Determination, page 47.

[26] Rule Determination, page 63.

## Benchmark efficiency to provide incentives for efficient financing

For the NGO to be achieved, the allowed rate of return objective needed to ensure that the rate of return allowed to a service provider reflected the efficient financing costs of a benchmark efficient entity with similar circumstances and degree of risk to the service provider. This requirement was necessary, the AEMC advised, to ensure that service providers could earn revenues sufficient to attract investment into electricity networks and gas pipeline systems in the long term interests of energy consumers while minimising the costs to those consumers. Rule 87(3) therefore requires that the allowed rate of return be consistent with the rate of return required by a benchmark efficient firm with similar risk characteristics to the service provider in question.[27]

The concept of efficiency and the characteristics of the benchmark efficient firm are not, however, specified in rule 87. The AEMC was of the view that they, and the benchmark characteristics that relate to service provider risk, were best left to regulator determination.[28]

This was, in part, considered necessary by the AEMC because the concept of a benchmark efficient service provider and the risks that a benchmark service provider may face can change over time.[29]

Although it is noted that there is an established set of judicial precedent to define the concept of efficiency in the field of regulatory economics. APIA further outlines its position on the Benchmark Efficient Entity concept in response to AER's question 7.

The AEMC was of the view that the regulator and the industry should have the opportunity to discuss these matters periodically and to make incremental changes as required. Guidelines revision provided the forum for these discussions.[30]

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[27] Rule Determination, pages 23, 43.

[28] Rule Determination, page 65.

[29] Rule Determination, page 65.

[30] Rule Determination, page 65.

## Guidelines will set out methodologies for determining the rate of return

The guidelines now required by rule 87(13) are important in providing both flexibility and certainty without an overly rigid prescriptive approach.[31] Their role is to provide service providers, investors and consumers with certainty on the methodologies of the various rate of return components and how the regulator is likely to assess the relevant financial models, estimation methods, market data and other evidence in meeting the allowed rate of return objective.[32]

The guidelines are not intended to explicitly lock-in any methods of rate of return determination, or specific parameters, from which departure would not be permitted. Their purpose is to "narrow the debate" at the time of a specific regulatory determination or access arrangement revisions decision.[33]

The guidelines also provide the regulators with the opportunity to specify how they will deal with unpredictable changes in market conditions at the time of a specific regulatory determination or access arrangement revisions decision.

The processes of preparing and revising the guidelines will also provide stakeholders with an opportunity to engage with the regulator to determine how the rate of return will be estimated at the time of a specific regulatory determination or access arrangement revisions decision.

The guidelines are not, the AEMC advised, to be the determinative instrument for calculating the rate of return. Rate of return determination is about making the best estimate of the rate of return at for each regulatory determination or access arrangement revisions process.[34]

The AEMC summarised: rule 87 now provides the regulator with sufficient discretion on the methodology for estimating the required return on equity and debt components but also requires the consideration of a range of estimation methods, financial models, market data and other information so that the best estimate of the rate of return can be obtained overall that achieves the allowed rate of return objective.[35]

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31 Rule Determination, page 46.

32 Rule Determination, page 57.

33 Rule Determination, page 58.

34 Rule Determination, page 59.

35 Rule Determination, page 8.

# Achieving the Allowable Rate of Return Objective

## Practical approach to determine the allowed rate of return

APIA considers the allowed rate of return will be best delivered by a methodology that:

- Uses a wide range of relevant evidence, data and models (rate of return informative material);
- Weights each piece of rate of return information material according to its merits at the time of determination; and
- Uses the weighted evidence to provide a transparent and clear decision on the allowed rate of return.

The new gas rules specifically allow, and encourage, such an approach. This is made clear in the AEMC's reasoning provided in the Final Decision.

APIA has also obtained advice from the Brattle Group on the approach to be followed in relation to the estimation of the cost of equity. The Brattle Group has confirmed that this is the correct approach to adopt for the return on equity as it will give greater confidence as to the rate of return being estimated. A copy of the report prepared by the Brattle Group (**Brattle Report**) is in Schedule 1. Relevantly, the Brattle Report makes the following points:

- Practitioners, regulators and textbooks commonly look to several models or data sources before reaching conclusions on the cost of equity
- All models have relative strengths and weaknesses, with the result that there is no one model that is the most suitable for estimating the cost of equity at any given time or for any given company.
- Professor Myers of the Massachusetts Institute of Technology commented:

  *Use more than one model when you can. Because estimating the opportunity cost of capital is difficult, only a fool throws away useful information. That means you should not use any one*

*model or measure mechanically or exclusively. Beta is helpful as one tool in a kit, to be used in parallel with DCF models or other techniques for interpreting capital market data.*[36]

The advantages of such an approach are:

- It delivers a robust rate of return that avoids the false precision of a single model.
- The use of multiple models and other relevant evidence means the effects of biases and weakness of any single model are reduced.
- The consequences of discretionary decisions required in estimating the rate of return of a single model (or any errors that occur) are muted as the influence of any one model is not too great.
- If the guidelines effectively establish the principles and articulate the criteria under which the regulator will make decisions (so long as they align with the requirements in the rules and the NGL) it will result in transparent, consistent and logical use of regulatory discretion and judgement.
- It better manages the effects caused by the fact that all individual models can be, and often are, subject to instability over time[37].

## The use of regulatory judgement

A multiple model methodology will require the use of regulatory judgement and discretion throughout the decision making process. This is not something that can, or should, be avoided in making complex decisions on the rate of return and other matters of economic regulation. The transparent application of well-informed, logical regulatory judgement consistently across determinations will lead to a regulatory environment all stakeholders can have confidence in.

To APIA's mind, the use of regulatory judgement is a two stage process. First, the regulator must apply understanding, perspective and insight to the evidence before it with logic and reasoning. Second, a decision must be reached and explained in a logical, clear and transparent manner. . This is not a new concept – this is exactly what occurs when a judge makes a decision at the conclusion of a legal proceeding. Throughout the process of exercising judgement, the regulator must be mindful of consistency.

[36] Brattle Report, p51

[37] Brattle Report, p 10

A series of well-articulated decisions will build consistency, with stakeholders reasonably being able to predict a regulator's judgement in a decision based on the discussion in previous decisions.

The guidelines have a major role to play in ensuring this occurs. In APIA's view, the primary purpose of the guidelines is to set out the principles, criteria and 'rules' under which the AER will exercise its judgement. In finalising these matters in the guideline through a genuinely consultative process, presumably they will be based on a logical approach that all stakeholders agree on and understand.

## A first proposal

Putting a multiple model methodology into practice will be challenging. In order to make a decision that is appropriate both in the quality of its finding and its resource intensity, it is clear some boundaries and rules will have to be established to enable the consideration of a wide range of evidence and its weighting. Below, APIA provides its first thoughts on how the practical implementation of a multiple model methodology could be achieved. The details of each stage would be discussed and finalised during the Guidelines process.

**Step 1:** Relevant Rate of Return Information Materials are used to make initial estimates of the rate of return. The Rate of Return Information Materials to be used are determined during the guideline process and published in the guideline. It is important that the Materials are:

- Consistent with the goal being pursued;
- Transparent;
- Produce consistent results;
- Robust to small deviations or sampling error;
- As simple as possible (while maintaining reliability);
- Can be replicated by others; and
- Able to recognise the regulatory context and legislative requirements in which the service provider operates.

**Step 2:** Each model delivers a range for the rate of return – based on uncertainties in the various parameters that are inputs to the models.

**Step 3:** The Rate of Return Information Materials must be weighted having regard to their key characteristics. In relation to the cost of equity, APIA recognises that there is no one single way to estimate the cost of equity and that it will require the exercise of judgement by the estimator. However, to help guide the weight to be given to each of the Rate of Return Information Materials, there must be a consideration of:

- the degree to which the information from the Rate of Return Information Materials overlaps versus providing additional information;
- the economic and financial environment that gave rise to the estimates; and
- the context in which the Rate of Return Information Materials are being used.

APIA has engaged the Brattle Group to recommend how this weighting process should be done. Details are outlined in section IV of the Brattle Report. This will be discussed in more detail in response to question 4 of the Issues Paper.

**Step 4:** The regulator must then assess if further adjustment is warranted based on the unique risks of each service provider and the unique characteristics of each model. APIA refers to this as 'risk positioning'. Risk positioning must be conducted under principles which are determined during the guideline process and published in the guideline.

The factors that may be considered have been assessed by the Brattle Group in the Brattle Report. They are risks that expose the service provider to systematic risk and have been conveniently categorised by the National Energy Board in Canada as follows:

- Supply risk
- Market (downstream) risk
- Regulatory risk
- Competitive risk

- Operating risk[38]

[38] Brattle report, page 72

# Response to AER Questions

## Principles based approach

| Question 1<br><br>Do stakeholders consider that following these principles would promote the allowed rate of return objective? Should any of the principles be considered as more prominent or important than others? |
|---|

A principles based approach is appropriate to ensure the methodology used to determine the allowed rate of return meets the objective and is applied consistently and transparently.

In approaching the task of developing the principles, it is appropriate to be cognisant of the hierarchy of objectives that must be met when determining the allowed rate of return. In the case of gas decisions, the overarching priority is meeting the National Gas Objective (NGO). Under the NGO sits the Revenue and Pricing Principles (R&PP). Then there are the requirements of the National Gas Rules, primarily set out in rule 87.

A high level set of principles for the rate of return are already set out by 87(5) of the NGR and its NER equivalent. This is further supported by specific principles for the return on equity (87(6)-(7)) and debt (87(8)-(12)) already provided.

Any further subset of principles regarding the rate of return developed by a regulator should be explicitly referenced back to the principles contained in the rules and be focussed on how the decision maker intends to ensure its thought process in making rate of return decisions is rigorous and meets the requirements of the rules.

It is not useful to for any principles developed for the Guideline to repeat any matters dealt with in higher order objectives.

In addition, APIA would also caution against the development of principles which gives greater priority to one or some of the principles in the rules at the expense of other principles in the rules.

It is therefore imperative that the principles must not:

- be inconsistent with this hierarchy of objectives; and
- limit the consideration of matters that are required to be considered in order to ensure the objectives and RPPs are being met.

At this time, APIA offers the following comments on the current set of proposed principles:

- The overall purpose of the identified principles seems to be to set out a framework for rigorous regulatory thinking. This is an excellent purpose for the principles.
- Many of the principles identified are more appropriately applied to information (whether financial models, market evidence, other data) used to determine the allowed rate of return rather than to the methodologies themselves. Some clarification of language, including establishing agreed definitions, is appropriate.
- 1(a) may be inconsistent with rule 87 and unnecessarily restricts the types of evidence the regulator would consider if the principle is to be applied. Rule 87(5)(a) requires that regard must be had to relevant estimation methods, financial models, market data and other evidence in determining the allowed rate of return. While financial models are likely to have 'strong theoretical foundation' it is conceivable that estimation methods, market data and other evidence may not be based in theory but are no less valid. A better principle would be one that gives weight to rate of return informative material that has a strong theoretical foundation and/or strong empirical results.

  1 (c) Internal consistency is necessary for rigorous decision making.

- 1(d) creates uncertainty. APIA considers 'regard to prevailing market conditions' is adequately conveyed in the rules at 87(7) for return on equity. Further, the trailing debt average methodology (as allowed for in 87(10)(b) of the NGR) is a methodology that does not have regard to prevailing market conditions.

- 2(a) Transparent and replicable decisions are implicitly part of good regulatory practice and the use of sound judgement. APIA is concerned that some stakeholders may consider the use of judgement to be at odds with either characteristic.

- 2(b) is useful. Uncertainty needs to be recognised and accounted for. This is a preferable approach to dismissing analysis because of uncertainty,

- 2(c) as with uncertainty, high sensitivity should not lead to analysis being dismissed. High sensitivity should be accounted for.

- 4(a) APIA is supportive of the regulator using well-reasoned and transparent judgement. It is unclear to APIA what the AER intended by the use of the term predictable. APIA agrees that regulatory judgement should be used in a consistent manner but would be concerned if the AER is suggesting that the outcome can be somehow predetermined.

- 4(b) requires that the methodologies avoid the search for false precision. A better principle would aim to achieve a rate of return determination that instils confidence in the result acknowledging that all models have strengths and weaknesses but none the less can used in a multiple model methodology to construct a robust decision. A rate of return decision based on a single model delivers a false precision. This is a key conclusion made in the Brattle Report.

- The principles articulated in 5(a to c) are valid aims but should be considered sub-ordinate to other principles. They are not a prime requirement of the law.

- 5(a) Although APIA would not like to see the approach applied to the rate of return shift dramatically from one guideline to the next, APIA sees no requirement in rule 87 to apply methodologies consistently across industries, service providers, regulators and time. In fact, as is outlined in the Brattle Report, while stability and robustness of models are desirable features of models, they must also be able to adjust to changes in economic conditions[39]. Arguably, the energy sector has its own specific regulator because there does not need to be a level of consistency between the energy industry and other industries. APIA considers that the rule now

[39] Brattle Report, p10

affords the regulatory the flexibility to respond to prevailing conditions in the market. Additionally, methodologies must recognise that differences, not just similarities, apply across industries, service providers, regulators and time.

- 5(b) Methodologies do not need to be comprehensible and accessible to all. To try and achieve this would fail to recognise the complexity of the task. Methodologies should be understood and explained well by regulators and businesses.

- 5(c) APIA does not agree that rule 87 require that simple models be afforded preference over complex models.

| Question 2<br><br>Are there other principles or criteria which should be considered? |
|---|

Firstly, APIA is concerned by the over emphasis of theoretical strength in the proposed principles. If there are to be additional principles there should be an acknowledgement of methods that produce results consistent with observable market conditions, i.e. that the methodologies have empirical value.
There needs to be at least equal emphasis on empirical support.

| Question 3<br><br>Do stakeholders have a broad preference for predictability or flexibility, and do these preferences differ at each level (the overall rate of return, the return on equity and debt, and at the parameter level) of the rate of return? |
|---|

The use of the terms 'predictable' and 'flexible' seem to be being used as substitutes for to describe a decision making process that is 'mechanistic' versus one that is 'discretionary'. This is not entirely appropriate. A discretionary decision that is made by well-informed and clearly articulated judgement is both

predictable and flexible. A mechanistic decision may be entirely predictable – however on some, if not most, occasions it will be predictably wrong.

APIA preference is for confidence that rate of return determinations will achieve the allowable rate of return objective; the AEMC has been clear in its decision that this will require regulators to apply judgement in a flexible way based on understanding of reality for it to take into account a changing market environment. The focus should be on ensuring well-informed judgement.

Finally, un APIA's view the new rule 87 is heavily focused on outcome, rather than a detailed, mechanistic prescription of the rate of return determination process, for a reason, to provides the flexibility that is needed to deal with changing market conditions and new evidence.[40]

| Question 4<br><br>To what extent should the guideline set out a pre–determined approach that can then be applied at each determination? |
|---|

As outlined above, the guidelines now required by rule 87(13) are important in providing both market and information responsiveness (flexibility) and confidence without an overly rigid prescriptive approach.[41] Their role is to provide service providers, investors and consumers with certainty on the methodologies of the various rate of return components and how the regulator will assess the relevant financial models, estimation methods, market data and other evidence in meeting the allowed rate of return objective.[42]

The guidelines are not intended to explicitly lock-in any methods of rate of return determination, or specific parameters, from which departure would not be permitted. Their purpose is to "narrow the debate" at the time of a specific regulatory determination or access arrangement revisions decision.[43]

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40 Rule Determination, page 44.

41 Rule Determination, page 46.

42 Rule Determination, page 57.

43 Rule Determination, page 58.

The guidelines also provide the regulators with the opportunity to specify how they will deal with unpredictable changes in market conditions at the time of a specific regulatory determination or access arrangement revisions decision.

It is clearly not the AEMC's intention for the guideline to be a determinative instrument, as stated in its reasoning in the Final Decision:

*The guidelines should not be seen as a determinative instrument for calculating the rate of return.*[44]

APIA considers the extent of pre-determination should be limited to:

- The process undertaken in determining the allowed rate of return through a multiple model methodology. The process for the Cost of Equity and Cost of Debt will need to be described separately.

- Identification of the relevant rate of return informative material that can be used in determining the rate of return. This would provide appropriate clarification as to the regulators thinking on the application of NGR 87 (5)(a).

- Establishment of the recognised biases, strengths and weakness of rate of return information materials identified.

- Establishment of the technique, rules or framework that will apply to the regulator's judgement in weighing the various rate of return informative material to determine the rate of return.

- Discussion of the relevant interrelationships between financial parameters that the regulator. This would provide appropriate clarification as to the regulators thinking on the application of NGR 87 (5)(c).

[44] P71 AEMC Rule Determination 29/11/12

In terms of the rules or framework that will apply to weighting, APIA believes clear boundaries can be established within which the AER can apply its judgement consistently. These boundaries should cover matters such as:

- The maximum and minimum weighting a piece of rate of return informative material can have.
    - For example, it may be deemed that if a model is relevant it must have a weighting between 10 and 40%.
- Conditions under which a piece of rate of return informative material identified in the Guideline will be discarded. These may be specific to each piece of material and may also consider the statistical validity of the material at the time of determination.
    - For example, it may be deemed that a model or method will be discarded it is delivering a rate of return that is greater than two standard deviations from the mean of all piece of rate of return informative material.
    - For example, a model or method may be deemed irrelevant based on the prevailing market conditions and it's identified (and articulated in the Guidelines) strengths and weaknesses.
- The determination of relative weighting of each piece of evidence.
    - For example, models that are deemed strong at a point in time and set of circumstances may be required to be weighted equally or near equally. If not weighted equally, a logical reason must be articulated.
    - For example, models that are deemed strong at the time of determination may be required to be weighted at least double those that are deemed weak at time of determination.
- Individual criteria to deem strength/weakness and appropriate weighting or discarding a single piece of rate of return informative material must be developed and articulated in the Guideline based on the known biases, strengths and weakness for each relevant piece of rate of return information material.

- The factors that guide the specific weighting as noted in the Brattle report[45] should be:

    - Economic factors such as market volatility and risk free rates. The Brattle Group demonstrates how these factors inform relative weighting on each model in the following table taken from page 62 of the Brattle report.

| | | Prevailing Risk-free Rate in Economy | | |
|---|---|---|---|---|
| | | **High** | **Average** | **Low** |
| **Market Volatility** | **High** | Consumption CAPM | | |
| | **Average** | Consumption CAPM / DDM | CAPM / ECAPM | Consumption CAPM / DDM |
| | **Low** | Consumption CAPM / DDM | | |

    - Industry factors such as market beta of the relevant industry, the stability of growth forecasts, whether an industry is exposed to financial distress and/or significant merger and acquisition activity and the prevalence of share buy backs. The Brattle Group demonstrates how two of these factors inform relative weighting on each model in the following table taken from page 66 the Brattle report.

| | | Industry Exposure to Financial Distress and/or M&A | |
|---|---|---|---|
| | | **High** | **Low** |
| **Prevalence of Share Buybacks** | **High** | Other Models: Risk Premium, comparable earnings, maybe use other industries | CAPM, ECAPM, DDM that includes all cash that accrues to shareholders |
| | **Low** | | CAPM, ECAPM, DDM |

    - Company factors as notes at page 67 of the Brattle report.

[45] Brattle report, page 59

## Key concepts and terms

Question 5

Aside from a balance between debt and equity financing, are there other characteristics of the way in which an efficiently financed entity would approach its financing task that should be considered in estimating the allowed rate of return?

Conditions in the market for funds are such that a capital intensive business requiring a substantial volume of debt would currently be unable to secure its entire requirement in Australian capital markets nor would it be efficient to do so. It would be prudent for a large regulated utility to acquire debt from a number of sources including international capital markets.

The domestic and international markets in which a large Australian regulated utility might expect to be able to obtain funds at the lowest total costs are:

1. Australian domestic bond market;
2. Australian bank market;
3. US public bond (144a) market;
4. US private placement market;
5. Asian bank market;
6. Sterling market; and
7. Eurobond market.

It is generally accepted that the Sterling and Eurobond markets are likely to be difficult to access. In the Sterling market, lenders generally finance issuers with credit ratings of BBB+ or above. In the Eurobond market, the minimum issue size of €500 million is likely to be a barrier to an Australian service provider. Funding costs in this market are generally higher than in comparable markets, and the minimum issue size creates problems for Australian borrowers requiring cross currency swaps and future refinancing.

The Australian domestic bond market is less well developed than its counterparts in Europe and North America, and a large Australian regulated utility seeking to access this market may have some difficulties because issues are generally restricted to more highly rated enterprises. However, investors participating in the bond market understand Australian utilities regulation, and market access negates any requirement for cross currency hedging.

The principal source of Australian dollar debt finance for a large Australian regulated utility is the Australian bank market. However, tenor is an issue in this market: it may be available for 5 to 7 years, but only a small number of banks have the capacity to finance for as long as 7 years.

Longer term financing, with a tenor of around 10 years, is only available in highly liquid debt markets in the United States, principally the public bond market (144a market), and the private placement market.

Question 6

Is it still appropriate to separate a conceptual benchmark from its practical implementation?

The benchmarking of service providers cannot occur in the abstract—they are dependent upon the reliability of gas suppliers, the location of the assets, the conditions in which they are operated and maintained, the state and efficiency of capital markets, the credit-worthiness of contractual counterparties and so on. These are matters susceptible to subjective judgment, and these judgments are ones against which a final determination of a return on capital that meets the requirements of the Rules as a whole must be made.

Question 7

Does the current definition [of benchmark efficient entity] reflect an appropriate level of detail for the conceptual definition? Are there other factors which should be considered?

APIA submits that the benchmark efficient entity, in the context of the allowable rate of return objective, cannot be applied in a "one size fits all" manner. This is evident from the words "*with a similar degree of risk which applies to the service provider*"

In APIA's view the regulator can only achieve this by considering what the service provider's individual risk characteristics would be, assuming the service provider met benchmark levels of efficiency. It cannot undertake this task in the abstract, by simply having regard to generic risks that might be faced by some conceptual; entity. This conclusion is also supported by the AEMC's statement that:

"*the objective is focused on the rate of return required by the benchmark efficient service provider, with similar risk characteristics as the service provider the subject of discussion*"[46];

"*the regulator must determine a rate of return that is consistent with that required by a benchmark efficient firm with similar risk characteristics to the service provider in question*"[47]; and

"*the* [allowable rate of return objective] *incorporates the concept of a benchmark efficient service provider, which means that the regulator can conclude that the risk characteristics of the benchmark efficient service provider are not the same for all service providers across the electricity transmission, electricity distribution and gas and / or within those sectors*"[48]

It is also a point made by the Brattle Group in the Brattle Report. It argues that "[p]rovided that the range has been developed in an appropriate way that takes account of the market and industry factors described in this section, the final step is to consider the relative risk of the target company compared to the sample of companies from which the cost of equity range has been developed. The cost of equity is adjusted upwards or downwards depending on the target entity's risk characteristics relative to those of the sample.

[46] Rule determination page iii

[47] Rule determination page 65

[48] Rule determination page 67

Question 8

In relation to the current definition of the conceptual benchmark, is more or less detail preferable?

It is APIA's view that the concept of the benchmark efficient entity refers to gearing and other financial and other financial parameters for a going concern. Therefore to answer the AER's question, APIA's does not see how a prescriptive conceptual benchmark will help to achieve the allowable rate of return objective for the reasons outlined above.

Question 9

Are the proposed factors reasonable?

Again, APIA fails to see how stakeholders can agree to factors while it remains unclear what is being measured. However, APIA suggests that there should be a preference for constructing samples that include companies that are comparable to the service provider in question. To do otherwise would seem contrary to achieving the allowable rate of return objective requiring the benchmark efficient entity with a similar degree of risk.

APIA does support the use of a wider range of credit ratings and benchmark terms for debt than has been used in the past and. appropriately also is seen to consider comparable companies with in similar credit rating bands to assist in determinations of the cost of debt for individual service providers.

A process that could be used to determine risk levels for service providers is:

1. Define the risks for a service provider.

2. Identify whether they are systematic or non-systematic.

3. Examine the risks of the peers of the service provider.

4. Assess the relevance of the risk for benchmarking.

Question 10

Are there other factors which should be considered?

Gas transmission pipelines are substantially different from electricity networks. A full discussion of these differences in provided at Schedule 3.

Question 11

Are there characteristics that differentiate the level of risk in the gas and electricity sectors, or between distribution and transmission networks?

Yes. There are characteristics that differentiate the level of risk in gas and electricity sectors. Further, each gas transmission asset has unique characteristics that differentiate the level of risk between gas transmission assets. APIA's view on these characteristics is presented in detail at Schedule 3.

A summary of the differences between some major regulated gas transmission pipelines is:

| Pipeline | Primary customer base | Source of gas | Revenue Model |
|---|---|---|---|
| DPNGP | Minerals processing<br>Power generation<br>Manufacturing | Offshore Carnarvon basin – NWSG and Varanus Island Export | Contract Carriage |
| GGP | Mining | Offshore Carnarvon Basin -NWSG and Varanus Island | Contract Carriage |
| AGP | Power Generation | Single offshore field – Blacktip<br>Formerly Amadeus Basin | Contract Carriage |

| | | | |
|---|---|---|---|
| RBP | Power Generation<br>Large Industrial<br>Residential & Commercial | Surat-Bowen Basin<br>Conventional and increasingly coal seam gas | Contract Carriage |
| VTS | Residential & Commercial<br>Small-mid industrial; | Multiple offshore basins<br>Linkages to QLD/SA supply through NSW | Market Carriage |

The characteristics to take into account have to be determined for each service provider at the time of determination. As mentioned above, a process to do this could be:

1. Define the risks for a service provider.

2. Identify whether they are systematic or non-systematic.

3. Examine the risks of the peers of the service provider.

4. Assess the relevance of the risk for benchmarking.

| |
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| Question 12<br><br>Are there other characteristics that should be taken into account when assessing the level of risk? |

APIA is of the clear view that the specific risks of a firm must be taken into account. It is our reading of the NGR that this is required.

Section IV Part D of the attached Brattle Report at Schedule 2 covers characteristics that should, and have, been taken into account when assessing the level of risk.

Question 13

To the extent that different risk levels exist, can these differences be estimated in a manner consistent with the regulatory principles outlined in section 2?

APIA believes these differences can be estimated to a sufficient extent for gas transmission pipelines that they must be.

For electricity transmission and distribution and gas distribution it is more likely that the similarities outweigh the differences.

APIA commends to the AER Section IV Part D of the attached Brattle Report at Schedule 2 which deals specifically with the issue of risk positioning.

## Overall rate of return

Question 14

To date our practice has been to estimate the allowed rate of return based on the standard WACC formula. Should we continue with this, or if not, what alternative approaches should be explored?

It is important that the regulator have full regard to all relevant evidence and this could include a top down approach. However, there are significant problems with obtaining top down WACC estimates, both in terms of relevance and quality. The examples cited in the Issues Paper are excellent examples of top down estimates that that have at best limited relevance and can be low quality.

Each of the methods identified are problematic, in terms of relevance and/or in terms of the quality. It is worthwhile reviewing the issues of relevance and reliability/quality for each of the methods identified in the Issues Paper:

1. *Brokers' reports:* The relevance of brokers' reports is doubtful, but should not be excluded. Broker reports should be considered in the context that the brokers provide recommendations to hold, buy or sell for the purposes of advising clients that generally have a portfolio of stocks and are looking at the

issues of asset allocation. That is, investors have a certain amount of capital available and seek to optimise their returns by allocating their capital in a way that is designed to give them the best risk-weighted return. Thus analyst estimates are focussed on the relative value of a stock rather that their absolute value. APIA refers to Brattle's consideration of other evidence at Section III.F.5 of its report.

2. *Trading multiples:* In its Report to APIA Brattle[49] identifies a number of "conceptual problems with this approach, so that it has no value as a cross check against the regulator's cost of capital determination. Brattle identifies two main assumptions that render this approach of no value: (i) the company to which the approach is applied is likely not to consist entirely of a regulated business and (ii) that the regulator's cost of capital determination is the only factor impacting the market value of the stock. Further to this advice, the effect of market cycles and volatility must be properly considered. Depending where the market is in it's cycle – "bear" or "bull" a regulated utility stock may appear undervalued or overvalued relative to its regulatory value. Market volatility must also be properly considered. In sum, trading multiples can neither be considered as having much relevance or quality as top down estimates of the WACC.

3. *Financibility tests*: These tests were developed by IPART, not to determine the rate of return, but to assess whether the revenue allowances in its determinations would undermine the financial viability and financibility of regulated businesses. That is, it wanted to make sure that regulatory outcomes would not jeopardise the viability of the business or have the effect of increasing, inadvertently the cost of debt through reduced credit ratings. The intent of such an approach is laudable, but the modelling approach designed to reflect the way credit ratings agencies determine credit ratings is problematic, given (i) that credit ratings agencies do more than mechanical modelling exercises and (ii) such approaches say nothing about the cost of debt and equity. Consequently, such tests are not relevant and, even if they were are not reliable, even in attempting to achieve the goal of determining the impact of a regulatory decision on credit ratings.

4. *Estimates of other regulators*: This method is clearly fraught in terms of relevance and reliability/quality. Regulators' decisions are made at a time and for a particular asset. Therefore they are relevant to that time and asset and not to another. Moreover, if regulators were to base rate of

[49] Estimating the Cost of Equity for Regulated Companies, The Brattle Group, February 2013, pages 37,38

return decisions either on their own previous decisions or another regulator's decisions they will suffer the problem of regulatory group think. It is essential that regulators start afresh each time they undertake a review of the Rate of Return to properly consider the question: what is the rate of return that meets the ARORO for this business at this point in time?

On top of all of this, if any of these methods were to be used as part of developing a top down estimate it would then be necessary to convert them (with appropriate weightings) into a cost of equity and a cost of debt in a manner that is consistent with the Rules. Significantly, the WACC implied by any of most of these is a post- tax WACC. In the case of analyst views the post-tax WACC that imputation credits are not valued by investors. In the case of trading multiples the treatment value of tax credits are unknown; however, if analysts' recommendations are considered as influential on investors then these effectively do not include any value for tax credits. Between the treatment of tax credits and the difficulties of taking a post- tax WACC and converting it into a vanilla WACC further broken down in to costs of equity and costs of debt with their respective weights, it is difficult to see how the requirements of the Rules could be met (especially the cost of debt provisions or Rule 87) – at least in practical sense – using such an approach.

| Question 15<br><br>How can overall rate of return considerations be used under the new rule framework? This may include consideration of the relevance of the methodologies identified above (or others not yet identified), and |
|---|

Overall rate of return considerations are best dealt with by considering all relevant evidence estimating the cost of equity and the cost of debt and how they inform each other in determining a rate of return that will achieve the ARORO. This could include benchmarks and test as discussed in Question 14. However, as demonstrated the currently identified methods are unlikely to be very informative in assessing the rate of return.

**Rather**, it is more likely that looking at overall rate of return considerations will be best achieved by considering the various models for estimating the cost of equity and the cost of debt and how they inform each other in determining a rate of return that will best achieve the ARORO.

## Return on equity

| Question 16 |
| --- |
| Are the assessment criteria presented in section 3.1 an appropriate basis for evaluating the cost of equity methodology in order to meet the allowed rate of return objective? |

No, see APIA comments on the AER proposed principles above. The discussion in Section 3.1 covers principles to be applied in reasoning.

| Question 17 |
| --- |
| What overall cost of equity methodology best meets the allowed rate of return objective? |

It is clear from the AEMC's reasoning that a methodology that considers relevant models, techniques, evidence and data is utilised is more likely to achieve the allowed rate of return objective. APIA believes an appropriate methodology to do this has been articulated as APIA's first proposal on page 17 of this submission.

APIA notes the methodology outlined above requires significant regulatory discretion and judgement. APIA must emphasise that the regulators discretion and judgement must be applied in a rigorous and transparent manner, clearly detailed in decision documents and grounded in NGO, RPPs and Rule 87.

The advantages of such an approach are:

- It delivers a reliable rate of return that avoids the false precision of single model.
- The use of multiple models means the effects of biases and weakness of any single model are reduced.
- The consequences of discretionary decisions required in estimating the rate of return of a single model (or any errors that occur) are muted as the influence of any one model is not too great.

- If the guidelines effectively establish the principles and articulate the criteria under which the regulator will make decisions it will result it transparent, logical and clear use of regulatory discretion.

- It maximises stability over time by minimising the effect of instability in any single model.

APIA recognises this will be an aspect in the determination process requiring understanding and thoughtful reasoning and because of this has started to articulate a framework for this judgement to be applied within, largely outlined by the Brattle report. APIA considers this is an area that will require further work and looks forward to working cooperatively with the AER and other stakeholders in establishing a clear framework for use by the regulator so that it not seen to be applying it regulatory judgement in isolation.

| Question 18<br><br>What individual cost of equity model best meets the allowed rate of return objective? |
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In summary, APIA is firmly of the view that no individual cost of equity model can meet the allowable rate of return objective.

The attached report from The Brattle Group and the covering note by Professor Stewart Meyers are unequivocal on this point:[50]

*It is useful to recognize explicitly at the outset that models are imperfect. All are simplifications of reality, and this is especially true of financial models. Simplification, however, is also what makes them useful. By filtering out various complexities, a model can illuminate the underlying relationships and structures that are otherwise obscured. After all, while a perfect scale model representation of the city might be highly accurate, it would make a poor road map. It is therefore imperative that regulators and other users of the models use sound judgment when implementing and using the models - - there is no one model or set of models that are perfect.*

[50] Brattle Group report p8.

*The gap between financial models and reality can sometimes be quite significant (as was painfully demonstrated by the recent financial crisis). There is no single, widely accepted, best pricing model to estimate the cost of capital – just as there is still no consensus on some fundamental issues, such as the degree to which markets are efficient. Analysts have a host of potential models at their disposal, and it must be acknowledged that cost of capital estimation continues to be part art. Several regulators as well as textbooks therefore recommend that the "best practice" is to look at a totality of information from alternative methodologies.* [51]

*Academics, practitioners and regulators have all acknowledged that there is no one way to determine the cost of equity. In the academic literature, several prominent researchers have commented that the use of more than one method is important. For example, Professor Myers of the Massachusetts Institute of Technology commented:*

*Use more than one model when you can. Because estimating the opportunity cost of capital is difficult, only a fool throws away useful information. That means you should not use any one model or measure mechanically or exclusively. Beta is helpful as one tool in a kit, to be used in parallel with DCF models or other techniques for interpreting capital market data.*[52]

*Professors Berk and DeMarzo of Stanford University in their corporate finance textbook comment on the use of the CAPM, DDM, and other models by practitioners, and state:*

*In short, there is no clear answer to the question of which technique is used to measure risk in practice — it very much depends on the organization and the sector. It is not difficult to see why there is so little consensus in practice about which technique to use. All the techniques we covered are imprecise. Financial economics has not yet reached the point where we can provide a theory of expected returns that gives a precise estimate of the cost of capital. Consider, too, that all techniques are not equally simple to*

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[51] See, for example, the Ontario Energy Board's EB-2009-084 decision, December 2009, the U.S. Surface Transportation Board's Ex. Parte 664 (Sub-No. 1) decision, January 2009, and Roger A. Morin, New Regulatory Finance, Public Utilities Report Inc., 2006, Chapter 15.

[52] Stewart C. Myers, "On the Use of Modern Portfolio Theory in Public Utility Rate Cases: Comment," *Financial Management*, Autumn 1978.

*implement. Because the trade-off between simplicity and precision varies across sectors, practitioners apply the technique that best suit their particular circumstances.*[53]

*Similarly, Roger A. Morin, in the context of U.S. regulation, mentions the use of the CAPM, DDM, risk premium models, and the comparable earnings method, concluding:*

*No one individual method provides the necessary level of precision for determining a fair return, but each method provides useful evidence to facilitate the exercise of an informed judgment. Reliance on any single method or pre-set formula is inappropriate when dealing with investor expectations because of possible measurement difficulties and vagaries in individual companies' market data.*[54]

*Regarding the methods used to determine the so-called Equity Risk Premium (ERP), the Ontario Energy Board concluded:*

*the use of multiple tests to directly and indirectly estimate the ERP is a superior approach to informing its judgment than reliance on a single methodology.*[55]

Critically, APIA is of the view that each methodology applied to assist in determining the cost of equity must be applied fully and faithfully. In particular, for each model to which the AER has regard, the results of that model must be determined with the degree of rigour as if it were the sole model being relied upon to guide the regulator's discretion. It would not be appropriate for the AER to purport to have had regard to a model or methodology which has been applied half-heartedly.

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[53] Jonathan Berk and Peter DeMarzo, *Corporate Finance: The Core*, 2009, (Berk & DeMarzo 2009) p. 420.

[54] Roger A. Morin, New Regulatory Finance, Public Utilities Reports, Inc., 2006, (Morin 2006) p. 428. Quoted in Brattle Group p48.

[55] Ontario Energy Board, "EB-2009-0084, Report of the Board on the Cost of Capital for Ontario's Regulated Utilities," Issued December 11, 2009, p. 36 (emphasis in the original). Quoted in Brattle Group p49.

Question 19

What other evidence (estimation methods, financial models, market data and other estimates) is relevant to the determination of the cost of equity?

APIA notes that the Rules require the AER to have regard to "relevant estimation methods, financial models, market data and other evidence".[56] APIA considers, and its consultations with the AEMC confirm, that "relevant" is intended to be a very low threshold. It therefore reflects a presumption that a broader range of models, methods and evidence are more likely to be "relevant" than not.

Within the context of the Rules, APIA considers that the threshold question is not "what other evidence is relevant" as much as "is there any evidence that could reasonably be considered to be irrelevant?"

In this regard, APIA has asked The Brattle Group to assess two approaches previously applied by the AER, being an assessment of premiums paid in takeover transactions and an assessment of market-to-RAB multiples.[57] In both cases The Brattle Group has found that these methodologies are of low relevance in informing the regulator's view on a business' required cost of capital.

Consistent with its broader views on this matter, APIA considers that it is incumbent on the AER to:

- include a broad range of models, market information and data sources in the Guideline, consistent with the "relevant" threshold, and
- have regard to further information proposed by the regulated business in the context of a regulatory price review submission (i.e. information or data sources not already reflected in the Guideline) through the lens of the "relevant" threshold.

[56] Rule 87(5)(a).

[57] Brattle Report page 58.

In summary, APIA submits that evidence or information should not be discarded lightly. The advice to APIA from the Brattle Group is that the following methods are relevant to determining the cost of equity:

Sharpe-Lintner CAPM

Empirical CAPM

Consumption-based CAPM

Fama-French Three-factor Model

Arbitrage Pricing Theory (Black CAPM)

Dividend Discount Model (both single-stage and multi-stage)

Residual Income Model

Risk Premium Approaches

Build-up Method

Comparable Earnings

Methods that the Brattle Group do not consider relevant are:

Market-to-book and Earnings Multiples

Analyst Reports

## Return on debt

| Question 20<br><br>What are the advantages and disadvantages of portfolio approaches compared with the current "on the day" approach to the return on debt? |
|---|

In summary, APIA considers that the presentation of this question is overly simplified, and has scope to truncate the debate in a way that is not in accordance with the Rules.

Rule 89(10) clearly does not provide an "either/or" approach as suggested by the question, but that either option (or indeed a combination of them) is acceptable. Moreover, the term "without limitation" in Rule 87(10) clearly indicates that some other methodology would be equally acceptable:

> (10) Subject to subrule (8), the methodology adopted to estimate the return on debt may, without limitation, be designed to result in the return on debt reflecting:
>
> (a) the return that would be required by debt investors in a benchmark efficient entity if it raised debt at the time or shortly before the time when the AER's *decision* on the access arrangement for that *access arrangement period* is made;
>
> (b) the average return that would have been required by debt investors in a benchmark efficient entity if it raised debt over an historical period prior to the commencement of a regulatory year in the *access arrangement period*; [the "moving average" approach] or
>
> (c) some combination of the returns referred to in subrules (a) and (b).

APIA considers that is inappropriate (indeed beyond powers) for an AER Guideline to truncate alternate approaches and methodologies that are explicitly allowed in the Rules, and to restrict consideration of other methodologies that are envisioned (albeit not specified) as potentially becoming available in the future.

APIA considers that the Rules attempt to reflect the diversity of approaches that different businesses take to managing their debt portfolios. In this regard, APIA considers that it is not reasonable to espouse a "one size fits all" approach – in order to avoid arbitrarily advantaging or disadvantaging the regulated business, the approach to estimating the efficient regulatory cost of debt must reflect the business' debt management practices.

In this regard, APIA is firmly of the view that the decision about which methodology to apply (that is, Rule 87(10)(a) or (b)) or the extent to which they are combined under 87(10)(c), or indeed whether some other methodology should apply, should be at the discretion of the service provider. Critically, APIA is concerned that the AER would purport to put itself in a more expert position on the management of a business' debt portfolio than the management of the business.

APIA considers that there is significant work to be done on the cost of debt component of the Guideline, and this work should reasonably be undertaken once the higher level direction has been decided. In particular, matters surrounding sources of bond yield information or the composition of any benchmark bond portfolio are important matters which will require careful consideration.

APIA looks forward to working with the AER on these matters of detail.

# ESTIMATING THE COST OF EQUITY: INTRODUCTION AND OVERVIEW

Stewart C. Myers

February 17, 2013

## 1. Introduction

The Australian Pipeline Industry Association (APIA) has requested me to review the methods and evidence that Australian energy regulators should take account of when determining the cost of equity for energy infrastructure companies. The request followed the Australian Energy Market Commission's new Rule 87 and its new "allowed rate of return objective." The new Rule requires in part that "regard must be had to relevant estimation methods, financial models, market data and other evidence" in determining the overall rate of return and that "regard must be had to the prevailing conditions in the market for equity funds" in determining the cost of equity capital.[1]

This report accompanies a more extensive and detailed report by colleagues at The Brattle Group, Inc. (Brattle Report).[2] That report reviews models and methods that have been used for determining the cost of equity. I comment broadly on several of these models, including the Sharpe-Lintner Capital Asset Pricing Model (CAPM), the three-factor Fama-French model and the single- and multi-stage dividend discount models. I consider whether regulators should weigh estimates from two or more models, or whether it is better to rely exclusively on one model, for example the CAPM. I discuss how prevailing market conditions could be taken into account. For example, how should the extremely low interest rates prevailing now in most developed economies affect estimates of the cost of equity?

My comments reflect the current state of finance theory and research and my experience in using that theory in practice. Much of my practical experience has focused on valuation and estimation of the cost of capital, in both regulated and non-regulated settings.

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1 Australian Energy Market Commission, AEMC Final Position Rules: Amendments to the Natural Gas Rules, 15 November 2012, Rule 87 (5a), (7).

2 The Brattle Group, Inc., *Estimating the Cost of Equity for Regulated Companies*, prepared for the Australian Pipeline Industry Association, February 17, 2013. I am a principal of The Brattle Group, but did not contribute to the Brattle report.

Sections 2, 3 and 4 of this report focus on three models for estimating the cost of equity: the CAPM, the Fama-French model and dividend-discount models. Section 5 briefly discusses size premiums and the "build-up" method. Section 6 discusses possible responses to "prevailing market conditions." Section 7 sums up my conclusions and recommendations.

The Brattle Report describes and evaluates the CAPM and other models much more extensively than here. This report is an introduction and overview based on my professional knowledge and experience.

## 2. The Capital Asset Pricing Model (CAPM)

Cost of Equity = Risk-free interest rate + beta × Expected equity risk premium

"All economic models are wrong, but some are useful." The CAPM is of course wrong, that is, imperfect and incomplete, but it has many advantages. It the model most widely used by U.S. corporations to estimate the cost of capital.[3]

**Advantages of the CAPM.** The CAPM is simple and logical. It respects the key distinction between market risk, which all stock-market investors bear, and unsystematic, firm-specific risks, which "wash out" of diversified portfolios and should not affect the cost of equity. Stock markets in developed economies are dominated by diversified investors.

The CAPM requires three inputs: the risk-free rate of interest, the risk measure beta and the expected equity risk premium (also known as the market risk premium). These inputs can be estimated with tolerable accuracy. The risk-free rate of interest can be observed from rates on government bills, notes or bonds, depending on maturity. Beta can be estimated from past rates of return for individual stocks and for the stock market as a whole.[4]

Companies in industries that appear low-risk, including most regulated industries, generally have below-average betas, that is, betas less than one. Younger growth companies

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[3] See J. R. Graham and C. Harvey (2001), "The theory and practice of corporate finance: Evidence from the field," *Journal of Financial Economics* 60, 187-243, and J. R. Graham and C. Harvey (2002), "How do CFOs make capital budgeting and capital structure decisions?" *Journal of Applied Corporate Finance* 15, 8-23.

[4] Accuracy is better if betas are estimated for portfolios rather than individual stocks. Suppose the object is to measure the average beta of a sample of comparable companies. The best procedure is to first form a portfolio of the companies' stocks, then estimate beta from returns on the portfolio. The portfolio beta is more reliable than an average of betas for the individual stocks.

generally have high betas. Thus betas line up with intuitive views of risk, which increases confidence in CAPM estimates of the cost of equity.

The expected equity risk premium is difficult to forecast directly, but there is long-term historical evidence on average equity risk premiums in most developed economies.[5] [6] We know what normal risk premiums have been.

There is always room for argument, but careful applications of the CAPM tend to give estimates of the cost of equity that are sensible and reasonably stable over time. Nevertheless the CAPM does not give conclusive answers. Use of the CAPM should not exclude other models. The reasons are as follows.

**Four reasons for caution.** First, the CAPM, like other models for estimating the cost of equity, does not generate a single estimate of the cost of equity, but a range. Betas and equity risk premiums are statistical estimates, which are exposed to statistical noise and potential error. For example, a typical confidence limit for an estimated industry beta (plus or minus two standard errors) could be ±.2 – a beta estimated at .8 could actually lie between .6 and 1.0.[7] Suppose that the risk-free rate is 5% and the estimated equity risk premium is 6%. The confidence limit for the cost of equity would span a range from 5 + .6×6 = 8.6% to 5 + 1.0×6 = 11%. The range is wider if uncertainty about the true equity risk premium is introduced.

Of course CAPM analyses must zero in on a specific number for the cost of equity. It is important to remember, however, that the number is drawn from a range.

Second, empirical estimates of the security market line are "flatter" than the CAPM predicts. (The security market line is the relationship between beta and expected rate of return.) That is, average returns for the lowest-beta stocks have been higher than the CAPM predicts. Average returns for the highest-beta stocks have been lower. Thus CAPM cannot be a complete model of risk and return in financial markets.

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[5] Average risk premiums from 1900-2011 are available for 22 developed countries. See *Credit Suisse Global Investment Returns Sourcebook 2012*, Credit Suisse Research Institute, February 2012.

[6] Arithmetic averages should be used when the cost of equity is based on historical risk premiums. Sometimes geometric averages are proposed, which is a mistake.

There are some statistical issues that could impart an upward bias to arithmetic-average premiums and could justify placing some weight on geometric averages. Jacquier, Kane and Marcus derive adjustments to remove the bias, but the adjustments are small when cash flows are forecasted for, say, five or ten years. See E. Jacquier, A. Kane and A. Marcus (2005), "Optimal Estimation of the Risk Premium for the Long Run and Asset Allocation: A Case of Compounded Estimation Risk," *Journal of Financial Econometrics* 3, 37-55.

[7] This example assumes a single regression estimate. An analyst could look to other information, for example, "rolling betas" estimated over much longer periods. On the other hand, confidence limits widen when predicting future betas (out of sample).

The "empirical CAPM" has been proposed for estimating the cost of equity. In this approach, the cost of equity is derived from the empirical security market line, that is, from the long-run average relationship between beta and expected return. The CAPM says that the intercept of the security market line (at beta = 0) should be the risk-free interest rate. The empirical CAPM uses a higher intercept (call it the SML intercept) because the empirical security market line is flatter. The equation for the cost of equity is:

Cost of Equity = SML intercept + beta × (Expected market return - SML intercept)

The empirical CAPM is rarely used by non-regulated firms, although I understand it has been given weight in some regulatory settings. This model is nevertheless an important reminder for analysts and decision-makers. The CAPM has not been randomly wrong; it has systematically understated long-run average returns on low-beta stocks. Stocks of regulated firms are almost always low-beta, that is, less than 1.0.

Third, the CAPM assumes that investors' portfolios are fully diversified and therefore highly correlated with returns on the market portfolio, that is, the entire stock market. Therefore the market portfolio cannot be defined as a limited slice of the entire market. For example, a U.S. application of the CAPM could not define the market portfolio as the Massachusetts stock market, because no diversified investor would invest only in Massachusetts companies. Usually the U.S. market portfolio is defined as the S&P 500 Index or some still broader index.[8]

The case for the CAPM becomes less convincing when it is applied in smaller economies, especially economies with no barriers to the inflow or outflow of capital from or to international markets. Thus analysts in countries such as Canada, New Zealand and Australia should not focus exclusively on betas estimated with local stock-market indexes. For example, Canadian regulators consider betas for the U.S. as well as the Canadian market.[9]

It makes sense to check betas estimated against broader indexes, or to check whether local betas match betas for similar companies in other countries. Suppose, for example, that an Australian regulator estimates betas for a portfolio of local electric utilities. It is then useful to check the estimates against betas for similar electric utilities in other countries.

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[8] Even U.S. indexes may be too narrow. For example, I have considered betas measured against a world stock-market index in valuing an oil field that produces for the world market.

[9] See Brattle Report, Section IV.A.

Fourth, a mechanical application of the CAPM may be dangerous in current market conditions. Central banks have forced interest rates down to exceptionally low levels. The "flight to quality" by investors during the recent financial crisis has also pushed down interest rates on government debt and high-quality corporate debt. Routine CAPM estimates of costs of equity are therefore much lower than past estimates, and much lower than "normal" equity rates of return. In some cases, routine implementations of the CAPM have yielded costs of equity less than the regulated company's cost of debt – an impossible result.[10]

Routine applications of the CAPM assume that the equity risk premium is stable. But the premium fluctuates. It clearly increased because of the flight to quality during the financial crisis. It is probably still abnormally high. For example, the average equity risk premium in Graham and Harvey's latest survey of U.S. financial executives has increased to levels last observed in the financial crisis in 2009.[11]

The equity risk premium compensates investors for absorbing the volatility of the market portfolio and also for the poorer liquidity of equities compared to government debt securities. Investors pay "liquidity premiums" for government debt and therefore accept lower interest rates. The liquidity premium increased during the financial crisis; very low government interest rates suggest that it is still high. Thus the expected equity risk premium is probably still above normal levels.

I present these four issues not to argue against the CAPM, but to argue against its exclusive use when other methods are feasible.

## 3. The Fama-French three-factor model

$$\begin{aligned}\text{Cost of Equity} = {} & \text{Risk-free interest rate} + \text{beta} \times \text{Expected equity risk premium} \\ & + b_{size} \times \text{Expected return on size factor} \\ & + b_{value} \times \text{Expected return on value factor}\end{aligned}$$

[10] See Brattle Report, Section II.B.

[11] J. R. Graham and C. R. Harvey (2013), "The Equity Risk Premium in 2012," Duke University, SSRN 2206538, Table 1. Average premiums from the Graham-Harvey survey peaked at 4.74% in the second quarter of 2009, fell below 3% in 2010, and increased to 4.48% by the second quarter of 2012, the last date in the survey. I believe these premiums are unrealistically low, but the time pattern is worth noting.

The Fama-French model is an example of arbitrage pricing theory (APT). The model captures the excess average returns earned by investors in small stocks and in value stocks. The "size" factor is the difference between the expected rates of return on the smallest and the largest stocks, where size is measured by market capitalization. The "value" factor is the difference between the expected rates of return on value vs. growth stocks. Value stocks are stocks with high ratios of book value to market value per share. Growth stocks sell at high market-to-book ratios and therefore *low* book-to-market ratios.

Fama and French showed that both the size and value factors generate significant positive rates of return on average. If the CAPM were strictly correct, the expected rate of return on both of these factors would be zero.

The Fama-French model says that a company's cost of equity depends on not only on beta and the equity risk premium, but also on its exposures to the risks of small-cap stocks (vs. large-cap stocks) and the risks of value stocks (vs. growth stocks). The exposures to these size and growth factors are measured by $b_{size}$ and $b_{value}$, which are in effect two additional betas.

**The Fama-French model in practice.** The Fama-French model is superior to the CAPM for many purposes. It explains past returns on large portfolios of common stocks much better than the CAPM. It is widely used in practice to test for superior performance of actively managed portfolios. For example, any thorough analysis of the performance of pension or mutual funds now corrects for the funds' exposures to the Fama-French factors.[12]

The Fama-French model is an extremely important contribution to understanding risk and return. It is used in practice for many important tasks, but *not* to estimate the cost of equity. Attempts to use the model for that task typically encounter three chief difficulties.

First, the factor exposures $b_{size}$ and $b_{value}$ are (in my experience) unstable when estimated for individual stocks or portfolios of stocks in narrowly defined industries. They "bounce around" more than the CAPM beta.

Second, it is difficult to understand why the factor exposures bounce around for companies or industries when business risks appear stable. It is not easy to see what risks the factor exposures are measuring. Thus estimates of $b_{size}$ and $b_{value}$ generally get less intuitive support than estimates of beta.

[12] Such evaluations of investment performance can use past returns for the investment portfolio and for the size and value factors. There is no need to estimate expected returns on the size and value factors.

Third, the expected risk premiums for the size and value factors are difficult to forecast. Of course the CAPM's equity risk premium is also difficult to forecast, but more historical data are available, and there has been at least a partial convergence of views about the equity risk premium.

There is no need for financial analysts or decision-makers to lock out the Fama-French model as a method for estimating the cost of equity. Research may clear the way for more robust estimates from the model or from extensions of it.

## 4. Dividend discount models

Dividend discount models start with the valuation principle that stock price equals the discounted present value of expected future cash payouts to the stockholder. This principle should hold for all companies, but it is only useful for companies that are mature, consistently profitable and reasonably stable.

The valuation principle implies that an analyst should be able to (1) observe stock price, (2) forecast cash payouts and (3) back out the discount rate that explains the stock price. The discount rate is the expected rate of return to the stockholder and therefore the cost of equity.

Dividend discount models are hard to apply generally. They are rarely used for growth companies or in industries where business risks come and go, product prices are volatile, and markets and technologies are changing. But the models do make sense for many regulated firms, providing that the firms make regular cash payouts to shareholders.

**Constant-growth models.** Suppose one could find a mature company that will grow at a constant expected rate *g* for the indefinite future. If the payout ratio is constant and dividends per share grow at g, the discount rate that explains stock price is:

Discount rate = cost of equity = $DIV_1/P_0 + g$,

where $DIV_1$ is next period's dividend (at date 1) and $P_0$ is the current price (at date 0).

This formula makes the stringent assumption that the expected rate of growth is constant in perpetuity, or at least for the indefinite future. Few companies meet this assumption. Even if one could find such a company, forecasts of growth in the very long run would not be available. For example, forecasts by security analysts of "long-run" growth in earnings extend to five years at most.

The constant-growth model overestimates the cost of equity when near-term growth cannot be sustained. For example, the U.S. Surface Transportation Board (STB) once used the constant-growth model to track the cost of equity for U.S. railroads. But by 2005 the largest railroads were expanding rapidly and profitability was increasing. Security analysts were forecasting "long-run" earnings growth for some railroads at 15% per year. Such growth could not be sustained, so the constant-growth model overstated the true cost of equity by a wide margin. The STB therefore changed over to a blend of the CAPM and a multi-stage dividend discount model.[13]

**Multi-stage models**. Multi-stage models improve dividend forecasts by distinguishing near-term and long-term growth. [14] For example, colleagues at the Brattle Group use security analysts' forecasts for the first five years of earnings and dividends, but then assume that growth converges over ten years to the long-term growth rate of GDP. Thus there are three stages: initial growth for five years, convergence over ten years, and perpetual growth thereafter. Future cash flows in all three stages are then discounted to present value. The discount rate that explains the stock price is the cost of equity.

The Ibbotson SBBI Yearbooks implement a similar three-stage model,[15] as does Bloomberg.

Multi-stage dividend discount models can be a valid method for estimating the cost of equity. They often work well for regulated industries, which are more likely to be populated with companies that are mature, reasonably stable and paying out cash to investors.

The multi-stage models focus on cash returns to investors. This is an important advantage. If the cash returns are unbiased forecasts, then the model must yield the expected rate of return to investors. The analyst does not have to measure risk and expected risk premiums. The analyst does not have to assume an equilibrium model of risk and return, for example the CAPM. The analyst looks directly at the cash payoffs that an investor can expect to receive.

Costs of equity derived from multi-stage dividend discount models are particularly useful now. With extremely low current interest rates, routine applications of the CAPM, which use "normal" equity risk premiums, can now yield cost of equity estimates that seem unreasonably low.

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13 See Brattle Report, Sections III.E and IV.C.

14 "Residual income models" are another form of multi-stage dividend-discount models. See Brattle Report, Section III.E.

15 Ibbotson SBBI 2012 *Valuation Yearbook*, Morningstar, Chicago.

It is hard to measure year-to-year changes in the equity risk premium, but it is nevertheless plausible to say that the premium currently remains at abnormally high levels. Direct estimates of expected returns to investors, which the multi-stage dividend discount model can provide, can test whether this plausible statement is in fact true. The difference between the cost of equity from the dividend discount model and the risk-free interest rate is a direct estimate of an expected risk premium demanded by investors. The expected market equity risk premium can be backed out of this estimate.[16]

Notice that an analyst or decision-maker concerned with Industry X does not have to perform this test on that industry. Suppose that the multi-stage dividend discount model is not a good fit to Industry X but is a good fit to Industry Y. If application of the model to Industry Y indicates a higher-than-normal equity risk premium, then the same higher-than-normal premium should also apply to Industry X.

**Three reasons for caution**. Multi-stage dividend discount models can give robust and credible estimates of the cost of equity, but there are three main reasons for caution. First, the models are unreliable for companies facing volatile markets and changing technologies and for growth companies that do not generate reliably positive free cash flow and make regular cash distributions to investors. Second, the "long-run" growth rates estimated by security analysts look out five years at most. These growth estimates may be noisy and biased. Third, the growth forecasts are normally for earnings and dividends *per share*, and the number of shares outstanding depends on share repurchases. There is a solution to the third problem, however.

**Dividends and repurchases.** Stock repurchases now constitute "the dominant form of payout," at least in the U.S.[17] Repurchases complicate use of dividend discount models, because repurchases change the number of shares outstanding and therefore the growth rate of dividends per share. Therefore repurchases should be adjusted for when implementing dividend discount models. But repurchases fluctuate and are hard to predict.

This problem has a simple solution, which I recommend going forward.[18] Forecast *aggregate* payout, dividends plus repurchases, to all shareholders. Calculate the discount rate

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16 A beta estimate is required. The dividend discount model estimates the cost of equity directly. Given the beta and the risk free rate, one can solve for the market risk premium that explains the direct estimate.

17 D. J. Skinner (2008), "The evolving relation between earnings, dividends and stock repurchases," *Journal of Financial Economics* 87, p. 584.

18 This revised method is explained in R. A. Brealey, S. C. Myers and F. Allen (2013), *Principles of Corporate Finance*, 11th Ed., McGraw-Hill Irwin, Ch. 16.

that explains the company's market capitalization, that is, the aggregate market value of all shares outstanding at the current price $P_0$. This discount rate is the cost of equity. The method could be labeled an *aggregate cash payout* discount model.

The valuation principle is unchanged: stock price equals the discounted present value of expected future cash payouts. But cash payouts include repurchases as well as cash dividends. By forecasting total payout to all shareholders, one forecasts the *sum* of repurchases and dividends, and avoids the challenges of forecasting repurchases and changes in the number of shares outstanding.

I understand that Australian natural-gas pipelines rarely repurchase shares in significant amounts. Nevertheless, the aggregate cash flow discount model is no more difficult to apply than the traditional dividend discount model and is simpler and more robust generally.

## 5. The build-up method

Other models sometimes used to estimate the cost of equity are less well grounded in theory and not as extensively tested as the models covered above. The other models may, however, allow the analyst or decision-maker to introduce additional information and to apply judgment in determining the final estimate.

The "build-up" method calculates the cost of equity as:

$$\text{Cost of Equity} = \text{Risk-free rate} + \text{Equity risk premium} + \text{Size premium} + \text{Industry premium}$$

The first two terms of the build-up cost of equity match the CAPM cost of equity if beta equals 1.0. If the size premium is zero and the industry premium equals (beta – 1) × Equity risk premium, then the build-up method and the CAPM give identical answers.

The build-up method gives the analyst or decision-maker two additional degrees of freedom, the industry premium and the size premium. The additional degrees of freedom are probably the method's main attraction.

**Size premium.** The Fama-French model can be invoked to justify addition of a size premium to the cost of capital for small companies.[19] Fama and French showed that investors in small-cap stocks have earned above-average returns, after adjusting for the stocks' above-average betas.

The Fama-French model does not say that investors demand higher expected returns from small-cap companies just because they are small. Higher expected returns come from $b_{size}$, the exposure to the size factor, and the expected risk premium on the size factor, which proxies for some underlying economic risk that small companies are especially exposed to.

The right question – if one accepts the Fama-French model – is not whether a company is small or large, but whether the company's exposure $b_{size}$ is materially greater than zero.[20] Some small-cap companies have negative exposure ($b_{size} < 0$); they act like large companies with respect to the size factor. Some large companies have positive exposure ($b_{size} > 0$). Analysts should not add size premiums without first estimating $b_{size}$ for the company at hand or for a portfolio of similar companies in the same industry.

**Industry premium**. The industry risk premium could be estimated by multiplying the equity risk premium by the difference between the industry beta and 1.0. In this case the sum of the industry risk premium and the equity risk premium simply equals beta × equity risk premium, as in the CAPM. The Ibbotson SBBI Yearbooks use this method, but with a "full-information" beta for the industry.[21] The alternative is to estimate the industry risk premium by judgment or some ad hoc method.

## 6. Prevailing market conditions

Rule 87 requires that decision makers must consider "Prevailing market conditions." Therefore, the lingering effects of the recent financial crisis and the continuing, rock-bottom

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[19] Size premiums are sometimes proposed for investment projects that would be small companies if traded. Adding size premiums to costs of capital for individual projects is blatantly illogical. One could describe Exxon Mobil as a portfolio of smaller projects, add a size premium for each project, add the projects back up, and conclude that Exxon Mobil's cost of capital should include a size premium.

[20] The average values of $b_{size}$ and $b_{value}$ are both zero, because the return on the size factor is the *difference* between returns on small- vs. large-cap stocks. The return on the value factor is the *difference* between returns on value- vs. growth stocks.

[21] Ibbotson SBBI 2012 *Valuation Yearbook*, Morningstar, Chicago, Chapter 3.

interest rates on government bonds in most developed economies must be considered. The low interest rates result from monetary policy and also from investors' "flight to quality" and their willingness to accept very low rates of return on safe, liquid assets. The concern is that routine applications of the CAPM will generate unrealistically low estimates of the cost of equity.

Routine applications of the CAPM assume a normal equity risk premium. Tracking year-to-year changes in the expected equity risk premium is difficult. Nevertheless, there are plausible reasons why this risk premium should now be higher than normal, pre-crisis levels. The "flight to quality" is not over, which suggests that investors are still unusually cautious about the risks of equity markets and also still willing to pay an unusually high liquidity premium for holding liquid government debt vs. less-liquid equities.

Dividend or aggregate cash flow discount models can provide a check on the current expected equity market risk premium.[22] The differences between a cost of equity estimates from these models and the government bond rates can be used to estimate the equity market risk premium. If the resulting estimates are now higher than normal, pre-crisis levels, then the CAPM is probably generating an unrealistically low estimate for the cost of equity.

Current market conditions also call for sanity checks on estimates of the cost of equity from any model. For example, the cost of equity cannot be less than the cost of debt. Costs of equity should be several percentage points above the cost of debt.

## 7. Conclusions

I have reviewed several models or approaches to estimating the cost of equity. This task is intrinsically difficult, because it requires estimates of the future rates of return that investors are implicitly demanding. The task is somewhat easier for regulated firms, however, because many regulated firms are mature, stable and make regular cash payouts to investors. Thus analysts or decision-makers can often reach beyond routine applications of the CAPM to gain additional information and understanding. Analysts and decision makers should consider estimates from other models or sources whenever the estimates are informative. As I have noted in the past,

[22] The check does not have to be restricted to Australian gas pipelines. Any industry can be used for the check, provided that the discount models are a good fit to companies in the industry.

> Use more than one model when you can. Because estimating the opportunity cost of capital is difficult, only a fool throws away useful information. That means that you should not use any one model or measure mechanically and exclusively.[23]

My comments on the CAPM and other models are briefly summarized below.

1. The CAPM must be used with caution, despite the model's simplicity, tractability and other virtues. There is a case for the "empirical CAPM," at least as a reminder of the tendency for low-beta stocks to earn higher average rates of return than the CAPM predicts.
2. Routine applications of the CAPM can now generate implausibly low estimates of the cost of equity. But there are good reasons to think that costs of equity have *not* fallen in lockstep with today's exceptionally low interest rates -- in other words, good reasons to think that the equity risk premium remains high post-crisis.
3. Multi-stage dividend (or aggregate cash payout) discount models are often useful for rate-regulated companies. These models can provide direct estimates of the cost of equity. The models can also provide a check on whether the current expected equity risk premium is now "normal" or abnormally high.
4. The Fama-French model is widely accepted for many purposes, including evaluating performance of mutual or pension funds, but not for estimating the cost of equity. The Fama-French model does open the door for adding a size premium to the cost of equity, as in the build-up method. But small-cap stocks do not deserve a size premium just because they are small. It's important to show higher-than-average exposure to the Fama-French size factor.
5. Finance evolves, so analysts and decision-makers should of course leave the door open for other models or approaches.

[23] S.C. Myers (1978), "On the Use of Modern Portfolio theory in Public Utility Rate Cases: Comment," *Financial Management*, Autumn, p. 67.

The Brattle Group

# Estimating the Cost of Equity for Regulated Companies

Date : 17 February 2013

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## EXECUTIVE SUMMARY

In this report, we discuss the models available for estimating the cost of equity for the purpose of the Natural Gas Rules in Australia. Given that the new Rule 87 requires relevant estimation methods, financial models and market data to be considered, as well as the "prevailing conditions in the market for equity funds", this report focuses on the characteristics of the various models, how they perform under various market conditions, and therefore how to assign weight to a method, model or other data based on prevailing market or industry conditions. Further, the report finds that practitioners, regulators, and textbooks commonly look to several models or data sources before reaching a conclusion on the cost of equity.

All models have relative strengths and weaknesses, with the result that there is no one model that is the most suitable for estimating the cost of equity at any given time or for any given company. As our colleague and MIT professor Stewart Myers has put it eloquently "Use more than one model when you can. Because estimating the opportunity cost of capital is difficult, only a fool throws away useful information." This report provides a set of guidelines that can be used in deciding which models should have more weight than others under different market, industry, or company-specific circumstances.

The focus of the report is on the key characteristics of the various cost of equity estimation methods available for a decision maker and circumstances under which each method may be more or less suitable. It is imperative that the choice of model(s) and their implementation take into account the prevailing economic conditions, industry specifics as well as characteristics of the firm for which the cost of equity is being determined, because, according to the circumstances, each model can show bias. We therefore emphasize that there is no single or formulaic approach to estimating the cost of equity. Evidence from academics, practitioners and regulators alike agree that a mechanistic reliance on a single model, without regard to changing market or industry conditions, may deliver spurious results.

The different models should be applied to a set of comparable firms, rather than the single firm for which the cost of equity is to be determined, because all methods for estimating the cost of

equity introduce significant noise or uncertainty. Applying the models to a set of comparator firms generates a range of cost of equity estimates for each model. Consideration of prevailing economic conditions, industry specifics, and characteristics of the firm for which the cost of equity is to be determined should go to the weight that is put on each model in deriving an overall reasonable range for the cost of equity.

For example, a dividend growth model might have more weight and the Sharpe–Lintner CAPM less weight when (as currently) interest rates on government bonds are unusually low. Conversely, a dividend growth model might have less weight, and the CAPM more weight, in a sector where growth forecasts are considered to be less reliable. In addition, empirical results from the Sharpe–Lintner CAPM suggest that results may be biased for firms with beta significantly different from one. In addition to the traditional Sharpe-Lintner CAPM and dividend growth models, the report also discusses other models such as the Black CAPM, the Fama-French model, the Consumption CAPM, and the Arbitrage Pricing Theory. We also touch upon new developments in implementing the dividend discount model and on other data and evidence that is sometimes used in combination with the models mentioned above.

Once a reasonable range for the cost of equity has been identified, selecting a point within that range is a matter of judgment, but that judgment can be guided by considering the riskiness of the firm at hand relative to the riskiness of the comparable firms used to generate the cost of equity estimates. Only non-diversifiable risks should be included—for example, variation in demand, which might be more highly correlated with general economic growth for a utility with significant industrial load than for a utility serving mostly residential customers.

## I. INTRODUCTION

The Australian Energy Market Commission recently changed the rules that guide the regulation of pipelines (and other regulated entities) in Australia. The Australian Pipeline Industry Association (APIA) has therefore asked *The Brattle Group* (*Brattle*) to review the methods that are currently used or could be used to estimate the cost of equity capital for the purposes of the National Gas Rules in Australia. As part of this exercise, the APIA has asked us to review how academics, practitioners and regulators worldwide think models should be used, and how they have been used in determining the cost of equity for regulated entities. Thus, in this report, we discuss examples of regulatory approaches in the U.S., Canada and the U.K. where regulators have considered a number of methods for estimating the cost of equity capital, and have determined the optimal use of these multiple evidence sources in order to provide greater confidence in their results. The report also includes a discussion of the recommendations of academics and practitioners with regards to the use of several cost of equity estimation models.

The report focuses on the new Rule 87 and the new *allowed rate of return objective,* which, in order to be achieved, requires that ~~r~~regard must be had to relevant estimation methods, financial models, market data and other evidence"[1] in determining the overall rate of return, and that ~~r~~regard must be had to the prevailing conditions in the market for equity funds"[2] in determining the cost of equity component of the overall rate of return. We therefore focus on introducing a broad set of methods for cost of equity estimation, the risk positioning of a company relative to the industry or other companies, and methods relied upon by regulators and practitioners around the globe.

*Section II* provides some background for cost of equity estimation. *Section III* focuses on the evolution, theoretical underpinnings, and characteristics of various cost of equity estimation methods including (a) the Sharpe-Lintner Capital Asset Pricing Model (CAPM), (b) variations of the CAPM such as the Empirical CAPM (ECAPM) and the Consumption-Based CAPM, (c) the Fama-French Three-Factor Model, (d) the Arbitrage Pricing Theory, (e) Dividend Discount

[1] Rule 87, s.5a.

[2] Rule 87, s.7.

Models including both Single-Stage and Multi-Stage models, and (f) Other Models including the so-called Risk Premium method, Residual Income Valuation model, Ibbotson's Build-up method, the Comparable Earnings model, Market-to-Book and Earnings Multiples approaches. We note that the above is not intended to be an exhaustive list of models that regulators or practitioners could feasibly rely upon in determining the cost of equity. We also note that as finance evolves, new estimation methods, financial models, market data and other evidence may become available that could be informative for the purpose of estimating the cost of equity. *Section IV* discusses implementation issues, summarizes the characteristics of the various cost of equity estimation methods, and discusses how to use the models under different market conditions. Additionally, this section includes a description of how to position the target entity relative to a sample based on its relative risk.

## II. METHODS, FINANCIAL MODELS, MARKET DATA AND OTHER EVIDENCE USED TO ESTIMATE THE COST OF EQUITY CAPITAL

### A. INTRODUCTION

To determine the cost of capital, one must evaluate the cost of equity, the cost of debt (possibly both long-term and short-term) and the capital structure of the company subject to regulation. This report focuses on the estimation of the cost of equity component of a regulated entity's cost of capital.

To determine the cost of equity for a specific utility, decision makers typically look at a range of evidence presented to them. In the case of regulators, they commonly review expert evidence, models and other information presented by experts, the utility and other stakeholders, and also evidence that the regulator itself generates. Ultimately, a degree of judgment is used to arrive at a final determination having considered this evidence. The evidence considered might include different financial models which are used to extract estimates of the cost of equity for similar utilities from market data (stock prices). It might also include estimates from models that take equity analyst forecasts as inputs. For example, three regulators, the Alberta Utilities Commission (AUC), the Ontario Energy Board (OEB), and the U.S. Surface Transportation Board (STB), recently reviewed their cost of equity estimation approach. These three regulators noted that each methodology has its own strengths and weaknesses and subsequently decided to

rely on more than one model or approach to determine the cost of equity.[3] We further note here that in discussing the characteristics of each model or practice, we are pointing to advantages or disadvantages of the models assuming they will inform the ultimate decision, but we do not expect any one model to be the only piece of evidence considered and used by either regulators or practitioners in determining the cost of equity.

This report describes a number of models that can be used to inform the regulator's judgment in determining the cost of equity. It also discusses the views of academics and practitioners with regards to the determination of the cost of equity from multiple estimation models.

Below, we describe methodologies that regulators and practitioners use in Australia, Canada, Europe, the U.K., and the U.S., as well as some more recent methods that have been proposed, albeit it is not clear from the record the extent to which regulators have used these methods. It is important to realize that in many jurisdictions the regulator does not look to a single model, but considers all the evidence in front of it and then makes a decision. In North America, where the consideration of more than one model and possibly other evidence is common, the ultimate decision is often not explicit about the weight assigned to each model or other pieces of evidence.[4]

## B. THE USE OF MODELS FOR COST OF CAPITAL ESTIMATION

### 1. Context

The National Gas Rules set the framework for how the AER (and the ERAWA) determine access arrangements for covered gas pipelines, including the rate of return on capital which is a component of the charges paid by pipeline customers. We understand that the regulators are

[3] Alberta Utilities Commission, Decision 2011-474, p. 27-28, Ontario Energy Board, EB-2009-084, p. 38, Surface Transportation Board, Ex Parte 664 (Sub-No. 1), pp. 3-5.

[4] There are exceptions to this rule such as the Federal Energy Regulatory Commission and the Surface Transportation Board in the U.S., and the Canadian Transportation Agency. However, most U.S. state and Canadian federal and provincial regulators do not have a specified cost of equity estimation method. Instead, they commonly hear evidence from a number of different parties on cost of equity (often including regulatory staff). Based on this information the regulator then makes its decision.

currently developing guidelines as to how the rate of return provisions of the NGR will be applied in future determinations.

The NGR state that "… the rate of return for a service provider is to be commensurate with the efficient financing costs of a benchmark efficient entity with a similar degree of risk… ".[5] In addition, the NGR require that "[I]n determining the allowed rate of return, regard must be had to: (a) relevant estimation methods, financial models, market data and other evidence;…"[6] and that "[i]n estimating the return on equity under subrule (6), regard must be had to the prevailing conditions in the market for equity funds."[7]

In this report, we describe the estimation methods, financial models, market data and other evidence that may be relevant for setting the cost of equity in future access arrangement determinations in Australia.

### *a) The cost of capital*

The cost of capital is a key parameter in regulatory settings, because it contributes to determining the return to the company's investors. Defined as *the expected rate of return in capital markets on alternative investments of equivalent risk*, it is the expected rate of return investors require based on the risk-return alternatives available in competitive capital markets. Stated differently, the cost of capital is a type of opportunity cost: it represents the rate of return that investors could expect to earn elsewhere without bearing more risk.[8, 9]

While the details of energy network regulation are different in different jurisdictions, regulators are in many jurisdictions required to set a cost of capital which provides investors in rate-regulated entities a reasonable opportunity to earn a return on their investment equal to the opportunity cost of capital.

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5 Rule 87(3).

6 Rule 87(5).

7 Rule 87(7).

8 "Expected" is used in the statistical sense: the mean of the distribution of possible outcomes. The terms "expect" and "expected" in this Report, as in the definition of the cost of capital itself, refer to the probability-weighted average over all possible outcomes.

9 The cost of capital is a characteristic of the investment itself, not the investor.

In the U.K., the Gas Act 1986 requires the regulator to have regard to ~~t~~he need to secure that licence holders are able to finance the[ir] activities.…"[10] Ofgem has also said:

> In setting price controls, we are required to have regard to the ability of efficient network companies to secure financing in a timely way and at a reasonable cost in order to facilitate the delivery of their regulatory obligations.[11]

In Canada, the National Energy Board has explained the ~~f~~air return standard" as follows:

> The Board is of the view that the fair return standard can be articulated by having reference to three particular requirements. Specifically, a fair or reasonable return on capital should:
> - be comparable to the return available from the application of the invested capital to other enterprises of like risk (the comparable investment standard);
> - enable the financial integrity of the regulated enterprise to be maintained (the financial integrity standard); and
> - permit incremental capital to be attracted to the enterprise on reasonable terms and conditions (the capital attraction standard).[12]

Finally, in the U.S., the starting point for the Federal Energy Regulatory Commission's approach to determining the cost of equity is Supreme Court precedent, which states that:

> the return to the equity owner should be commensurate with the return on investments in other enterprises having corresponding risks. That return, moreover, should be sufficient to assure confidence in the financial integrity of the enterprise, so as to maintain its credit and to attract capital.[13]

While these legal standards are differently worded, a common thread is that regulated entities are allowed to earn a return that is comparable to that of other enterprises of similar risks and which enables the regulated entity to finance its operations. The legal standards in North America and Europe are not specific about how to accomplish the goal(s).

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[10] Gas Act 1986, s. 4AA(2)(b).

[11] *RIIO-T1: Final Proposals for National Grid Electricity Transmission and National Grid Gas*, Ofgem (December 2012), paragraph 4.6.

[12] RH-2-2004, p. 17. See also the Supreme Court of Canada's decision in Northwestern Utilities Limited v. City of Edmonton [1929] S.C.R. 186.

[13] *FPC v. Hope Natural Gas Co.*, 320 U.S. 591 (1944). *Bluefield Water Works & Improvement Co. v. Public Service Comm'n*, 262 U.S. 679 (1923), cited in FERC policy statement on the *Composition of Proxy Groups for Determining Gas and Oil Pipeline Return on Equity*, April 17 2008, p. 2.

### *b) What should we expect from models?*

It is useful to recognize explicitly at the outset that models are imperfect. All are simplifications of reality, and this is especially true of financial models. Simplification, however, is also what makes them useful. By filtering out various complexities, a model can illuminate the underlying relationships and structures that are otherwise obscured. After all, while a perfect scale model representation of the city might be highly accurate, it would make a poor road map. It is therefore imperative that regulators and other users of the models use sound judgment when implementing and using the models — there is no one model or set of models that are perfect.

The gap between financial models and reality can sometimes be quite significant (as was painfully demonstrated by the recent financial crisis). There is no single, widely accepted, best pricing model to estimate the cost of capital — just as there is still no consensus on some fundamental issues, such as the degree to which markets are efficient. Analysts have a host of potential models at their disposal, and it must be acknowledged that cost of capital estimation continues to require the exercise of judgment. Practitioners, regulators, as well as textbooks therefore often recommend that the "best practice" for ensuring robustness is to look at a totality of information.[14] These practitioners, regulators and texts therefore use or present a variety of methodologies that may be applicable for the determination of the cost of equity in a specific circumstance.

While no model is perfect, there are certain features that make models more useful from a regulatory perspective. For example, it is desirable to have models and methods that i) are consistent with the goal being pursued, ii) are transparent, iii) produce consistent results, iv) are robust to small deviations or sampling error, v) are as simple as possible (while maintaining reliability), vi) can be replicated by others (*e.g.,* data is widely available), and vii) recognize the regulatory context and legislative requirements in which the regulatory body operates. Clearly different models will satisfy these criteria to differing degrees, and different models may be better suited to different regulatory jurisdictions.

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[14] See, for example, the Ontario Energy Board's EB-2009-084 decision, December 2009, the U.S. Surface Transportation Board's Ex. Parte 664 (Sub-No. 1) decision, January 2009, Morningstar *Ibbotson Cost of Capital 2012 Yearbook*, and Roger A. Morin*, New Regulatory Finance*, Public Utilities Reports Inc., 2006, Chapter 15.

For example, the CAPM and the Dividend Discount Model (DDM) both are transparent and developed from economic theory. Their results can be replicated easily, since the data required are widely available from many public sources. However, the implementation of the CAPM and DDM requires a number of subjective decisions – decisions which can be hotly contested and can lead to significantly different results. The CAPM, for instance, relies on a risk-free rate that is currently driven unusually low by the recent flight to quality and the easing of monetary policy. The model also requires an estimate of the market risk premium, which may pose difficulties in times of high market volatility.

The single-stage DDM is especially sensitive to the growth rate estimates used, which can vary widely among analysts and over time, contradicting the underlying assumption of growth stability inherent in this model. The variability in growth rates and stock prices may increase when industries are in transition, making the reliability of the DDM more questionable in such periods. In addition, it has become more common to distribute cash to shareholders in a form other than dividends. For example, regulated entities in both the U.S. and the U.K. have had share buyback programs that substantially affected the number of shares, and these are not captured in the standard DDM.[15] Some of the growth rate problems in the DDM are alleviated by the reliance on a multi-stage version of the model as done by, for example, *The Brattle Group*, Morningstar *Ibbotson Cost of Capital Yearbook*, and the U.S. Surface Transportation Board (STB).[16]

Similar problems arise in other models that inherently rely on data for a sample of companies and data for economic phenomena that may be changing quickly; the latter is especially true for models such as the Fama-French, where the reliance on three risk factors can lead to highly variable results across time. As a result, no single model is ideal and the implementation of any model necessarily requires choices that involve subjective judgments. Therefore, it is important to look to the totality of relevant information available from methods, models, market data and

[15] See, for example, National Grid Share Buyback Programme and Spectra Energy Corp's 2008 form 10-K.

[16] *The Brattle Group* is a consulting firm, Morningstar is a commercial provider of data and the STB is a U.S. federal regulator.

other evidence. The relative strengths and weaknesses of the various cost of equity estimation models are outlined in further detail in *Section III* of this report.

### *c) Model stability and robustness*

For an estimation model used to determine the cost of equity, stability and robustness over time are desirable unless economic conditions have truly changed. Stability means that cost of capital estimates done in similar economic environments should be similar, not only period-to-period but also company-to-company within a comparable sample. Robustness is meant here as the ability of a model to estimate the cost of capital across different economic conditions.

In general, all of the models discussed here have characteristics that make them more or less suited to one economic environment versus another. As such, all individual models can be, and often are, subject to some instability over time. For example, the currently very low government bond yields lead to very low cost of equity estimates using the CAPM — sometimes less than the costs of debt of investment-grade companies! During the early 2000s, the DDM was subject to substantial criticism due to allegations of analysts' optimism bias. Similarly, the risk premium model[17] has produced very different results in times of high and low inflation that did not necessarily reflect the true cost of capital. Thus, estimates at any given point of time may seem too high or too low, and it is important to understand whether the estimated figures are driven by actual changes in the systematic risk of the regulated entities, or by something else (*e.g.,* data irregularities). It is for these reasons that regulators in the U.S. and Canada often rely on and analysts recommend relying on the results from at least two estimation models.[18]

A notable example of a regulator that has acknowledged the difficulty in relying on only one model or method is the U.S. Surface Transportation Board. The STB in 1982 started to rely on a single-stage DDM to determine the cost of equity for U.S. railroads. However, in 2006, the shippers on the railroads complained that the estimated cost of equity was out of line with reality,

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[17] The risk premium used in the risk premium model is different from the market risk premium used in the CAPM. The model is frequently used in U.S. regulatory proceedings.

[18] See, for example, U.S. Surface Transportation Board, Ex Parte 664 (Sub-No. 1), served January 28, 2009; Mississippi Power, Performance Evaluation Plan, Rate Schedule „PEP-5", November 9, 2009 (http://www.mississippipower.com/pricing/pdf/pep-5.pdf); Ontario Energy Board, EB-2009-0084, Report of the Board on the Cost of Capital for Ontario's Regulated Utilities, Issued December 11, 2009.

because forecasted growth rates for railroad companies were substantially higher than the economy-wide forecasted growth. The shippers argued successfully that such high growth rates could not be sustained forever as assumed by the single-stage DDM, and the STB thus initiated a rulemaking proceeding to review and eventually determine how to set the allowed cost of equity going forward. Following several years of expert submissions and proceedings, the STB decided to rely on an equally-weighted average of the Sharpe-Lintner Capital Asset Pricing Model and a specific version of the multi-stage DDM. In doing so, the STB concluded:

> if our exploration of this issue has revealed nothing else, it has shown that there is no single simple or correct way to estimate the cost of equity for the railroad industry, and countless reasonable options are available. Both the CAPM and the multi-stage DCF [DDM] models we propose to use have their own strengths and weaknesses, and both take different paths to estimate the same illusory figure. By using an average of the results produced by both models, we harness the strengths of both models while minimizing their respective weaknesses. The result should be a stable yet precise estimate of the cost of equity that we can use in future regulatory proceedings and to gauge the financial health of the railroad industry.[19]

### 2. Risk-Return Tradeoff

At its most basic level, an asset (security) is a claim to a stream of future (risky) cash flows and sometimes with potential rights to exert some control over those flows. Financial markets allow investors to exchange these claims, and therefore risks. Through trade, investors are able to create different packages of risks and returns than could be achieved by holding individual securities (or fixed packages of securities), and investors can change their risk exposure over time. Because investors are assumed to be risk-averse, they evaluate the universe of risky investments on the basis of a risk-return trade-off. Investors can only be induced to hold a riskier investment if they expect to earn a higher rate of return on that investment. The essential tradeoff between risk and the cost of capital is depicted in Figure 1 below.

[19] *U.S. Surface Transportation Board, Ex Parte 664 (Sub-No. 1)*, served January 28, 2009, p. 15.

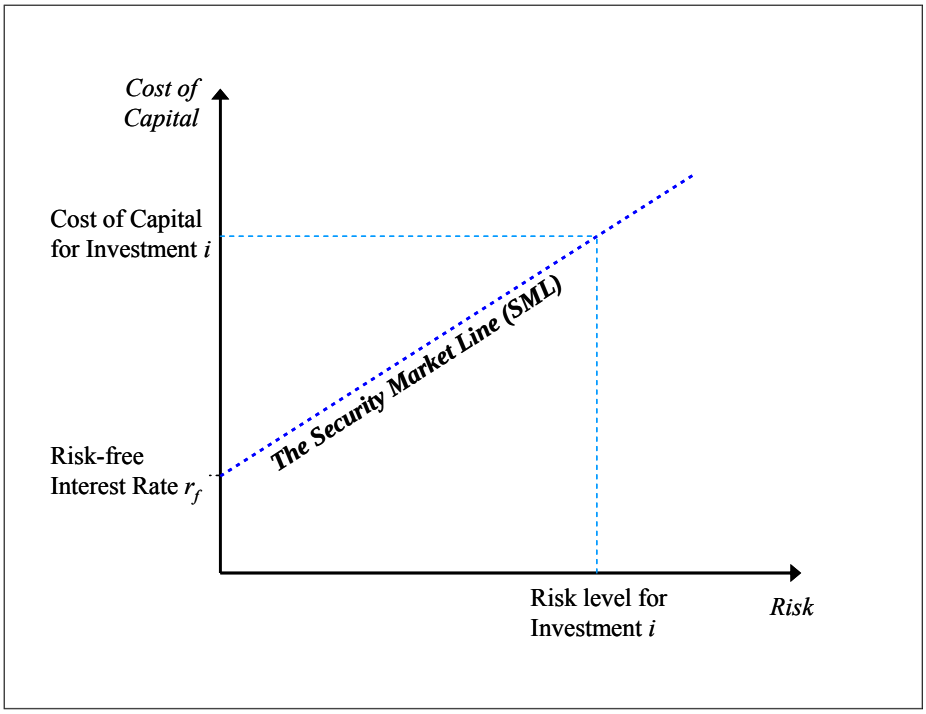


**Figure 1: Security Market Line**

## III. COST OF EQUITY ESTIMATION MODELS

### A. SHARPE-LINTNER CAPITAL ASSET PRICING MODEL

One of the most common pricing models used in business valuation and regulatory jurisdictions is the Sharpe-Lintner CAPM, which in its simplest form is depicted in Figure 2 below.

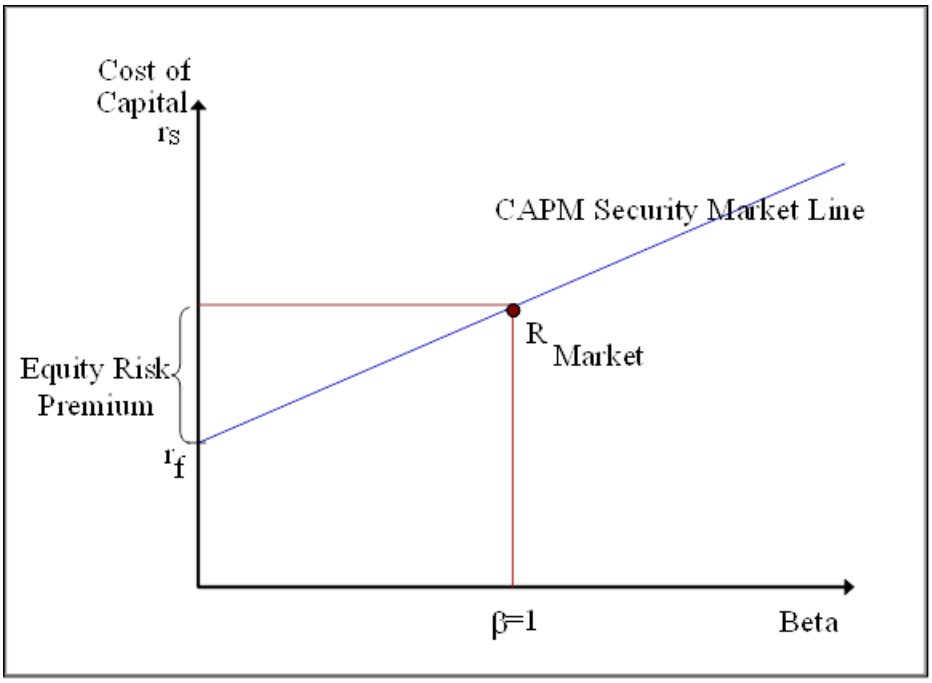


**Figure 2: Capital Asset Pricing Model**

Thus, in the world in which the CAPM holds, the expected cost of (equity) capital for an investment is a function of the risk-free rate, a measure of systematic risk (beta), and an expected market risk premium (MRP):[20]

$$E(r_S - r_f) = \beta_S \times E(r_M - r_f) \quad \textbf{(1)}$$

where $r_S$ is the cost of capital for investment $S$; $r_M$ is the return on the market portfolio, $r_f$ is the risk-free rate, and $\beta_S$ is the measure of systematic risk for the investment $S$. The $(r_M - r_f)$ term is known as the market risk premium (MRP),[21] and $\beta_S$ measures the response of the stock S to systematic risk. Re-arranging this equation produces the CAPM's formula for the cost of (equity) capital of a traded asset:

$$r_S - r_f = \beta_S \times MRP \quad (2)$$

[20] While the CAPM model frequently is applied to equity capital, it applies to all assets.

[21] We note that some European regulators use the term Equity Risk Premium (ERP) instead of MRP.

To implement the CAPM, it is necessary to determine the risk-free rate, $r_f$, and to estimate the MRP and beta, $\beta_S$.

### 1. Evolution of the CAPM

The CAPM was developed as a theoretical equilibrium model and fits with the intuition of a risk-return tradeoff. The development of the CAPM signaled the first time that economists were able to quantify risk and the reward for bearing it. Under the CAPM, the expected return of an asset must be linearly related to the covariance of its return with the return of the market portfolio.[22]

Markowitz (1959)[23] first laid the groundwork for the CAPM. In his seminal research, he expressed the investor's portfolio selection problem in terms of expected return and variance of return. He argued that investors would optimally hold a mean-variance efficient portfolio, that is, a portfolio with the highest expected return for a given level of variance. Sharpe (1964)[24] and Lintner (1965)[25] built on Markowitz's work to develop economy-wide implications. They showed that if investors have homogeneous expectations and optimally hold mean-variance efficient portfolios, then, in the absence of market frictions, the portfolio of all invested wealth, or the market portfolio, will itself be a mean-variance efficient portfolio. This is the heart of the Sharpe-Lintner CAPM. The standard CAPM equation (as expressed in Equation (2)) is a direct implication of this statement.

The Sharpe-Lintner CAPM assumes unrestricted lending and borrowing at a risk-free rate of interest. In the absence of a risk-free asset, Black (1972)[26] derived a more general version of the CAPM which did not rely on this potentially problematic assumption. In this version, known as the Black CAPM, the expected return of an asset in excess of the "zero-beta" return is linearly

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[22] For a basic introduction to risk-return models, see R.A. Brealey, S.C. Myers, and F. Allen, Principles of Corporate Finance, 10ed, 2011 (Brealey, Myers & Allen (2011), pp. 192-203.

[23] H. Markowitz, "Portfolio Selection: Efficient Diversification of Investments," 1959, John Wiley, New York.

[24] W. Sharpe, "Capital Asset Prices: A Theory of Market Equilibrium under Conditions of Risk," *Journal of Finance* 19, 1964, pp. 425-442.

[25] J. Lintner, "The Valuation of Risky Assets and the Selection of Risky Investments in Stock Portfolios and Capital Budgets," Review of Economics and Statistics 47, 1965, pp. 13-37.

[26] F. Black, "Capital Market Equilibrium with Restricted Borrowing," *Journal of Business* 45, 1972, pp. 444-455.

related to its market beta. In essence, the return on the risk-free asset in Equation (2) above is substituted with a return on a zero-beta portfolio associated with the market portfolio. This zero-beta portfolio is defined to be the portfolio that has the minimum variance of all portfolios uncorrelated with the market portfolio. The empirical implementation of the Black CAPM is often referred to as the Empirical CAPM or ECAPM.

Empirical tests of the Sharpe-Lintner CAPM have focused on three implications of equation (2): (i) The intercept is zero; (ii) The market beta completely captures the cross-sectional variation of expected excess returns; and (iii) The market risk premium is positive.

There is substantial literature on empirical tests of the CAPM since its development in the 1960s, with mixed results. Black, Jensen and Scholes (1972)[27], Fama and Macbeth (1973),[28] and Blume and Friend (1973)[29] found empirical evidence to be consistent with the mean-variance efficiency of the market portfolio. However, Black, Jensen and Scholes (1972) and Fama and MacBeth (1973) identified a fundamental challenge to the CAPM; namely that low-beta stocks have higher average returns than predicted by the CAPM, and high-beta stocks lower average returns. In other words, the empirical estimates are consistent with pivoting the Security Market Line (SML) around beta = 1 compared to the Sharpe-Lintner CAPM. This suggests that the cost of capital for regulated companies, which often have a beta less than one, will be underestimated by the traditional CAPM.[30]

Several subsequent studies confirmed the robustness of this result and proposed explanations revolving around market frictions, such as different borrowing and lending rates, and the role of

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[27] F. Black, M.C. Jensen, and M. Scholes, "The Capital Asset Pricing Model: Some Empirical Tests," *Studies in the Theory of Capital Markets*, Praeger Publishers, 1972, pp. 79-121.

[28] E. Fama and J. Macbeth, "Risk, Return, and Equilibrium: Empirical Tests," *Journal of Political Economy* 81, 1973, pp. 607-636.

[29] M. Blume and I. Friend, "A New Look at the Capital Asset Pricing Model," *Journal of Finance* 28, 1973, pp. 19-33.

[30] Implementing a long-run version of the CAPM which uses (annualized) long-horizon returns (*e.g.*, with long bond rates as risk-free rate) generally produces a flatter SML than obtained by using short-rates, due to the general presence of an upward sloping yield curve. While this partially compensates for the empirically observed flattening, it is not sufficient to explain all of the observed flattening of the SML. That is, even implementations that utilize a long-run risk-free interest rate require a further, albeit smaller, adjustment to match the empirical SML.

taxes. Nevertheless, the empirical evidence suggested significant movement in the SML, often flattening, to the point that Fama and French (1992) found a zero slope in the empirical SML.[31] Fama and French (1992, 1993[32]) in turn suggested that factors other than the risk relative to the market, such as size and book-to-market value ratios (among others) were significant in explaining the observed SML. Fama and French found that firms with high book-to-market ratios and small size have higher average returns than is predicted by the standard CAPM, and vice versa. Their work culminated in the model now known as the Fama-French three-factor model.

The Fama-French papers cited above continued in the vein of the so-called "anomalies" literature that had arisen in the late 1970s. These anomalies can be thought of as firm characteristics that provide incremental explanatory power for the sample's mean returns beyond the market. Earlier anomalies included the price-earnings ratio effect (first reported by Basu (1977)[33]) and the detection of the size effect (Banz (1981)[34]). For example, Basu found that firms with low price-earnings ratios have higher sample returns than those predicted by the standard CAPM. The price-earnings ratio and size anomalies are at least partially related, as low price-earnings-ratio firms tend to be small.

The Empirical CAPM (ECAPM), described further in the section below on variations of the standard CAPM, is an alternative method of correcting for the empirical flattening of the SML. The ECAPM can be viewed from the positive school of thought as a practical adjustment that can be made to measure the cost of capital. It can be applied without knowing the "cause" of the increased intercept and decreased slope of the SML relative to the Sharpe-Lintner CAPM.

To sum up, there has been a wealth of statistical evidence contradicting the Sharpe-Lintner CAPM over the past 40 years or so and controversy remains about how the evidence should be

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[31] E.F. Fama and K.R. French, "The Cross-Section of Stock Expected Returns," *Journal of Finance* 47, 1992, pp. 427-465.

[32] E.F. Fama and K.R. French, "Common risk factors in the returns on stocks and bonds," *Journal of Financial Economics* 33, 1993, pp. 3-56.

[33] S. Basu, "The Investment Performance of Common Stocks in Relation to Their Price to Earnings Ratios: A Test of the Efficient Market Hypothesis," *Journal of Finance* 32, 1977, pp. 663-682.

[34] R. Banz, "The Relationship Between Return and Market Value of Common Stocks," *Journal of Financial Economics* 9, 1981, pp. 3-18.

interpreted. Some argue that the standard CAPM should be replaced by multifactor models with several sources of risk, such as the Fama-French model. Others argue that evidence against the CAPM is overstated due to potential mis-measurement of the market portfolio, data mining or sample selection biases. One further key deficiency in the CAPM is that it is a static model which ignores consumption decisions, and treats asset prices as being determined by the portfolio choices of investors who have preferences defined over wealth one period in the future. Implicitly, these models assume that investors consume all their wealth after one period or at least that wealth uniquely determines consumption. This assumption does not match with reality. Therefore, to make the model more realistic, intertemporal equilibrium asset pricing models have been developed that model consumption and portfolio choices simultaneously. An example of such a model is the consumption-based CAPM, which is described further in *Section III.B.2* below.

### 2. CAPM Implementation Issues

Fundamentally, an analyst using the CAPM must determine three parameters to implement the model: the risk-free rate ($r_f$), the MRP, and the asset's beta ($\beta_S$) as shown in Equation (2) above. Through the determination (or estimation) of the parameters on the right-hand side of Equation (2), the analyst obtains an estimate of the cost of equity, $r_S$.

It is common to choose (i) a forecasted yield on government bonds (as is often done in Canada), (ii) a current measure of local government bond yields (a common practice in the U.S.), or (iii) a regional or global measure of the current yield on government bonds (*e.g.*, the Netherlands).

Like the risk-free rate, the choice of market proxy is local, regional, or global. The choice of risk-free rate and market index should be consistent, so the cost of equity is estimated as either a local, regional, or global figure.

For many years it was common to estimate the MRP from an arithmetic average of historical realized MRPs, measured as the long-term excess of market returns over the risk-free rate in the country or region of interest. European decision makers have in recent years often looked to the study of Dimson, Marsh, and Staunton to determine the MRP, while many in the U.S. commonly

look to evidence from Morningstar (formerly Ibbotson).[35] Some decision makers and analysts also look to either forecasted MRPs or survey results.[36] The estimation of the MRP remains controversial and the resulting cost of equity estimates generated by the standard CAPM are sensitive to the choice of MRP.

### 3. Characteristics of the CAPM

While the strengths and weaknesses of the CAPM inherently depend on its exact implementation, the following are some generic strengths:

- The model is transparent, well-documented and relies on economic theory.
- Data needed for the model are readily available if applied to companies with a reasonable trading history in well-developed markets. It is therefore also auditable.
- The model is sensitive to economic conditions through risk-free rates and market performance, as well as to changes in companies' systematic risk.

Among the weaknesses of the CAPM are the following:

- The model is very sensitive to developments in the risk-free rate that may reflect monetary policy rather than economic conditions.
- The model is sensitive to different estimation procedures for the MRP.
- Because beta estimates rely on historical data, there may be a delay in incorporating changes in systematic risk. MRP estimates based on historical data are also backward-looking.
- The model may downward bias cost of equity estimates for low-beta stocks and vice versa (see section on ECAPM below).

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[35] Texts such as Morningstar, *Ibbotson SBBI 2012 Yearbook*, p. 55-56 recommends to use the income return rather than total return or yield as the risk-free rate. The income return consists of the coupon payment divided by the bond price rather than the total return as this is the true risk-free component of the bond return. Capital gains or losses carry risk.

[36] For examples, see Bank of England, "Financial Stability Report," June 2012, Chart 1.11 and P. Fernandez, J. Aguirreamolla and L. Corres (2013), "Market Risk Premium used in 82 countries in 2012: a survey with 7,192 answers," IESE Business School, University of Navarra, SSRN 2084213.

- The model incorporates only one source of risk (the market), and therefore does not reflect the effects of, for e.g., consumption or economic growth, technological or regulatory risks.
- The CAPM is a static model and therefore ignores the dynamics of investment behavior and hedging.
- The model is based on the assumption that all investors optimally hold well-diversified portfolios and therefore only care about systematic risks. This assumption does not necessarily hold, however, when investor expectations about returns and investment opportunities are heterogeneous.

Because the model was developed as a generic approach to determining the cost of capital for companies, it does not specifically take industry factors or the context in which it is being used into account. However, the CAPM is a well-founded and commonly used model that relies primarily on readily available information. It may be less stable than ideal because changes in interest rates affect the risk-free rate and market volatility affects the beta estimates. Furthermore, determination of which sample companies to rely upon and the MRP remains controversial.

The CAPM has been widely used for a long period of time for a variety of reasons. The primary reason for the model's widespread use is its solid economic foundation, making it taught in every introductory finance class. The model is also relatively simple to implement. Most market-based models that have been developed since the CAPM take the CAPM as their point of departure to generalize the model. Also, academic researchers have not found any one alternative to the model that is easily applied in practice.

## B. VARIATIONS ON THE CAPM

### 1. The Empirical CAPM

As described above, the ECAPM is one way of correcting for the empirical flattening of the Security Market Line (SML). Specifically, the ECAPM directly adjusts the CAPM SML by a parameter, alpha, that can be controlled for sensitivities, *etc.* Formally, the ECAPM relation is given by Equation (3) below:

$$r_S = r_f + \alpha + \beta_S \times (MRP - \alpha) \quad (3)$$

where $\alpha$ is the ~~"a~~lpha" adjustment of the risk-return line, a constant, and the other symbols are as defined above. The alpha adjustment has the effect of increasing the intercept but reducing the slope of the SML, which results in a security market line that more closely matches the results of empirical tests.

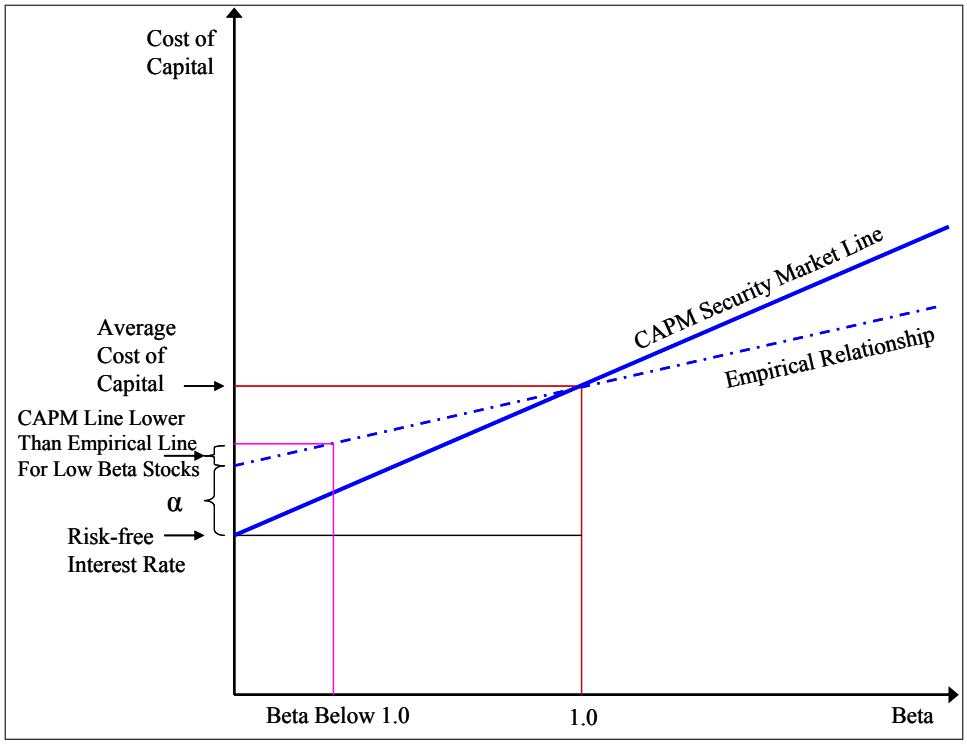


**Figure 3: The Empirical Security Market Line**

The academic literature has estimated a fairly wide range of alpha parameters, using primarily U.S. data, of approximately 1 to 7 percent.[37] While this is a rather large range, much of the variation between studies arises from differences in methodology and time periods so that the alpha estimates are not strictly comparable. The ECAPM is included among the models relied upon by some decision makers and experts including U.S. state and Canadian provincial regulators.[38]

[37] See Appendix A for details.

[38] The Mississippi Public Service Commission in the U.S. and the Alberta Utilities Commission in Canada have included the ECAPM as one of the models used to determine the cost of equity.

### 2. The Consumption-Based CAPM

The Consumption CAPM is an example of an intertemporal equilibrium model. This model aggregates investors into a single representative agent and considers a changing investment opportunity set over time, unlike the static standard CAPM. The representative agent is assumed to derive utility from the aggregate consumption of the economy. In this model, the stochastic discount factor, (defined such that the expected product of any asset return with the stochastic discount factor is equal to one), is equal to the intertemporal marginal rate of substitution for the representative agent.[39] Through mathematical equations, (the so-called Euler equations), asset returns and consumption can be linked. Using this setup, the model explains the risk premia on assets using the covariance between their returns and the intertemporal aggregate consumption marginal rate of substitution. As a result, the consumption-based pricing model can help explain the observed phenomenon of predictable variations in asset risk premia over time, and expands the risk-return relation to allow for a time-varying relationship between a stock's risk and return.

An important feature of the consumption model is that the expected conditional risk premium on an asset is related to its predicted conditional volatility. In particular, the relationship between a stock's risk premium and its conditional volatility could be positive or negative, depending on the extent to which the stock is an intertemporal hedge against shocks to the marginal utility of consumption. Furthermore, hedging assets have volatility patterns that could lead to expected rates of return lower than the risk-free rate. Note that this would generally not be the case for public utility stocks, since they are not viewed as defensive stocks.

Several versions of the consumption-based CAPM have been developed. In one of the more applicable versions, the addition of assumptions about the preferences of investors allows the model to explain the risk premia on assets through their covariance with consumption growth, so that the model, to a degree, can explain variations in the excess returns of risky assets over time. Other versions of the model allow time-varying investor risk aversion to explain predictable movements in risk premia.

[39] This is equal to the discounted ratio of marginal utilities for the representative agent in two successive periods.

In a regulatory setting, the consumption CAPM can be used to either project the expected risk premium over the risk-free rate or verify the relied-upon market risk premium. The model has not commonly been used in a regulatory setting, but a recent implementation of Ahern, *et al.* (2012)[40] was developed explicitly to estimate the cost of equity for regulated entities. The description below therefore focuses on this version of the model.

The Ahern model is estimated using a so-called GARCH-in-mean (GARCH-M) model, which unlike the Sharpe-Lintner CAPM allows for the stock returns to depend on a volatility (variance) measure. In particular, the GARCH-M specification is such that the expected risk premium on a stock is a linear function of its conditional volatility. In this model, the parameter of interest, α, which represents the linear relationship between the risk premium on the stock and the conditional volatility in the GARCH-M model, can be translated into the following implication of the theoretical asset pricing model described above:

| | | |
|---|---|---|
| $\alpha = -\frac{vol_t[M_{t+1}]}{E_t[M_{t+1}]} corr_t[M_{t+1}, R_{t+1}]$ | | (4) |

where $R_{t+1}$ is the expected total return on the public utility stock index or individual utility stock, and $M_{t+1}$ is the stochastic discount factor (SDF), *i.e.*, the (aggregate) consumption intertemporal marginal rate of substitution. The equation above implies that the coefficient on volatility will be positive (*i.e.*, returns and conditional volatility will be positively correlated) if the conditional correlation between the SDF and the asset return is negative, *i.e.*, if the stock is not a hedging asset.

Ahern, *et al.* (2012) estimate the conditional risk-return model using monthly total returns from January 1928 to December 2007 on the S&P Public Utilities stock index, and the monthly Moody's public utility Aa, A, and Baa yields for the cost of debt. The authors then compare the model's performance with the performance of, for example, the Sharpe-Lintner CAPM. The estimates of the cost of common equity from the model are similar to the CAPM values and

[40] P.A. Ahern, F.J. Hanley, R.A. Michelfelder, —New Approach to Estimating the Cost of Common Equity Capital for Public Utilities," *Journal of Regulatory Economics*, 2012 (Ahern, *et al.* 2012)

appear to be stable and consistent over time. Thus, the empirical implementation of the theoretical model resulted in cost of equity estimates that appeared to be within a range of reasonableness. The model has been presented in some U.S. regulatory jurisdictions but regulatory decisions based on the model are either still pending or it is not clear how the regulator used the information. Ahern, *et al.* conclude that the consumption-based asset pricing model ~~–s~~hould be used in combination with other cost of common equity pricing models as additional information in the development of a cost of common equity capital recommendation".[41]

### 3. Characteristics of CAPM Variations

As for the CAPM, the strengths and weaknesses of the variations discussed above depend on the implementation of the models. However, some strengths of the models are:

- Both the ECAPM and the Consumption CAPM allow for empirically observed phenomena to be modeled:
  - The ECAPM recognizes the flatter-than-predicted-by-CAPM Security Market Line.
  - The Consumption-CAPM allows for the expected risk premium to vary with asset and investor characteristics, such as conditional volatility and risk aversion.
- Data needed for the models are usually available if applied to companies with a reasonable trading history in well-developed markets. The models are therefore also auditable.
- The models are sensitive to economic conditions. The Consumption-CAPM considers more factors than does the CAPM.

Among the weaknesses of the models are the following:

[41] Ahern, *et al.* (2012), p. 17.

- The ECAPM has not been tested extensively outside the U.S. or in recent market conditions.
- The Consumption CAPM relies on the use of more data than does the CAPM and requires a refined estimation process, which makes it less accessible to a broader audience.

### C. THE FAMA-FRENCH THREE-FACTOR MODEL

The Fama-French model holds that the expected return of a security is described by an augmented CAPM relationship:

$$E(r_S - r_f) = \beta_S \cdot E(r_M - r_f) + s_S \cdot E(SMB) + h_S \cdot E(HML) \quad (5)$$

where $E(r_M - r_f)$ is the market risk premium (MRP) as used in the CAPM, SMB is the difference in returns between small companies and big companies ("~~S~~*Small Minus Big*"), and HML is the difference in returns between securities of firms with a high book-to-market equity ratio and a low one (*"High Minus Low"*). The factor loadings $s_S$ and $h_S$ represent security *S*'s "~~h~~olding" of each of these risk factors, which is to say they are the regression coefficients of $r_S$ on each of the factors.

*Evolution of the Fama-French Three-Factor Model*

Fama and French (1992) was the last influential paper in a series of academic research into the placement of the empirical SML relative to the theoretical CAPM. Controlling for firm size, the authors found no relationship between the market and expected return (zero beta). Stated differently, any explanatory power that the market beta in the CAPM might have is absorbed by using size to explain the cross-sectional variation in returns. Fama and French interpreted this to mean that market beta (and by extension the CAPM) had zero explanatory power for expected returns. Moreover, they found that all of the variation in returns that were (in other research) associated with size, earnings/price ratios, book-to-market equity ratios, and leverage, could be captured by size and the book-to-market equity ratio alone. Fama and French (1993) ultimately settled on a three-factor model that brought the market return back into the model (size, book-to-market ratio, and market return). Their 1993 paper found that this model explained 90 percent of

the variations in the cross-section of returns, and it has since become known as the Fama-French three-factor model.

From an empirical perspective, the Fama-French model is an alternative to the ECAPM – one should not employ a Fama-French model with an alpha adjustment (Equation (3)). However, the interpretation of the findings of Fama and French has been critiqued by many academics as the size and book-to-market factors may proxy for other phenomena.[42]

*Standard Implementation:*

The SMB factor and HML factor are typically created following Fama & French's (1993) approach. Specifically, at each point in time one allocates each firm into the small or big category, according to whether its market cap is in the top or bottom half of all firms considered. The firms in each half are then value-weighted to form two portfolios: small firms and big firms. The difference in realized returns between each of these portfolios is then taken as the SMB realization in that period. Creation of the HML series is similar, but firms are allocated to the "high" category if their book-to-market ratio is in the top 30th percentile and to the "low" category if their book-to-market ratio is in the bottom 30th percentile. These two time series can then be used to estimate the average SMB and HML, as well as the factor loadings for a given security; *i.e.*, the factors in the regression version of Equation (5), $\beta_S$, $s_S$, and $h_S$ are estimated.

As a practical matter, the SMB and HML factors can be obtained free of charge from Professor Kenneth French's website,[43] where he maintains a database of the factors for regional areas such as Asia-Pacific, Europe, and North America.

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[42] For a discussion of this critique, see, for example, Black, F., "Beta and return," *Journal of Portfolio Management* 20, 1993, pp. 8-18; A.C. MacKinlay, "Multifactor Models Do Not Explain Deviations from the CAPM," *Journal of Financial Economics* 38, 1995, pp. 3-28; A. Lo and A.C. MacKinlay, "Data-Snooping Biases in Tests of Financial Asset Pricing Models," *Review of Financial Studies* 3, 1990, pp. 431-467; Fama, E. and K.R. French, "Size and Book-to-Market Factors in Earnings and Returns," *Journal of Finance* 50, 1995, pp. 131-155; and Fama, E., and K.R. French, "Industry costs of equity," *Journal of Financial Economics* 43(2), 1997, pp. 153-193.

[43] The website is located at http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html.

*Regulatory Use*

The Fama-French model has been submitted in Australia, North America, and the U.K.[44] While U.S. decisions are only rarely explicit about how evidence was weighted, we are not aware of a U.S. decision that primarily relied on the Fama-French model. However, the U.K. Competition Commission used the model to determine whether a small company premium should be included in the cost of capital.[45] The Régie de l'énergie in Québec considered the Fama-French approach and found that the model had not been sufficiently examined to date to be used as a basis for setting the rate of return for a gas distributor.[46]

*Characteristics of the Fama-French Three-Factor Model*

Many of the Fama-French model characteristics are similar to those of the CAPM. It relies on a risk-free rate and an estimate of the market risk premium, so like the CAPM it is sensitive to developments in risk-free rates. Like the ECAPM, the Fama-French model captures the empirical observation that the Security Market Line predicted by the CAPM is too steep. The Fama-French model has two additional factors, which vary over time and therefore add to the variations in the cost of equity estimates over time.

### D. ARBITRAGE PRICING THEORY

The Arbitrage Pricing Theory (APT) was developed by Ross (1976a, 1976b)[47] as a multifactor alternative to the CAPM. The model is a theoretical approach to explaining the cross-section of returns with additional factors beyond the standard market portfolio in the Sharpe-Lintner CAPM. It is a one-period model in which all investors believe the stochastic properties of capital assets' returns are consistent with a factor structure. Assuming equilibrium prices offer no arbitrage opportunities, the expected returns on these capital assets are approximately linearly

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44 See, for example, Jemena Gas Networks (NSW) Ltd - Initial response to the draft decision - Appendix 5.2 - NERA: Cost of Equity – Fama-French Model; California Public Utilities Commission, "Decision 07-12-049," December 20, 2007; and U.K. Competition Commission, "Market Investigation into Supply of Bulk Liquefied Petroleum Gas for Domestic Use: Provisional Findings Report," August 2005, Appendix K.

45 See, for example, U.K. Competition Commission, "Market Investigation into Supply of Bulk Liquefied Petroleum Gas for Domestic Use: Provisional Findings Report," August 2005, Appendix K.

46 Régie de l'énergie, Décision D-2007-116, Gaz Métropolitain, pp. 23-24.

47 S.A. Ross, "Options and Efficiency," *Quarterly Journal of Economics* 90, 1976, pp. 75-89 and S.A. Ross, "The Arbitrage Theory of Capital Asset Pricing," *Journal of Economic Theory* 13, 1976, pp. 341-360.

related to the factor loadings. The factor loadings are proportional to the returns' covariances with the factors - much like in the CAPM.[48]

The empirical specification of the model is

$$E(r_S) = \beta_1 \cdot E(Factor1) + \beta_2 \cdot E(Factor2) + ... + \beta_N \cdot E(FactorN) \quad (6)$$

The APT is a generalization of the standard CAPM in that it allows for multiple risk factors and does not require the identification of the market portfolio. However, the theoretical APT only provides an approximate relation between expected asset returns and a combination of factors. Therefore, testability of the model depends on imposing several additional assumptions on the conditional distribution of returns. For example, exact factor pricing holds in an equilibrium intertemporal asset pricing framework. In this general model specification, the market portfolio is one pricing factor as in the standard CAPM, and additional factors arise from investors' need to hedge uncertainty about future investment opportunities. These factors can be specified as traded portfolios of assets, or macroeconomic variables that reflect the systematic risks of the economy, such as industrial production growth, changes in bond yield spreads or unanticipated inflation.

The key difference between factor specification in the APT versus the Fama-French model described above, is that the factors in the APT are theoretically motivated as hedging variables that capture economy-wide non-diversifiable risks, whereas the factors in the Fama-French model are empirically motivated, and are instead selected based on observing the firm characteristics that best explain the cross-section of returns over a specific sample period.

### E. DIVIDEND DISCOUNT MODEL

Although there are several versions of the Dividend Discount Model (DDM), all versions determine today's stock price as a sum of discounted cash flows that are expected to accrue to shareholders. Assuming that dividends are the only type of cash payment to shareholders, the pricing formula becomes:

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[48] For a brief introduction, see Gur Huberman, "Arbitrage Pricing Theory," in *The New Palgrave: Finance*, eds. J. Eatwell, M. Milgate, and P. Newman, 1989, pp. 72-80.

$$P_t = \frac{E_t(D_1)}{(1+r_S)} + \frac{E_t(D_2)}{(1+r_S)^2} + \frac{E_t(D_3)}{(1+r_S)^3} + \cdots \quad (7)$$

where "$P_t$" is the market price of the stock; "$D_i$" is the dividend cash flow at the end of period $i$; "$r_S$" is the cost of capital of asset/security $S$ (as before); and the sum is into the infinite future.[49] The formula above says that the current stock price is equal to the sum of the expected future dividends (or cash flows), each discounted for the time and risk between now and the time the dividend is expected to be received – with the cost of capital $r_S$ as the appropriate discount rate. The notion that the current stock "price equals the present value of expected future dividends" was first developed in 1938 by Williams and was then rediscovered by Gordon and Shapiro in 1956.[50]

### 1. Single-Stage DDM

If the dividend growth rate is constant, then we obtain the standard Gordon Growth model,[51] which can be shown to determine the cost of capital on security $S$ as:

$$r_S = \frac{D_O \times (1+g)}{P} + g \quad (8)$$

where g is the constant, periodical growth rate.

This equation says that the cost of capital equals the expected dividend yield (dividend divided by price) plus the (perpetual) expected future growth rate of dividends. As is readily seen from Equation (8) above, an implementation of the constant growth DDM requires a determination of the current stock price, current dividends, and the applicable growth rate.

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[49] With the convention that $D_i$ is zero for periods beyond the expected life of the asset.

[50] See Brealey, Myers, and Allen (2011), p. 82.

[51] Named after Myron J. Gordon, who published an early version of the model in "Dividends, Earnings and Stock Prices," *Review of Economics and Statistics*, Vol. 41, 1959, pp. 99-105.

### 2. Multi-Stage DDM

If the assumption of constant growth is not considered reasonable for several years before settling down to a constant rate, variations of the general present value formula can be used instead. For example, if there is reason to believe that investors do *not* expect a steady growth rate forever, but rather have different growth rate forecasts in the near term (*e.g.,* over the next five or ten years) converging to a constant terminal growth, these forecasts can be used to specify the early dividends in Equation (7). Once the near-term dividends are specified, Equation (8) can be used to specify the share price value at the end of the near term (*e.g.,* at the end of five or ten years), and the resulting cost of capital can be determined using a numerical solver. A standard ~~"~~multi-stage" DDM approach solves the following equation for $r_S$:

$$P = \frac{D_1}{(1+r_s)} + \frac{D_2}{(1+r_S)^2} + \ldots + \frac{D_T + P_{TERM}}{(1+r_S)^T} \quad (9)$$

The terminal price, $P_{TERM}$, is just the discounted value of all of the future dividends after constant growth is reached and $T$ is the last of the periods in which a near-term dividend forecast is made. The implementation of the multi-stage growth model requires, in addition to a current price and current dividend, the selection of growth rates for each stage of the model and a determination of the length of each period.

More recent DDM implementations have focused on variations of the multi-stage model described above. For example, the U.S. Surface Transportation Board relies on a version of the multi-stage DDM that uses cash flow rather than dividends and specifies three growth rates – a near-term company-specific growth rate, an intermediate industry-specific growth rate and a long-term economy-wide growth rate.[52] The STB version is identical to the model developed by Morningstar / Ibbotson, Ibbotson's ~~"~~three-stage" DDM, which is one of five models calculated for all U.S. SIC codes annually. In Ibbotson's version, dividends are replaced by cash flow (excluding extraordinary items) and the figure is normalized over a three-year period. The model then uses company-specific growth rates from analysts over the first five years, industry growth rates over the next five year and the GDP growth rate after year 10.

[52] See Surface Transportation Board, STB Ex Parte No. 664 (Sub-No. 1), ~~"~~Use of a Multi-Stage Discounted Cash Flow Model in Determining the Railroad Industry's Cost of Capital," January 28, 2009. The Alberta Utilities Commission, Decision 2009-216 (¶271) also specifies a preference for the multi-stage model.

Another example of more recent multi-stage DDMs used is the version frequently estimated by *Brattle*, where company-specific growth rates are used for the first five years while the long-term GDP growth rate is used from year 10 onwards. In the in-between years (6-10), the model assumes that the growth rates converge linearly from the company-specific rates to the GDP growth rate. Similarly, Professor Myers' report suggests that in many industries it is important to look at the total cash flow that accrues to shareholders rather than on a per share basis, because stock buyback programs make the per share figures less reliable. In this model, the fundamental variable being determined is the market value (total price) of a company rather than the price per share, and instead of looking to dividends per share the model uses total cash flow to shareholders.[53]

### 3. DDM Implementation Issues

To implement the DDM it is necessary to specify one or more growth rates and to determine whether (i) dividends accurately reflect cash flow to shareholders, (ii) the horizon over which to apply each growth rate if using a multi-stage model, and (iii) the exact determination of the initial stock price. In most applications, the choice of growth rate is the most controversial part of the DDM implementation and the determination of the stock price is the least controversial.

### 4. Characteristics of the DDM

As for the other models, many of the strengths and weaknesses of the DDM depend on its implementation. However, assuming a reliable implementation, some strengths of the DDM are:

- Both the single-stage and the multi-stage DDM rely on forward-looking information and hence estimate a forward-looking cost of equity.
- The models are usually easily replicated and are therefore easy to audit.

Among the weaknesses of the DDM are the following:

- The DDM relies on growth forecasts, which frequently are available only for 2-5 years.

[53] This revised method is explained in R. A. Brealey, S. C. Myers and F. Allen (2013), *Principles of Corporate Finance*, 11th Ed., McGraw-Hill Irwin, Ch. 16 (forthcoming).

- Because stock prices (and to a degree forecasted growth rates) change frequently, the model results often vary substantially over time.

Among the other issues to consider is the prevalence of stock buybacks, which means that dividends do not reflect all cash payments to shareholders. As mentioned above, some regulated entities have share buyback programs. In the pipeline industry, Spectra Energy, a U.S. based pipeline company, recently authorized share buybacks of $600 million for a little over 6% of its equity capital.[54]

Therefore, it is necessary to modify the model to take into account these cash transfers. In addition, for many companies, growth rates are only available on an infrequent basis, making the cost of equity estimates less forward-looking than ideal.

Both the single-stage and multi-stage DDM are frequently used in U.S. rate regulation to estimate the cost of equity. However, it is important to recognize that few U.S. regulators have a pre-specified methodology, but instead hear and review evidence from a variety of parties prior to issuing a decision on the cost of equity. Therefore, estimates from DDMs are only one of several pieces of evidence considered by most U.S. regulators. In addition, U.S. regulation was in place prior to the development of more market-based models such as the CAPM, and there is therefore a tradition to rely on the DDM.

### 5. Residual Income Model

One model that can be viewed as an extension of the multi-stage DDM is the residual income model, which relies on earnings or abnormal earnings instead of dividends. Broadly speaking, the model defines price as the sum of the book value of equity and the discounted present value of "abnormal" or "residual" earnings.[55] The model is a forward-looking methodology in that it generally uses analysts' forecasts to determine growth rates, although it uses historical earnings information to derive the current "residual income." The model is based on the so-called Ohlson-Juettner method, which like the multi-stage DDM allows growth rates to vary over time.

[54] See Spectra Energy, Form 10-K, 2008 p. 31.

[55] For an early exposition, see J. Ohlson, "Earnings, book values, and dividends in equity valuation," *Contemporary Accounting Research* 11, pp. 661-687.

Abnormal earnings are typically forecast using earnings estimates for one or two years ahead. Assuming that abnormal earnings in the long run grow at the assumed long-run rate, the model allows for a high short-term earnings growth rate that gradually declines to the long-term level. Technically, the model is appealing because it provides a closed form solution to the cost of equity based on few inputs, so that it is simple to implement.[56]

The Residual Income Valuation (RIV) method has been debated substantially in the accounting literature in recent years. Variations on this model have been cited in recent Australian cases – for example, the "residual income model" proposed by the DBNGP in its most recent access arrangement.[57] The model was also proposed to the STB, albeit the STB instead adopted Ibbotson's three-stage DDM model based on cash flows rather than dividends.

In a recent paper by Nekrasov & Shroff (2009)[58] the authors propose a valuation methodology that applies risk measures based on economic fundamentals directly into the valuation model, aiming to assess the differences in valuation derived from the use of fundamentals-based risk adjustments instead of the commonly used asset pricing models (estimated using historical returns). Note that this paper does not specifically address valuation and cost of equity for the regulated entities.[59]

The authors use the RIV model to derive an accounting-based risk adjustment, which is equal to the covariance between a firm's ROE and economic factors. Accounting risk factors are identified and used to construct a measure of risk adjustment, then applied to calculate firm value. Two components of value are estimated separately: the risk-free present value (RFPV) and

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[56] The model was also submitted for consideration to the U.S. STB; P.S. Mohanram, *Determining an Appropriate Cost of Capital for Railroads*, submission to the Surface Transportation Board, September 2007.

[57] See *Draft Decision on Proposed Revisions to the Access Arrangement for the Dampier to Bunbury Natural Gas Pipeline*, paragraphs 458-467. Tristan Fitzgerald, Stephen Gray, Jason Hall and Ravi Jeyaraj, 2010 "Unconstrained estimates of the equity risk premium," Working paper, The University of Queensland, http://ssrn.com/abstract=1551748 ("Fitzgerald et al.").

[58] A. Nekrasov & P. Shroff, "Fundamentals-Based Risk Measurement in Valuation," *The Accounting Review* 84, 2009, pp. 1983-2011.

[59] See example or models submitted in regulatory settings; see Fitzgerald et al. and Partha Mohanram, "*Determining an Appropriate Cost of Capital for Railroads*," Submission to the U.S. Surface Transportation Board, September 2007.

the covariance risk adjustment. The RFPV is calculated using a forecast of earnings, book value of equity and the risk-free rate as inputs to the model, while the covariance risk adjustment is estimated by calculating betas on the different risk factors and corresponding factor risk premia.

The authors acknowledge that this methodology ~~–m~~ay be more complex to implement than the returns-based cost of equity."[60] However, the authors conclude that the strong empirical performance of the one-factor accounting–beta model, combined with the need of few additional inputs for the estimation, justify its use in valuation applications.

### 6. Characteristics of the Residual Income Model

The pros and cons of the Residual Income Model are generally similar to those of the DDM model, but we note that the model considers earnings instead of dividends, so that if earnings and cash flows are reasonably consistent, this model better captures the totality of cash flow that accrues to shareholders.

## F. Other Models, Methods, Market Data and Evidence

### 1. Risk Premium Approaches

Some regulators in North America use a simplified version of the CAPM, the so-called risk-premium approach, which collapses the beta and risk premium to one figure and adds this figure to an interest rate. The debt instrument is either government bonds or utility bonds. The risk premium approach calculates the cost of equity, $r_S$, as:

$$r_S = r_D + \text{estimated risk premium} \qquad (10)$$

where $r_D$ is the return on a selected debt instrument. There are many versions of this model depending on the choice of the debt instrument, $r_D$, and the estimation of the risk premium. It is important to note here that the risk premium approach, while a generalized form of the CAPM, does not have the same level of theoretical support as the standard CAPM. This is because the return on the selected debt instrument used is not necessarily equal to the risk-free rate, and the

[60] *Ibid*. p. 1986.

estimated risk premium used is not explicitly based upon the product of the market beta and the MRP.

Equation (10) is frequently implemented using either a historical estimate of the risk premium, or a forward-looking or expected risk premium. The historical risk premium is commonly determined as the historical spread between equity and debt returns, so the primary choices for the analyst become which equity returns and debt instrument to use, as well as the period over which the spread (*i.e.*, the risk premium) is to be measured. It is not uncommon to see this model implemented using long-term government bonds or utility/corporate bonds to measure the cost of debt, while the equity investments used are typically either (a) realized accounting returns of regulated entities in the same industry, (b) realized stock returns of companies in the same industry, or (c) allowed returns on equity for the industry. In choosing a debt instrument to determine $r_D$, it is important that it be consistent with the debt instrument used to determine the risk premium. In other words, if a 10-year government bond is used to determine the historical risk premium, then $r_D$ must also be measured using a 10-year government bond. The realized risk premium is highly dependent on the time period over which it is estimated, so that choice is also important.

The forward-looking model requires that the analyst determine a proper measure of the expected cost of debt and estimates the expected risk premium going forward, rather than relying on historical data. Determining the expected equity return is more difficult and requires reliance on an estimation technique. It is common to rely on DDM models to determine the risk premium in the forward-looking version of the model. One result originating from these analyses of historical or forward-looking risk-premium approaches is that empirically there is a negative relationship between the risk premium and the yield-to-maturity. Historically, a 1% increase in the yield-to-maturity of government bonds results in less than a 1% increase in the estimated (or realized) return on common equity.[61] The relationship between the return on equity and

[61] For example, Roger A. Morin, ~~–~~*New Regulatory Finance*," Public Utilities Reports, Inc., 2006 pp. 128-129 summarizes several studies and found that the realized ROE changes approximately 50 basis points when government bond rates change 100 basis points. Regulatory agencies such as the Ontario Energy Board relied on this empirical finding as well as data submitted by experts in its recent hearing to update its annual change in the estimated cost of equity for Ontario utilities by less than the change in government bond rates.

(government or utility) bond yields is depicted in Figure 4 below. The figure is for illustrative purposes only and does not reflect an actual analysis of the relationship.

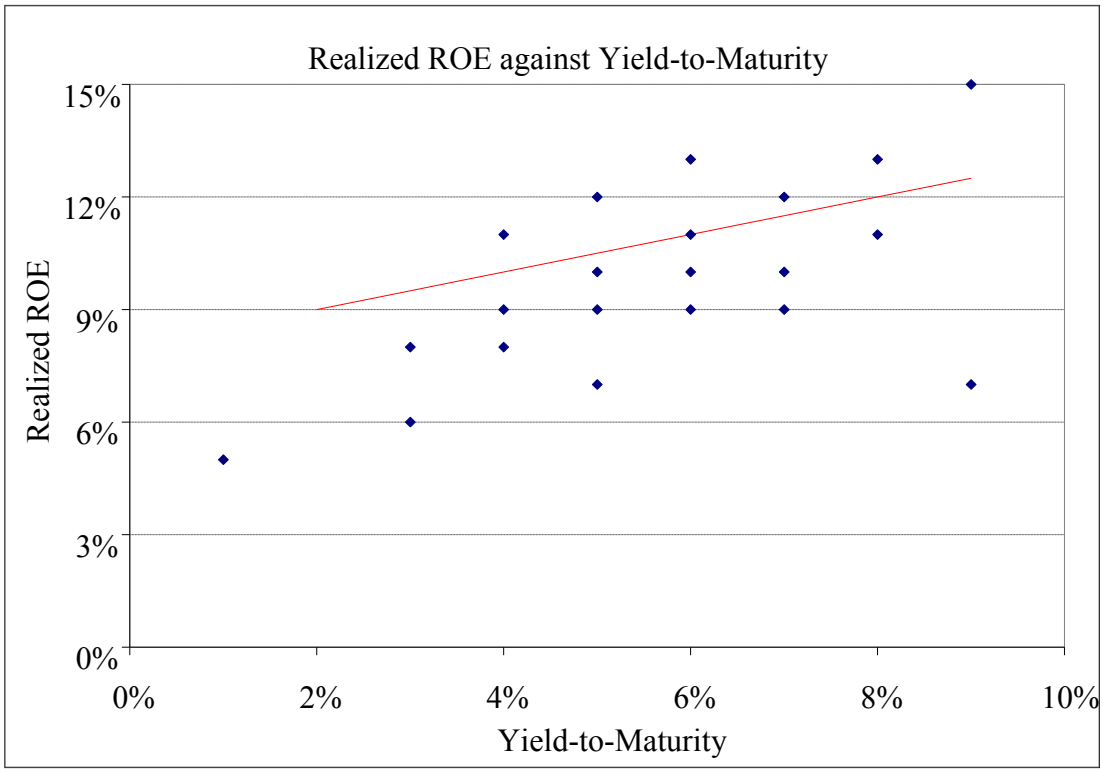


**Figure 4**

This is a reason why, for example, the Ontario Energy Board (OEB) took evidence from the risk premium approach into consideration when determining its baseline cost of equity in 2009.

### 2. Build-up Method

The build-up method estimates the return on an asset as the sum of a risk-free rate and one or more risk premia that represent the rewards an investor receives for taking on a specific risk:[62]

Cost of Equity = Risk-Free Rate + Market Risk Premium
+ Firm Size Premium + Industry Premium
+ potentially other factors

[62] *Morningstar Ibbotson SBBI Valuation Edition 2012 Yearbook*, p. 27.

Each of the components of the build-up method is discussed in detail below:

- The Risk-Free Rate is calculated using either Treasury bills ("T-bills") or long-term government bonds.
- The Market Risk Premium reflects the compensation above the return on a risk-free asset that investors require for the additional market risk they bear by investing in a well-diversified market portfolio of risky assets. Ibbotson calculates this as the difference between the total expected return on the market portfolio and the risk-free rate.
- The Firm Size Premium may be included to account for the additional risk inherent in small company stocks. A firm size premium can either be adjusted or unadjusted for the effect that a small company stock's higher beta has on its excess return. To illustrate the magnitude of the size premium, Table 1 below shows the empirically observed size premium for U.S. companies as reported by Ibbotson Associates.

| | Beta-Adjusted Size Premia (%) | Non-Beta-Adjusted Small Stock Premia (%) |
|---|---|---|
| Mid-Cap | 1.1 | 1.9 |
| Low-Cap | 1.9 | 3.4 |
| Micro-Cap | 3.9 | 6.3 |
| Small Company Stocks | 3.1 | 4.7 |

**Table 1: Ibbotson Associates' Size Premia on a Beta-Adjusted versus Non-Beta-Adjusted Basis, 1926-2011[63]**

- An Industry Premium can be determined based on the characteristics of the regulated entity's industry. Research has produced no consensus on this figure and Ibbotson notes that it is important to avoid double-counting industry risk by using other beta-adjusted (hence industry dependent) risk premia (positive or negative) and at the same time adding an industry premium.

[63] *Morningstar Ibbotson SBBI Valuation Edition 2012 Yearbook*, p. 27.

In addition to the factors discussed above, some argue for the inclusion of minority discount premia, control premia, key person discount, *etc.* However, these additional premia (positive or negative) are very difficult to measure and we know of no regulator that has included such additional factors. The New Mexico Public Regulation Commission in the U.S. has in the past used the build-up method as one of its methods to estimate the cost of equity.

### 3. Comparable Earnings

The comparable earnings method requires the analyst to go through three steps. First, a group of *unregulated* companies is required because the realized accounting rate of return of a regulated company depends on its allowed return. Using regulated companies to estimate the comparable earnings cost of capital would be circular, *i.e.*, the allowed rate of return is used to determine the allowed rate of return. However, the use of unregulated companies requires careful consideration of the risk characteristics of the companies and the comparability to those of the target utility.

Second, a time period over which to estimate the return on equity must be selected. Because a company‘s achieved earnings fluctuate from year to year and depend substantially on both company-specific and economy-wide factors, it is necessary to include companies from several industries, averaged over several periods.

Third, because the comparable companies are unregulated entities, it is necessary to adjust for any risk differences between the sample companies and the target company. There are many ways to adjust for risk differences, so the following is a simplified description of some common approaches rather than an exhaustive review. Analysts often collect information on the comparable companies‘ and the target company‘s bond ratings, asset betas, DDM estimates of the cost of equity, and other measurable risk factors. In many instances, this information is also collected for a sample of regulated companies in the same industry as the target company. If the sample companies are found to be consistently more (less) risky than the target company and its industry peers, then an adjustment is made to the required return on equity. This can sometimes be done formally. For example, if the sample companies‘ DDM estimates of cost of equity are consistently 25 basis points higher (lower) than the DDM estimates for the target company (or industry peers), then a downward (upward) adjustment of 25 basis points is made. For other

measures, it is more difficult to determine the exact adjustment, so it is usually made based on the analyst's experience. For example, does a two notch difference in bond rating require a specific upward or downward adjustment? Thus, while the differences are relatively easy to measure, the adjustment for such differences requires subjective judgment.

A major issue is whether realized book returns are a good proxy for the returns that investors expect going forward. From a statistical perspective, the realized accounting return on book equity for any given period is the realization of a single outcome of a distribution, whereas the expected return represents the probability-weighted average of all possible outcomes of the distribution. These two figures can differ substantially. In addition, there are practical problems with the implementation of this model because financial reporting occurs with a lag, which during times of change can mean that the results are out of date.

### 4. Market-to-Book and Earnings Multiples

In some regulatory decisions on the cost of capital, regulators have sought to "cross check" a proposed cost of capital estimate by examining the market value of the firms they regulate relative to the value of the regulatory asset base (RAB). The theory behind this approach would be that the only capital on which the regulated firm is earning a return (at the regulator-determined cost of capital) is the RAB. Therefore, if the market value of the firm's returns is greater than the RAB, the belief is that it is a signal that investors are discounting future returns at a lower discount rate than the regulator's cost of capital determination — or, in other words, the regulator's cost of capital is "too high".

This kind of cross check approach was cited by the Australian Energy Regulator in its June 2011 determination on Envestra.[64] In that decision, the AER considered two kinds of evidence: premiums paid in takeover transactions relative to the value of the RAB, and market values (based on share prices) relative to RAB.

[64] *Final Decision - Envestra Ltd Access arrangement proposal for the Qld gas network*, AER (June 2011), p. 35-37.

### *a) Takeover premiums*

The AER reviewed premiums paid in takeover transactions, where the premium was assessed as the sale price relative to the value of the underlying RAB. Premiums were in the range of 20% to 120%. The AER considered that these premiums were too large to be explained by factors such as expected synergies, and instead considered this as evidence that the cost of capital determined by regulators has been at least as high and likely higher, than the actual cost of capital faced by the businesses.

However, there are conceptual problems with this approach so that it has no value as a cross check on a regulator's cost of capital determination. First, the reliance on the approach implicitly assumes that (i) the company to which it is applied consists entirely of regulated businesses and (ii) that the regulator's cost of capital determination is the only factor impacting the market value of the company. In reality the cost of equity is only one component of a broader determination on what the firm's regulated rates should be. Thus, even if it were possible to estimate the impact of the regulator's decision on the market value of the firm, this impact would be associated with the overall decision, not with any one specific component (like the cost of capital). The market value of a regulated firm can be thought of as the expected future cash flows (from providing services at regulated rates), discounted at the firm's actual cost of capital. However, the regulator's cost of capital determination is only one of many factors which determine expected future cash flows, particularly where price determinations are forward-looking (as in Australia):

- If investors expect the firm to "beat" regulator assumptions on any of operating costs, capital costs, or revenue growth, expected future cash flows would be larger than the RAB in net present value terms, even if the discount rate is equal to the regulator-determined cost of capital.
- Investor expectations, which are implicit within the firm's market value, encompass expected cash flows beyond the end of the current price control period.
- Expected future cash flows are also affected by firm-specific factors such as idiosyncratic volatility, which would not be captured in the discount rate.

In addition, there are likely to be other more practical difficulties: for example, many regulated firms have at least some unregulated activities. These activities are valued by investors but are not part of the RAB or the regulator's cost of capital decision.

### *b) Trading premiums*

The AER also considered premiums measured on the basis of market value of listed firms (from share prices) relative to RAB. The AER estimated market-to-RAB trading multiples for four firms (including Envestra).[65] The trading multiples were in the range of 1.21 to 1.81.

The AER stated that these premiums were too high to be the result of factors such as expected synergies, and instead considered this as evidence that the cost of capital determined by regulators has been at least as high and likely higher, than the actual cost of capital faced by the businesses. However, the same difficulties described above for takeover premiums also apply to the consideration of trading premiums. In addition to the takeover premiums difficulties, the use of trading premiums suffers from bias in circumstances where the market is very volatile, where day-to-day changes reflect investor reactions to news such as the collapse of Lehman Brothers in September 2008, the ongoing European debt crisis, or industry factors such as cap and trade initiatives, etc. Therefore, trading premiums also have no value as a cross check on the regulator's cost of capital determination.

## 5. Other Evidence

Other evidence is a very broad category that does not readily lend itself to a short introduction by method. However, expert evidence can be highly valuable if of high quality, so it will be necessary to use judgment and consider how the expert arrived at his or her recommendations. Similarly, academic research may provide insights into the cost of equity, but bear in mind that most academic research focuses on finding or explaining ~~"in~~teresting facts" and often considers all companies and industries for which data are available. Because a result pertains to the market

[65] The four firms were SP Ausnet, Spark, Duet and Envestra (*Ibid.*, Table 5.5).

as a whole, it does not necessarily pertain to a specific industry, which may have unique characteristics.

Other types of evidence that are sometimes considered are equity analysts' reports on a specific company, an industry, or a market. When such evidence is reviewed, it is important to consider the purpose for which the evidence was produced. For example, equity analysts often produce research documents aimed at stock-buying investors and only rarely are concerned with the cost of equity over, for example, a regulatory period. Instead, equity analysts attempt to determine the current (or future) stock price as the discounted sum of future cash flows with the discount rate being the weighted average sum of the cost of debt and equity; *i.e.*, the focus is not on what the best estimate of the cost of equity is – it is merely one of many inputs to determining the stock price. In addition, because a lower cost of equity increases the estimated stock price, equity analysts have an incentive to, if anything, bias the cost of equity estimates downward.

### 6. Characteristics of Other Methods, Models, Market Data and Evidence

The methods, models, market data and other evidence in this section differ, so the advantages and disadvantages listed below are method-specific:

- The risk premium model is simple and data for its implementation are readily available.
- If the benchmark interest rate is a utility or corporate bond index, then the risk premium model tends to provide relatively stable results over time and is less impacted by monetary policy or country-specific risks than the CAPM.
- The build-up method recognizes size effects and potentially other risks.
- The comparable earnings method's strength is that it incorporates information from non-regulated entities.

Among the weaknesses of the methods we note the following:

- None of the methods are founded in economic or finance theory.
- The risk premium approach does not consider systematic risk specifically and does not allow for company-specific information to be considered.

- The build-up method generally does not consider systematic risks and treats size effects the same across industries.
- The comparable earnings model relies on historic accounting information, which may not be consistent with investor expectations. Also, the historic accounting information may reflect accounting choices rather than economic fundamentals and may be subject to significant variability over time.

As for other evidence such as expert reports and investment reports, the merits of the derived estimates are highly dependent upon the quality of the reports and the purpose for which the estimates were derived. We caution against placing weights on estimates where the purpose for their derivation is not known, and against placing substantial weight on estimates that were derived for purposes other than to provide an independent assessment of the cost of equity. For example, estimates derived for accounting purposes, stock recommendations, *etc.* may not be suitable for other uses.

This section has summarized the major models, methods and evidence that are currently used and considered by regulators and practitioners. The models described above are not intended to comprise an exhaustive list of all possible methods and evidence that could be relied upon in determining the cost of equity capital. Indeed, as the practice of finance continues to evolve, further relevant evidence may still be found, and certain models may become outdated or less relevant.

## IV. USING THE METHODS

In this section, we first discuss implementation issues for estimating the cost of capital and summarize the key characteristics of the models described above in *Section III*. We then address the issue of how and when to use the models to determine an appropriate regulatory return on equity, or range for the regulatory return on equity for the industry or benchmark, based on the views of academic, practitioners and regulators. Finally, we discuss how to position a target entity relative to a sample of companies.

### A. IMPLEMENTATION ISSUES

Regardless of the cost of equity estimation method that is used to estimate the cost of capital, there are some key elements of the cost of capital estimation process that must be addressed. This section discusses some of the important issues.

Most analysts rely on a "comparable sample" to determine the cost of equity for the target entity, so it becomes important to determine what is meant by comparable.[66] Although the selection of comparable companies is method and context-specific, it is generally viewed as ideal to have sample companies with business risk similar to that of the target company. Similar business risk generally implies selecting companies in the same line of business. Most researchers and practitioners rely on additional criteria to exclude sample companies that have the potential to bias the cost of capital estimation methodologies. For screening, it is preferable to rely on objective information from publicly available data sources; however, the determination of exactly which criteria to use is subject to the constraint that the sample be "large enough." This, in turn, requires a determination of which criteria are the most important from the many possible criteria that could be considered. Among the criteria typically employed are combinations of the following:

- Include companies with similar business risks (*e.g.,* companies in the same or similar industries);
- Exclude companies that face financial distress;
- Exclude companies that are or have recently been involved in substantial merger and acquisition activity;
- Exclude companies with unique circumstances that may bias the cost of capital estimation (*e.g.,* restatements of financial statements); and
- Exclude companies with insufficient data.

[66] A comparable sample can be used to assess the cost of capital for the target entity by (i) estimating the individual companies' cost of capital and placing the target company's cost of capital in relation to the sample using the average, median, range, or other measure to assess the cost of capital or (ii) using a portfolio approach, where the cost of capital for the portfolio of companies (rather than individual companies) is estimated to assess the cost of capital for the target entity.

There is, however, controversy about how to implement the criteria above. Each element of the sample selection criteria requires some judgment. For example, what size sample is "large enough"? Should the sample include both Australian and foreign companies?[67] How is financial distress measured? How is "substantial merger and acquisition" activity to be defined? The selection criteria are interrelated, because selection of the sample based upon one criterion may immediately reduce the potential sample to a small number of companies. The sample selection process is, therefore, a balancing act between selecting a sample that is "more comparable" and one that is "too small."

Second, decision makers must decide how the components of the cost of capital will be determined. For example, it is possible to estimate (a) the cost of debt, the cost of equity and the capital structure, each separately or (b) an overall cost of capital or (c) a combination of these. Another component of the cost of capital is the allowance for income taxes, which we ignore in this report. Finally, because the dollar amount that accrues to investors in a regulated entity ultimately depends on not only the allowed cost of equity and the size of the rate base but also on the relative share of equity and debt in the capital structure, it is important to consider the overall impact of these capital structure decisions on the individual components. Specifically, it is important to note that cost of equity estimation models provide estimates that reflect both the underlying business risk of the assets but also the financial risk inherent in how those assets have been financed.

### B. SUMMARY CHARACTERISTICS OF THE MODELS

Before we discuss how to use the various models and other information that may be available to a decision maker, we summarize in Table 2 below the key characteristics of the discussed models in the form of their economic underpinnings, any potential empirical bias, sensitivity to economic or industry factors, and whether the models are forward or backward-looking.

[67] For example, several Canadian regulators have used beta estimates from U.S. companies. See, for example, the National Energy Board's RH-1-2008 decision p. 67 and Ontario Energy Board's EB-2009-0084 decision, pp. 22-23.

**Table 2: Characteristics of Cost of Equity Methods**

| | Evaluation Criteria | | | |
|---|---|---|---|---|
| **Cost of Capital Methods** | **Economic Underpinnings** | **Bias** | **Impact of Market Conditions** | **Forward or Backward-Looking** |
| **Sharpe-Lintner CAPM** | An equilibrium model: Under no arbitrage and in a mean-variance-optimizing world, the expected cost of equity is a function of the risk-free rate, systematic risk (beta) and the expected MRP.<br><br>Transparent and sensitive to market performance and risk-free rates.<br><br>Empirical support for explaining cross-sectional returns of average-beta stocks, but failure for low-beta/high-beta/small/high book-to-market firms. | Empirical evidence that CAPM under-estimates the expected return for low-beta stocks.<br><br>A Portfolio approach to estimate betas provides more consistent results.<br><br>MRP estimation controversial with some historical measures potentially biased. | Sensitive to monetary policy.<br><br>Market uncertainty and economic turmoil likely to affect the expected MRP. | Beta estimates are backward-looking.<br><br>Historical MRP is backward-looking, but forecast MRP (e.g., DDM) are forward-looking. |
| **ECAPM** | Same as above, but captures the empirical observation that the SML predicted by CAPM is too steep. Tested in the U.S., but not extensively outside the U.S. or in recent market conditions. | Corrects for the empirical bias induced by the flatter-than-predicted-by-CAPM Security Market Line. | Same as above. | Same as above. |

**(Table 2 ctd.) Characteristics of Cost of Equity Methods**

| | Evaluation Criteria | | | |
|---|---|---|---|---|
| **Cost of Capital Methods** | **Economic Underpinnings** | **Bias** | **Impact of Market Conditions** | **Forward or Backward-Looking** |
| **Consumption-Based CAPM** | Generalization of the Sharpe-Lintner CAPM that relates the risk premium on the investment to the covariance between the asset return and the intertemporal marginal rate of substitution of the decision maker. The expected conditional risk premium on an asset is related to its predicted conditional volatility.<br><br>Requires more data and more refined estimation techniques than the Sharpe-Lintner CAPM. Lack of empirical support for most commonly used version (where covariance factor is aggregate consumption growth), but more support for versions with market frictions/time-varying risk aversion. | Allows for expected risk premium to vary with asset and investor characteristics, including conditional volatility and covariance with consumption growth; (considers more factors than the Sharpe-Lintner CAPM). Potentially mitigates empirical biases. | Empirical results appear stable and consistent over time (i.e. more robust to market conditions than standard CAPM). | Models forward-looking equity risk premia based on predicted conditional volatility. More forward-looking than Sharpe-Lintner CAPM. |

**(Table 2 ctd.) Characteristics of Cost of Equity Methods**

| | Evaluation Criteria | | | |
|---|---|---|---|---|
| **Cost of Capital Methods** | **Economic Underpinnings** | **Bias** | **Impact of Market Conditions** | **Forward or Backward-Looking** |
| **Fama-French Model** | Corrects for empirical biases of Sharpe-Lintner CAPM by adding 2 explanatory risk factors (size and book-to-market).<br><br>Empirical support for explaining cross-sectional returns of size- and book-to-market-sorted portfolios. Weak empirical support for explaining returns of other portfolios and for out-of-sample predictive power.<br><br>Fama-French factors (SMB and HML) are empirically motivated.[1] | Captures empirical observation that SML predicted by CAPM is too steep. Adds cross-sectional explanatory power to the standard CAPM. | Sensitive to monetary policy.<br><br>Estimates of the 3 factor risk premia vary substantially over time and more so when the 3 factors interact. | Betas and factor risk premia estimates are backward-looking. |
| **APT Model** | Equilibrium multifactor model which holds under competitive markets, factor structure for asset returns, and absence of arbitrage in large economies. Corrects for empirical biases of Sharpe-Lintner CAPM by adding explanatory risk factors.<br><br>APT factors are theoretically motivated. Model implemented empirically as intertemporal CAPM (see above for empirical issues). | Same as above. | Sensitive to market uncertainty and economic turmoil via market-related factor.<br><br>Estimates of factor risk premia can vary substantially over time. | Forward-looking model in theory, but betas and factor risk premia are backward-looking if estimated using historical data. |

1) See Fama and French (1993), Kothari, Shanken, and Sloan (1995), Black (1993), MacKinlay (1995), and Lakonishok, Shleifer, and Vishny (1994) for additional detail.

**(Table 2 ctd.) Characteristics of Cost of Equity Methods**

| | Evaluation Criteria | | | |
|---|---|---|---|---|
| **Cost of Capital Methods** | **Economic Underpinnings** | **Bias** | **Impact of Market Conditions** | **Forward or Backward-Looking** |
| **Risk Premium Model** | Simplified version of the CAPM, which collapses the beta and market risk premium to one figure and adds this figure to an interest rate.<br><br>Based on empirical estimation.<br><br>Does not capture systematic risk or company-specific information. | The relied upon interest rate may be biased due to, *e.g.*, monetary policy.<br><br>Does not account for changes in the risk premium. | Using a utility or corporate bond index as the benchmark, the risk premium model tends to provide relatively stable results. Reliance on government interest rates makes the model more sensitive to monetary policy.<br><br>Inflation leads to bias in the risk premium model, because the historical data underlying the estimate of the risk premium may not be consistent with the current level of inflation. | Mostly backward-looking due to reliance on a historic spread of realized equity returns over debt returns to measure the risk premium, and thus does not capture expected changes in the economy. |
| **Single-Stage DDM** | Determines today's stock price as the sum of the discounted cash flows that are expected to accrue to shareholders going forward.<br><br>Assumes that dividends (or cash flows) grow at a constant rate forever.<br><br>Lack of empirical support for constant dividends/earnings growth rates in perpetuity. | Sensitive to bias in analyst forecasts of earnings growth rates which at best reflect 5 years. Less of an issue for utilities than most other industries.<br><br>Sensitive to the exact implementation as dividends may not reflect all cash flow if the company engages in share repurchases or borrows to fund dividends.<br><br>Does not take real options into account and will underestimate the cost of equity for companies with substantial real options. | Model requires the constant-growth assumption.<br><br>Estimates are sensitive to changes in stock prices and forecasted growth rates, which is especially an issue if the industry is in transition.<br><br>Stock prices are influenced by the information available to investors. Information about financial distress or merger and acquisition activities may overwhelm fundamental information about growth. | Relies on forecasted (i.e. forward-looking) growth rates and current stock prices. Hence estimates are forward-looking. |

(Table 2 ctd.) Characteristics of Cost of Equity Methods

| | Evaluation Criteria | | | |
|---|---|---|---|---|
| **Cost of Capital Methods** | **Economic Underpinnings** | **Bias** | **Impact of Market Conditions** | **Forward or Backward-Looking** |
| **Multi-Stage DDM** | Extension of single-stage DDM which allows for different growth forecasts over time. Stronger empirical support than constant growth version. | Same as above, but less sensitive to any bias in analyst forecasts than the single-stage DDM, as growth rates usually converge to the GDP growth rate over time. | Requires a series of growth rates; commonly near-term, interim, and for the very long- term.<br><br>Sensitivity to growth rates is moderated.<br><br>Similarly to single-stage DDM, less applicable to companies in financial distress or engaged in merger or acquisition activities. | Same as above. |
| **Residual Income Method** | Version of the multi-stage DDM that values abnormal or unforeseen earnings instead of dividends. Abnormal earnings are forecast using earnings estimates for one or two years ahead. Allows growth rates to vary over time. Abnormal earnings are based on empirical estimates. | Considers earnings instead of dividends or cash, so if earnings reflect expectations better than dividends or cash, it reduces bias. | Same as above.<br><br>Performance relative to multi-stage DDM depends on implementation of each. | Same as above. |

**(Table 2 ctd.) Characteristics of Cost of Equity Methods**

| | Evaluation Criteria | | | |
|---|---|---|---|---|
| **Cost of Capital Methods** | **Economic Underpinnings** | **Bias** | **Impact of Market Conditions** | **Forward or Backward-Looking** |
| **Build-up Method** | Estimates the return on an asset as the sum of a risk-free rate and several risk premia that measure risks associated with size, industry, etc.<br><br>Based on empirical estimation. | Recognizes size effects and other industry or company-specific risks.<br>Exposed to same potential biases as standard CAPM and Fama-French models. | Exposed to same market uncertainties as standard CAPM and Fama-French models. | If risk factors and factor loadings are estimated from historical data, then the model is backward-looking. |
| **Comparable Earnings** | The model calculates the realized accounting rate of return on book equity of comparable (usually non-regulated) companies.<br><br>Based on empirical estimation.<br><br>Uses accounting returns rather than market data. | Selecting a sample of non-regulated comparable companies may lead to bias.<br><br>Accounting changes can produce changes in model estimates without any change in the underlying cost of capital.<br><br>The choice of estimation period may bias the accounting return on equity as accounting returns vary with economy, industry and company-specific factors. | Realized accounting returns are sensitive to economic, industry and company-specific events as well as to changes in accounting rules. | Uses backward-looking realized accounting rates of return, hence backward-looking.<br><br>Can be difficult to find a time period that accurately reflects the expected horizon of the regulated entity. |

### C. HOW TO USE THE MODELS AND OTHER INFORMATION

In this section we discuss how academics, practitioners and regulators think models should be used and how they have been used. The section also discusses the impact of economic conditions, industry factors and company-specific issues on the choice of models. The weight assigned to each model naturally depends on the key characteristics of the cost of equity estimation models described above. Finally, the section discusses how certain regulators have decided to use the models in specific economic environments.

#### 1. Views of Academics, Practitioners and Regulators

Academics, practitioners and regulators have all acknowledged that there is no one way to determine the cost of equity. In the academic literature, several prominent researchers have commented that the use of more than one method is important. For example, Professor Myers of the Massachusetts Institute of Technology commented:

> Use more than one model when you can. Because estimating the opportunity cost of capital is difficult, only a fool throws away useful information. That means you should not use any one model or measure mechanically or exclusively. Beta is helpful as one tool in a kit, to be used in parallel with DCF models or other techniques for interpreting capital market data.[68]

Professors Berk and DeMarzo of Stanford University in their corporate finance textbook comment on the use of the CAPM, DDM, and other models by practitioners, and state:

> In short, there is no clear answer to the question of which technique is used to measure risk in practice — it very much depends on the organization and the sector. It is not difficult to see why there is so little consensus in practice about which technique to use. All the techniques we covered are imprecise. Financial economics has not yet reached the point where we can provide a theory of expected returns that gives a precise estimate of the cost of capital. Consider, too, that all techniques are not equally simple to implement. Because the tradeoff between simplicity and precision varies across sectors, practitioners apply the technique that best suit their particular circumstances.[69]

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[68] Stewart C. Myers, "On the Use of Modern Portfolio Theory in Public Utility Rate Cases: Comment," *Financial Management*, Autumn 1978.

[69] Jonathan Berk and Peter DeMarzo, *Corporate Finance: The Core*, 2009, (Berk & DeMarzo 2009) p. 420.

Looking to practitioners' views, the widely used text, *Ibbotson Cost of Capital Yearbook*,[70] reports results on the cost of equity (and associated weighted average cost of capital) by SIC code in the U.S. and other countries. In doing so, the yearbook reports the estimated cost of equity using five estimation methods: Sharpe-Lintner CAPM, CAPM plus/minus a size premium, Fama-French 3-Factor model, Single-Stage DDM, and 3-Stage DDM. The data source does not provide specifics on how to use the data but states that:

> [r]eaders can select cost of equity from five different models explored in this book. Given the size of the database being analyzed, there will clearly be instances where certain cost of equity models will fail to produce useable numbers. When NMF is displayed in a cost of equity column, it indicates that the model is producing unreasonable numbers, and greater emphasis should be placed on other models.[71]

Similarly, Roger A. Morin, in the context of U.S. regulation, mentions the use of the CAPM, DDM, risk premium models, and the comparable earnings method, concluding:

> No one individual method provides the necessary level of precision for determining a fair return, but each method provides useful evidence to facilitate the exercise of an informed judgment. Reliance on any single method or preset formula is inappropriate when dealing with investor expectations because of possible measurement difficulties and vagaries in individual companies' market data.[72]

Looking to regulators, the U.S. Surface Transportation Board (STB) undertook a review of its cost of equity estimation methodology in 2007-09 in two rounds, focused on the CAPM and DDM respectively. The STB's review resulted in two decisions with detailed instructions on how to estimate the cost of capital for the railway industry.[73]

In connection with this review, the STB noted:

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[70] The most recent version is Morningstar, *Ibbotson Cost of Capital 2012 Yearbook* (Ibbotson 2012).

[71] Ibbotson 2012, p. 6. The text views cost of equity estimates below the risk-free rate and above 50 percent as being not meaningful.

[72] Roger A. Morin, *New Regulatory Finance*, Public Utilities Reports, Inc., 2006, (Morin 2006) p. 428.

[73] Surface Transportation Board, STB Ex Parte No. 664, "Methodology to be Employed in Determining the Railroad Industry's Cost of Capital," January 17, 2008 (STB 2008) and STB Ex Parte No. 664 (Sub-No. 1), "Use of a Multi-Stage Discounted Cash Flow Model in Determining the Railroad Industry's Cost of Capital," January 28, 2009 (STB 2009).

> While CAPM is a widely accepted tool for estimating the cost of equity, it has certain strengths and weaknesses, and it may be complemented by a DCF model. In theory, both approaches seek to estimate the true cost of equity for a firm, and if applied correctly should produce the same expected result. The two approaches simply take different paths towards the same objective. **Therefore, by taking an average of the results from the two approaches, we might be able to obtain a more reliable, less volatile, and ultimately superior estimate than by relying on either model standing alone** [emphasis added].[74]

In arriving at this conclusion, the STB took notice of comments from the Federal Reserve that ―multiple models will improve estimation techniques when each model provides new information,"[75] and also stated that there is ―robust economic literature confirming that, in many cases, combining forecasts from different models is more accurate than relying on a single model."[76]

Similarly, the Ontario Energy Board (OEB) reviewed its cost of capital estimation methodology in 2009 following a year-long process. For context, the OEB does not focus on the cost of equity, but instead determines the premium over the risk-free rate that rate-regulated utilities are allowed. Regarding the methods used to determine the so-called Equity Risk Premium (ERP), the OEB concluded:

> **the use of multiple tests to directly and indirectly estimate the ERP is a superior approach to informing its judgment than reliance on a single methodology**.[77]

Additional examples of regulators who have relied upon multiple cost of equity estimation models and/or judgment based on a range of evidence are discussed in the section below.

To sum up, as clearly illustrated above, many academics, practitioners and regulators find that it is preferable to use more than one estimation method to determine the cost of equity. We agree that it is important to use more than one estimation method and stress that in determining how to

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[74] STB 2008, p. 2.

[75] STB 2009, p. 15.

[76] STB 2009, p. 15.

[77] Ontario Energy Board, ―EB-2009-0084, Report of the Board on the Cost of Capital for Ontario's Regulated Utilities," Issued December 11, 2009, p. 36 (emphasis in the original).

weigh the estimation results, it is important to consider the degree to which the information from the methods overlaps versus providing additional information, the economic and financial environment that gave rise to the estimates, and the context in which they are being used.

### 2. Regulatory Practice in using Multiple Models

#### *a) The U.S.*

In the U.S., rates for rate-regulated entities are determined by several federal entities as well as regulators in each of the fifty states and the District of Columbia. Federal regulators tend to have well-specified methods to determine the cost of equity although they review all the information put to them. However, state regulators typically do not specify one single method and commonly have evidence from several estimation methods and parties in front of them before issuing a decision on the allowed cost of equity. In most cases the state regulator does not specify which weight was assigned to each method or other evidence. An exception is the determination of the cost of equity in Mississippi Power's Performance Evaluation Plan (PEP), where the Mississippi Public Service Commission annually updated the cost of equity for the company using a combination of the CAPM, ECAPM, risk positioning, and the DDM. In this specific circumstance, the weights assigned to each method are predetermined.[78] Some other examples of U.S. regulators' thought processes are provided below.

*Surface Transportation Board*

The STB used the constant growth model to track the cost of equity for U.S. railroads for a number of years. However, by 2005 the largest railroads were expanding rapidly and profitability was increasing. Security analysts were forecasting "long-run" earnings growth for some railroads at 15% per year. Such growth could not be sustained, so the constant growth model overstated the true cost of equity by a wide margin. The STB therefore initiated a cost of capital proceeding to consider how to change the determination of the cost of equity. After hearing evidence from academics and practitioners, the STB found that:

[78] http://www.psc.state.ms.us/.

> if our exploration of this issue has revealed nothing else, it has shown that there is no single simple or correct way to estimate the cost of equity for the railroad industry, and countless reasonable options are available.[79]

As a result of its deliberations the STB eventually settled on a blend of the CAPM and a multi-stage DDM.[80]

*Georgia*

The following example pertaining to Georgia Power, an integrated electric utility, illustrates a common approach in U.S. state regulation.

Georgia Power is regulated by the Georgia Public Service Commission (Georgia PSC), which has no pre-set method to determine the cost of equity. In Georgia Power's 2010 rate case, an expert for Georgia Power as well as for the Georgia PSC submitted evidence on the cost of equity for the company. The company's expert estimated the cost of equity using the Sharpe-Lintner CAPM, a single-stage DDM, and a risk premium approach, and recommended a return on equity of 11.0 to 11.2%. The PSC staff expert estimated the cost of equity using the Sharpe-Lintner CAPM, a sustainable growth DDM and also a comparable earnings model for a recommendation of 9.50 to 10.75%. The Georgia PSC approved a settlement including a cost of equity of 11.15%, but did not specify how it was arrived at.[81]

### *b) Canada*

Until the early 1990s, Canadian regulators, much like U.S. state regulators, heard evidence on a multitude of methods and from various experts before arriving at a decision on the allowed cost of equity. However, starting in British Columbia in 1994, the British Columbia Utilities Commission in the first generic cost of capital proceeding in Canada established a benchmark ROE and a formulaic approach to updating the allowed ROE annually.[82] Shortly thereafter, other Canadian regulators followed suit and similarly established a benchmark ROE and an

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79 *U.S.* Surface *Transportation Board, Ex Parte 664 (Sub-No. 1)*, issued January 28, 2009, p. 15.

80 *Ibid.*

81 Direct Testimony of J.H. Vande Weide in Docket No. 31958; Direct Testimony of D. Parcell in Docket No. 31958, and Settlement Agreement in Docket No. 31958.

82 BCUC Decision in the Matter of Return on Common Equity BC Gas Utility Ltd., Pacific Northern Gas Ltd., West Kootenay Power Ltd., June 10, 1994 (BCUC 1994 Decision), pp. 39-40.

annual updating formula. These formulae were linked to the change or forecasted change in government bond yields.

While the formula used to update the allowed ROE annually was mechanical, the methods used to estimate the benchmark ROE varied across jurisdictions, and in many jurisdictions, the regulator looked to more than one estimation method.[83]

As the yield on government bonds declined, so did the allowed cost of equity, and as the financial crisis of 2008 impacted financial markets, regulators in Canada abandoned or modified the formula or the relied-upon benchmark. As was the case for the originally developed benchmark, the regulators heard evidence on multiple methods from several experts and implicitly or explicitly weighted these methods to arrive at a new or modified cost of equity methodology.[84] Some examples of this regulatory approach in Canada are provided below.

*British Columbia*

British Columbia Utilities Commission's (BCUC) views on how to determine the appropriate cost of equity capital have evolved over time. In the BCUC 1994 Decision,[85] the BCUC "placed primary reliance on the various risk premium tests presented" whereas the "comparable earnings and DCF test results have been used primarily as a check upon reasonableness."[86] However, in the BCUC 2006 Decision, the BCUC assigned weight to the DCF model and found the comparable earnings methodology useful.[87] The BCUC 2006 Decision did not state how much weight it assigned to each model it considered. The BCUC's views evolved as the various

[83] For example, the BCUC 1994 Decision at p. 17 indicated that while primary reliance should be placed on risk premium tests, comparable earnings and the DDM should be used as checks.

[84] For example, the National Energy Board abandoned the formulaic approach, the Alberta Utilities Board modified the benchmark, and the Ontario Energy Board modified both the benchmark and the formula. Both the Alberta Utilities Board and the Ontario Energy Board used several cost of equity estimation methods to arrive at their revised benchmark. The British Columbia Utilities Commission is in the midst of a generic cost of capital proceeding that will determine the approach going forward.

[85] BCUC Decision in the Matter of Return on Common Equity BC Gas Utility Ltd., Pacific Northern Gas Ltd., West Kootenay Power Ltd., June 10, 1994 (BCUC 1994 Decision).

[86] BCUC 1994 Decision, p. 17.

[87] BCUC In the Matter of Terasen Gas Inc. *et al.* Return on Equity and Capital Structure Decision, December 16, 2009 (BCUC 2009 Decision), pp. 44-45.

models arrived at more or less plausible results. For example, in its 2009 decision, the BCUC found:

> The Commission Panel agrees that a single variable is unlikely to capture the many causes of changes in ROE and that in particular the recent flight to quality has driven down the yield on long-term Canada bonds, while the cost of risk has been priced upwards.[88]

Having acknowledged the influence of the current economic environment, the BCUC in 2009 gave the most weight to the DDM, less weight to the Equity Risk Premium method and CAPM, and a low weight to the comparable earnings model. While the BCUC acknowledged giving weight to the DDM, ERP, CAPM and comparable earnings method, it did not specify the exact weights used.[89] The BCUC is currently undertaking a review of its cost of capital estimation methodology.

*Ontario Energy Board*

The Ontario Energy Board (~~"O~~EB") regulates electric and gas utilities in Ontario and sets rates for electric and natural gas distribution and transmission. The OEB also regulates other aspects of the electric and natural gas sector, but it does not regulate competitive electric or gas supply. In addition to determining the allowed cost of capital, the OEB also determines a deemed (allowed) capital structure for the utilities it regulates, and the allowed cost of equity is applied to the deemed equity portion of the allowed rate base, which is based on historical cost.

The OEB reviewed its approach to determining the cost of capital for Ontario utilities and in December 2009 issued a report on its estimation procedures going forward.[90] Prior to the review, the OEB relied on a formula-based approach using a version of the risk premium approach, or Equity Risk Premium (ERP) method to determine the return on common equity. Although a number of concerns were raised with this approach, the OEB decided to continue

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88 BCUC 2009 Decision, p. 73.

89 BCUC 2009 Decision, p. 45.

90 Ontario Energy Board, ~~"E~~EB-2009-0084, Report of the Board on the Cost of Capital for Ontario's Regulated Utilities," Issued December 11, 2009 (OEB Report 2009).

relying on a formula-based methodology and the ERP method, but the review led to a resetting of the risk premium and an adjustment to the formula used to update the ROE.

The OEB's current approach to cost-of-capital estimation requires that the Board determine a baseline ROE and subsequently update the estimate annually using the determined formula. The baseline ROE was most recently determined in 2009 during the generic proceeding. To arrive at its initial estimate of the ERP for determining the baseline ROE, the OEB reviewed the recommendations of the submissions as part of the 2009 proceeding, and determined each submission's Low, Medium, and High ERP.[91] In determining the initial ERP, the OEB found that:

> **the use of multiple tests to directly and indirectly estimate the ERP is a superior approach to informing its judgment than reliance on a single methodology.**[92]

As a result, the OEB considered all submissions, which included estimates based on the CAPM, DDM, risk premium model, econometric ERP analyses, realized ERP analyses, the difference between awarded ROEs and realized government bond yields, and various forecasts. The OEB averaged the experts' calculations of the risk premium over the long-term government bond and used judgment to determine that an appropriate premium over long-term government bonds was in the low-end of the range determined by the averages of the experts' ranges.

#### *c) The U.K.*

The U.K. regulator Ofgem has for many years made its cost of equity decisions within a CAPM framework, and, at least in a formal sense, has published CAPM parameters which correspond to its cost of equity determinations. However, it is also clear that Ofgem does not treat the CAPM estimates mechanistically, and, in any case, Ofgem uses a degree of judgment in determining the equity beta parameter, since there is little direct market evidence that can be relied on. While some of Ofgem's analysis and discussion of utility submissions is framed in terms of the CAPM parameters, it is clear that Ofgem focuses much more on the final cost of equity figure than on

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91 OEB 2009, p. 38.

92 OEB 2009, p. 36 (emphasis in the original).

the mechanistic derivation of that figure, whether in a CAPM framework or otherwise. For example, Ofgem has said: "Overall, our Final Proposals retain the cost of equity assumptions in our Initial Proposals of 7.0 percent for NGET and 6.8 percent for NGGT. Table 3.5 shows our Final Proposals for the cost of equity in terms of the CAPM components. We note, however, that **it is the overall allowed return that matters**. [emphasis added]"[93]

### 3. Impact of Economic, Industry or Company Factors

It makes sense that multiple cost of equity estimation methods have been developed and remain in use for a variety of reasons as articulated by Professors Berk and DeMarzo: "[a]ll the techniques … are imprecise" and "practitioners apply the technique that best suit their particular circumstances."[94] Because economic, industry, and firm-specific factors vary, it is important to assess the circumstances under which the models discussed in *Section III* are and should be used.

#### *a) Economic Factors*

As a pertinent example, due to the flight to quality following the financial crisis and subsequent monetary policy initiatives in many countries, the risk-free rate has been suppressed and is unusually low. Thus, in a standard implementation of the CAPM, the current risk-free rate results in a low cost of equity estimate. At the same time, investors have in recent years faced unusually high market volatility as measured by, for example, the S&P / ASX volatility index or the S&P 500 volatility index.[95] Academic literature finds that investors expect a higher risk premium during more volatile periods. For example, French, Schwert, and Stambaugh (1987) find a positive relationship between the expected market risk premium and volatility:

> We find evidence that the expected market risk premium (the expected return on a stock portfolio minus the Treasury bill yield) is positively related to the predictable volatility of stock returns. There is also evidence that unexpected stock returns are negatively related to the unexpected change in the volatility of

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93 *RIIO-T1: Final Proposals for National Grid Electricity Transmission and National Grid Gas*, Ofgem, 17 December 2012, paragraph 3.45.

94 Berk & DeMarzo 2009, p. 420.

95 The S&P/ASX Volatility Index and the S&P 500 Volatility Index reflect the markets' expected volatility in the benchmark Australian and American equity indices, respectively.

> stock returns. This negative relation provides indirect evidence of a positive relation between expected risk premiums and volatility.[96]

And Kim, Morley and Nelson (2004) find:

> When the effects of volatility feedback are fully taken into account, the empirical evidence supports a significant positive relationship between stock market volatility and the equity premium.[97]

Other academic papers have found a relationship between general economic conditions and the MRP. Constantinides (2008) studies a classical utility model where consumers are risk-averse and also summarizes some of the empirical literature. Empirical evidence shows that consumers become more risk-averse in times of economic recession or downturn, and equity investments accentuate this risk.[98] Increased risk aversion leads to a higher expected return for investors before they will invest. Specifically, equities are pro-cyclical and their performance is positively correlated with the economy's performance. Thus, unlike government bonds, equities fail to hedge against income shocks that are more likely to occur during recessions.[99] As a result, investors require an added risk premium to hold equities during economic downturns.

The very low current risk-free rates make the cost of equity estimates from a standard implementation of the Sharpe-Lintner CAPM also very low at a time when volatility measures indicate that the MRP has increased as well. Therefore, these market circumstances call for a serious consideration of economic factors or other models rather than a mechanical implementation of the Sharpe-Lintner CAPM.

Conditional models such as the Consumption CAPM attempt to incorporate the relationship between market volatility and the MRP in determining the cost of equity. As the model

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[96] K. French, W. Schwert and R. Stambaugh (1987), "Expected Stock Returns and Volatility," *Journal of Financial Economics*, Vol. 19, pp. 3.

[97] C-J. Kim, J.C. Morley and C.R. Nelson (2004), "Is There a Positive Relationship Between Stock Market Volatility and the Equity Premium?," *Journal of Money, Credit and Banking*, Vol. 36, p. 357.

[98] Constantinides, G.M. (2008), "Understanding the equity risk premium puzzle," In R. Mehra, ed., *Handbook of the Equity Risk Premium*, Elsevier, Amsterdam.

[99] Constantinides, G.M., and D. Duffie (1996), "Asset Pricing with Heterogeneous Consumers," *Journal of Political Economy*, pp. 219-240. See also E.S. Mayfield (2004), "Estimating the market risk premium," *Journal of Financial Economics*, vol. 73, pp. 465-496.

estimates a relationship between the risk premium of a stock and its conditional volatility, the model allows for a time-varying relationship between risk and return; *i.e.*, the implied cost of equity varies with the degree to which (i) the underlying stock can serve as a hedge against the market and (ii) market volatility. As rate-regulated entities commonly move with the market, the cost of equity estimate usually moves in the same direction as the volatility of the market. Thus, the consumption-based model addresses the finding that volatility impacts the required risk premium. As such, it may be particularly useful to implement this model when market volatility is unusually high or low.[100]

Given the currently very low risk-free rates and the recent market volatility, the DDM may additionally provide useful insights into the cost of equity. This is especially true for versions of the model that take into account (i) all cash that flows to shareholders through not only dividends but also share buybacks and (ii) changes in the forecasted growth rates in the near term and the longer term (*i.e.* multi-stage versions of the DDM).

Table 3 below displays the impact of two key economic factors discussed above, market volatility and risk-free rates, on the choice of cost of equity estimation model. While there is no specific formula that can be proposed to select a particular model under given market circumstances, or a method that can be used to combine the various models mechanistically, there are certain market scenarios under which it is more appropriate to use one model rather than another. For example, in times of either extremely high or low market volatility, (or extreme values of other macroeconomic indicators such as inflation), the consumption-based CAPM becomes more relevant. The DDM model and especially the multi-stage DDM is also less sensitive to variations in the risk-free rate than the standard CAPM, but it can be sensitive to market volatility. This is because in times of economic turmoil, the growth estimates for companies, including rate-regulated entities, are less likely to be stable going forward. Because the multi-stage DDM has more realistic characteristics and is less sensitive to analysts' short-term forecasts, the tables in this section use the term DDM to reflect the multi-stage DDM.

[100] See Ahern, *et al.* (2012) for a discussion of its use in a regulatory setting.

The effect of the risk-free rate and market volatility on model choice is reflected in Table 3 below, which should be viewed as an illustration on the directional choice rather than a prescription.

**Table 3: Relationship Between Key Economic Conditions and Weights to be Given to Models**

| | | Prevailing Risk-free Rate in Economy | | |
|---|---|---|---|---|
| Market Volatility | | **High** | **Average** | **Low** |
| | **High** | Consumption CAPM | | |
| | **Average** | Consumption CAPM / DDM | CAPM / ECAPM | Consumption CAPM / DDM |
| | **Low** | Consumption CAPM / DDM | | |

### *b) Industry Factors*

As discussed above, empirical research has consistently found that the Security Market Line determined by the Sharpe-Lintner CAPM (as depicted in Figure 2) is too steep.[101] This result is also consistent with the findings of Fama & French (1992), which estimated a zero slope in the empirical SML.[102] Thus, the ECAPM as well as the Fama-French model attempt to find a model that is a better fit with empirical data from tests of the Shape-Lintner CAPM, showing that the latter tends to under estimate the cost of equity for companies with beta estimates below one, and over estimate the cost of equity for companies with beta estimates above one. A better-fitting model flattens the Security Market Line as depicted in Figure 3. Because most rate-regulated entities have beta estimates below one, reliance on the Sharpe-Lintner CAPM tends to bias the

[101] See, for example, F. Black, M.C. Jensen, and M. Scholes, "The Capital Asset Pricing Model: Some Empirical Tests," *Studies in the Theory of Capital Markets*, Praeger Publishers, 1972, pp. 79-121 and E.F. Fama and J.D. MacBeth, "Risk, Returns and Equilibrium: Empirical Tests," *Journal of Political Economy* 81 (3), 1972, pp. 607-636.

[102] E.F. Fama and K.R. French, "The Cross-Section of Expected Returns," *Journal of Finance* 47, 1992, pp. 427-465.

cost of equity estimates for these companies downwards. Therefore, for entities whose beta estimates are farther from one, it becomes important to look to the ECAPM to accurately reflect the cost of equity for the entity.[103] In many countries or regions, including Australia, Canada, Europe and the U.S, estimated betas for rate-regulated entities declined and become statistically insignificant in the early 2000s as the dot.com bubble burst. In such circumstances, the downward bias in the cost of equity estimates from the Sharpe-Lintner CAPM becomes more pronounced and models such as the ECAPM can improve the estimation.

For some industries the future may look like the past, but for others this is not the case. As an example, the outlook for the U.S shale gas industry today is different than it was in 2008. Similarly, the outlook for the nuclear industry in Japan changed dramatically after the 2011 tsunami. In such circumstances, forward-looking estimates of the industry's cost of capital as obtained through, for example, versions of the DDM, may be especially useful. As noted above, the DDM implementation should carefully consider not only the current economic environment but also industry and firm-specific factors, such as the sustainability of the current growth forecasts and whether dividends truly reflect all cash distribution to shareholders. For example, the multi-stage models discussed in *Section III* rely on several growth rates and therefore enable the analyst to consider near-term, intermediate, and long-term growth prospects for the individual company, industry, and economy. Therefore, a multi-stage DDM model, unlike the Sharpe-Lintner CAPM, can capture both near-term and longer-term changes in an industry. This becomes especially important when an industry's expected risk characteristics differ from its past characteristics.

*Rate-Regulated Entities vs. Other Industries*

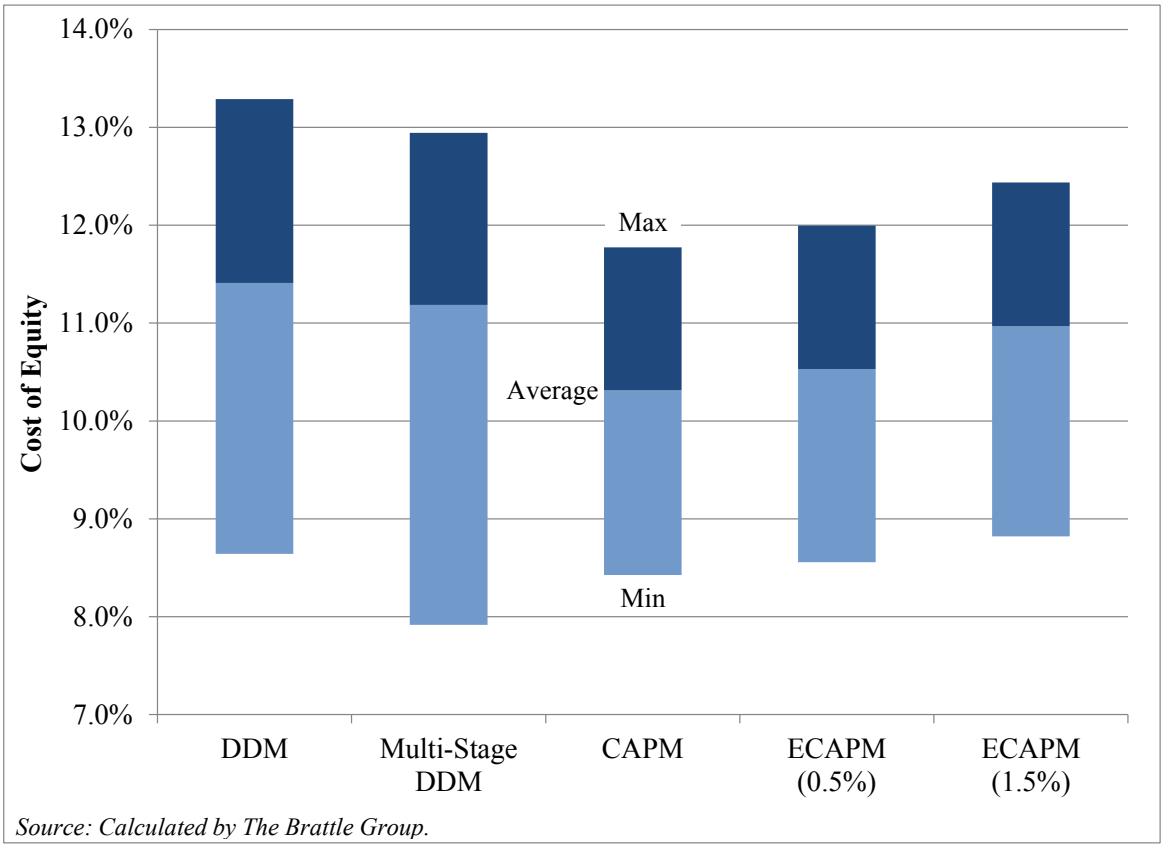
According to empirical studies, the Sharpe-Lintner CAPM remains the most commonly used model across the full spectrum of companies.[104] However, the utility industry and rate-regulated entities have some unique characteristics that make it plausible that the methods that serve other

[103] See Table A-1 in the Appendix for details. Much of the academic literature estimating alpha dates back to the 1980s. Academic research has since turned to the Fama-French multifactor model, which attempts to explicitly capture the empirical pivot of the SML as a function of additional pricing factors.

[104] J.R. Graham and C.R. Harvey, ―TheTheory and Practice of Corporate Finance: Evidence from the Field," *Journal of Financial Economics* 60, 2001, pp. 187-243.

industries well do not serve this industry nearly as well. For example, the utility industry tends to be relatively stable, so that the DDM (and especially the multi-stage DDM) is much more likely to provide usable results for this industry than for more volatile industries. As the residual income valuation model is a variation of the multi-stage DDM, the same comments pertain to this model.

Prior to the financial crisis, models such as the single-stage DDM, *Brattle*'s multi-stage DDM, the CAPM, and versions of the ECAPM resulted in fairly similar results. Figure 5 below illustrates this for the gas distribution industry in the U.S. towards the end of 2006. Specifically, the figure is based on implementing the constant growth DDM, a 3-stage DDM, the Sharpe-Lintner CAPM, the ECAPM with an alpha of 0.5% and an ECAPM with an alpha of 1.5% for seven gas distribution companies. Figure 5 then shows the range of the cost of equity estimates assuming a 50-50 gearing for the target company. The figure also indicates the average cost of equity obtained from the sample, which is at the split of each bar.




*Source: Calculated by The Brattle Group.*

**Figure 5**

It is clear from Figure 5 above that there is substantial overlap in the estimates. We attribute this effect to the fact that the economy was relatively stable in 2006 and so was the gas distribution industry. At the time, these models largely confirmed the range of the cost of equity estimates.

As discussed above, rate-regulated companies also tend to be low-beta entities, so the empirical finding that the SML predicted by the Sharpe-Lintner CAPM is too steep is a serious concern for this industry; *i.e.*, it becomes important to use the ECAPM or other models to ensure that this empirical observation is accurately reflected in the cost of equity estimates.

Analogously to Table 3, Table 4, Panels A and B below summarize the directional weighing of the models depending on various industry characteristics. The two industry factors considered in Table 4, Panel A below are the stability of growth rate forecasts and the average market beta of the industry. For example, as mentioned above, rate-regulated entities tend to have relatively more stable growth forecasts over time and low betas (*i.e.*, beta estimates below one). Therefore, for this industry, the use of the ECAPM or variations of the multi-stage DDM might become valuable in determining the cost of equity capital. The effect of the stability of growth forecasts and the beta value on model choice is reflected in Table 4, Panel A below, which should be viewed as an illustration on the directional choice rather than a prescription.

**Table 4: Relationship Between Key Industry Factors and Weights to be given to Models– Panel A**

| | | Stability of Industry Growth Forecasts Over Time | | |
|---|---|---|---|---|
| Market Beta of Industry | | **High** | **Average** | **Low** |
| | **High** | ECAPM / DDM | | ECAPM / Other |
| | **Average** | CAPM / DDM | | CAPM / Other |
| | **Low** | ECAPM / DDM | | ECAPM / Other |

Another characteristic of the industry that should be considered is whether companies in the industry are exposed to financial distress and/or significant merger and acquisition activity, and

the prevalence of share buybacks. As discussed above, market-based estimation models are relatively more affected when a given company faces financial distress, or unique circumstances that may lead to its stock price decoupling from fundamentals. Therefore, if many companies in an industry are subject to such effects, the whole industry may be affected. Further, companies that engage in a substantial amount of share buybacks will end up distributing cash to shareholders in a form other than dividends, which makes a DDM based on a per share dividend ratio less appropriate. Panel B below illustrates these effects.

**Table 4: Relationship Between Key Industry Factors and Weights to be given to Models– Panel B**

| | | Industry Exposure to Financial Distress and/or M&A | |
|---|---|---|---|
| | | **High** | **Low** |
| Prevalence of Share Buybacks | **High** | Other Models: Risk Premium, comparable earnings, maybe use other industries | CAPM, ECAPM, DDM that includes all cash that accrues to shareholders |
| | **Low** | | CAPM, ECAPM, DDM |

***c) Company Factors***

In many instances company-specific issues are better dealt with via sample selection or through risk positioning than through the determination of how to estimate the cost of equity. A company that is a potential member of the benchmark sample is often dropped if it faces unique circumstances that may bias the cost of capital estimation process. This is the case if, for example, a company is undergoing significant merger or acquisition activity, which inherently affects the information available in the market and therefore drives the stock price (and thus the results from all market-based models, including the CAPM, ECAPM, Fama-French and DDM).

After a range of cost of equity estimates has been obtained, it is necessary to consider where, from within this range, the final determination on the cost of equity will be. Provided that the range has been developed in an appropriate way that takes account of the market and industry factors described in this section, the final step is to consider the relative risk of the target company compared to the sample of companies from which the cost of equity range has been developed. The cost of equity is adjusted upward or downward depending on the target entity's risk characteristics relative to those of the sample. This issue is the topic of the next section.

## D. RISK POSITIONING OF THE TARGET ENTITY

The discussion in the preceding sections covered various models that produce cost of equity estimates. Typically the cost of equity will be estimated for a sample of firms, or all firms in a particular sector, because it usually is not possible to estimate the cost of equity for a single firm with a useful degree of accuracy. To determine a single value for the cost of equity for a specific firm from a range of values for a set of comparator firms, it makes sense to consider the riskiness of the specific firm relative to the riskiness of the sample, since the cost of equity itself is compensating investors for risk.

In the regulatory context, in some cases this process is implicit in the regulator's decision, while in others it is an explicit step in the cost of equity determination process. This step can conveniently be termed "risk positioning", because the regulator considers the risk characteristics of the specific utility relative to the benchmark.

### 1. Why risk positioning is necessary

While the precise details and wording of the regulator's objective in setting the cost of equity vary from one jurisdiction to another, the underlying idea is that investors will expect a return equivalent to the return that they would expect from other investments of like risk. Utilities generally have low risk relative to the market as a whole, but within the utilities sector, different firms are likely to have somewhat different risk characteristics. "Risk positioning" acknowledges the possibility that different utilities can have somewhat different risks. In this context, "risk" is defined as the characteristic of an investment which determines expected returns which would usually include "systematic" exposure to the wider economy, but not "idiosyncratic" risks associated with specific projects that can be diversified away in an investment portfolio. While

the cost of equity solely captures investors‘ compensation for bearing systematic risk, the cost of debt reflects total risk, including idiosyncratic risks. Therefore, there are instances of regulatory mechanisms, such as decoupling, which reduce the variability of total revenues and therefore also total risk, (affecting the cost of debt), but which may not impact the cost of equity for a given utility.

One way in which a utility is exposed to systematic risk is through variations in demand. End-user demand tends to be at least somewhat correlated with wider economic activity, and is thus a source of exposure to systematic risk. One utility might have more exposure than other, for example if it has a greater proportion of price-sensitive industrial load.

In some jurisdictions, leverage is considered a source of ―financial risk", which affects the risk positioning analysis. This could be so, for example, where the rate of return is generally determined on the basis of actual capital structure. A utility with more debt than the benchmark will require a higher return on equity than the benchmark, even if it otherwise has similar business risk exposure as the benchmark (just as two utilities with the same asset beta would have different equity betas if one has higher gearing than the other). Where this approach is taken, the term ―business risk" is used to refer to the other sources of relevant risk differences that are taken into account in the risk positioning analysis.

Once a benchmark rate of return has been defined (whether a point estimate or a range), the risk positioning approach requires an analysis of the particular utility‘s risk relative to that benchmark. To the extent that the utility is found to have more (or less) risk than the benchmark, the rate of return would be set higher (or lower) than the benchmark rate of return.

### 2. What risk characteristics are relevant?

The characteristics relevant to risk positioning are those which expose the utility to systematic risk and which therefore have an impact on the rate of return required by investors. Some important sources of uncertainty in revenues and returns to investors may not have an impact on the required return to the extent that investors are able to diversify away exposure to those risks. For example, the weather may be an important source of variability in revenues and returns, but may not be an important source of risk to investors because it is diversifiable.

A good way to think about risk positioning is to consider the extent to which different utilities are protected from risks. A distribution utility can in principle be protected from risks to the extent that it is able to pass on risk to its customers (which depends on the detail of the regulatory framework being applied). Demand risk (which is at least partly non-diversifiable), for example, can be borne by the utility if the regulatory regime sets prices and does not "true up" revenues to account for the difference between forecast and actual demand. Alternatively, demand risk can be passed on to customers through a true-up or balancing account process, which would allow the utility to recover in one year any "missing" revenue from the prior year caused by demand forecasting errors. Protection from demand risk in this way depends on both a regulatory framework that allows for such true-ups and on the existence of franchise customers that will bear the risks passed on to them. Therefore, other things equal, a utility with true-ups for demand risk would be considered less risky than one without.

Distribution utilities typically have franchise customers that rely on the utility and have no alternative supply of energy. However, this is typically not the case for gas pipelines: in many jurisdictions, gas pipelines do not have "franchise" customers: customers may be free to switch to competing pipelines. Even if there is no prospect of competition from other pipelines, it may still be difficult for pipelines to pass on demand risk to their customers, since large end-users may be price sensitive (i.e., if the pipeline increases price in response to a fall in demand, the price increase itself could further cut demand).

Pipeline regulators in both the US and Canada apply a risk-positioning approach in determining the cost of equity.

### 3. FERC Approach

The Federal Energy Regulatory Commission (FERC) has a standard approach to determining the cost of equity for gas pipelines, set out in a "policy statement",[105] which, together with precedent from prior decisions, guides all decisions on the cost of equity for gas pipelines. The FERC's approach is to use a form of the dividend growth model (typically termed the "DCF" model in

[105] *Composition of Proxy Groups for Determining Gas and Oil Pipeline Return on Equity*, FERC (April 2008).

the US) to estimate the cost of equity for a benchmark group of publicly-traded pipeline companies. The results of the model are a cost of equity estimate for each of the companies in the benchmark (or "proxy") group.

FERC starts by assuming that the median company in the proxy group is the appropriate cost of equity, unless either the pipeline or an intervener in the case demonstrates that the instant pipeline has risk factors which mean that the cost of equity should be set above or below the median:

> *after defining the zone of reasonableness through development of the appropriate proxy group for the pipeline, the Commission assigns the pipeline a rate within that range or zone, to reflect specific risks of that pipeline as compared to the proxy group companies.* [f/n omitted] *The Commission has historically presumed that existing pipelines fall within a broad range of average risk. A pipeline or other litigating party has to show highly unusual circumstances that indicate anomalously high or low risk as compared to other pipelines to overcome the presumption.*[106]

And

> unless *a party makes a very persuasive case in support of the need for an adjustment and the level of the adjustment proposed, the Commission will set the pipeline's [ROE] at the median of the range of reasonable returns.*[107]

In line with this approach, most FERC decisions result in the pipeline receiving a cost of equity equal to the median of the proxy group. A recent decision for El Paso Natural Gas (EPNG),[108] however, illustrates how FERC assesses relative risk and may, on occasion, move away from the median. In this case, the FERC ALJ[109] characterized EPNG's business risk on two related dimensions: competitive risk and regulatory risk. US natural gas pipelines typically secure long-term contractual commitments from shippers to use the pipeline capacity (with relatively high fixed charges, equivalent to a take-or-pay commitment). EPNG had long-term contracts for a smaller proportion of its capacity than did the pipelines in the proxy group, and its contracts were typically shorter. Furthermore, EPNG's throughput had been declining. This is symptomatic of higher business risk, because in the absence of contractual commitments and in the absence of

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106 *Ibid*., p. 4.

107 *El Paso Natural Gas Company*, Initial Decision, docket no. RP10-1398 (June 18, 2012), paragraph 40, quoting prior FERC decisions.

108 *El Paso Natural Gas Company, Initial Decision*, docket no. RP10-1398 (June 18, 2012).

109 A FERC rate case typically results in an "initial decision" issued by an Administrative Law Judge (ALJ). The ALJ's decision is subsequently reviewed by the FERC commissioners, and may be affirmed or varied.

franchise customers, the pipeline is no longer able to pass on risks to its customers. In the limit, the pipeline may be unable to charge rates high enough to recover its authorized revenue requirement (as increasing rates drives throughput lower still).

The ALJ found that EPNG was exposed to competition in its major downstream markets from new pipeline projects, and that this competition was to an extent the result of regulatory policies that favor new pipeline projects to foster competition (possibly harming existing pipelines).

Based on this analysis (and also a finding that EPNG had above-average financial risk, as evidenced by a credit rating of BBB-, lower than all but one of the proxy group companies), the ALJ determined that EPNG's cost of equity should be set "well above the median ROE [of the proxy group]".[110]

#### 4. NEB approach

In Canada, the approach taken by energy regulators (both provincial and national) historically was to set the cost of equity on a formula basis and to us the same cost of equity for all pipelines. Risk positioning was then used to vary the authorized proportion of equity in the capital structure, thereby increasing the overall return on capital for those utilities judged to be riskier. However, in the most recent decision by Canada's National Energy Board (NEB), the NEB moved to an approach which focuses on the overall after-tax return directly, rather than separately determining the cost of equity, the cost of debt, and the proportion of each in the capital structure.[111] The NEB takes a systematic approach to assessing business risk under the headings "supply risk", "market [downstream] risk", "regulatory risk", "competitive risk" and "operating risk", although the NEB said "The various forms of risk are in some cases inextricably linked, and the boundaries between them are subjective".[112] In the RH-1-2008 case,[113] the NEB was concerned with whether the business risk of the pipeline had increased

[110] *Ibid.*, p. 45. The ALJ did not specify an ROE. The final decision on ROE rests with the FERC commissioners.

[111] See RH-1-2008, discussed further below.

[112] *Reasons for Decision, Trans Quebec and Maritimes Pipelines Inc., RH-1-2008*, NEB (March 2009), p. 30.

[113] Concerning the Trans Quebec and Maritimes Pipelines, which predominantly move supplies sourced from the Western Canadian Sedimentary Basin (WCSB) via the TransCanada Mainline, into Quebec and on into New Hampshire.

since the last time that a decision on the cost of capital for the pipeline had been taken. The NEB identified a number of factors as contributing to an increased overall business risk.

- **Supply risk**: the pipeline was mainly supplied from a region with declining conventional production and rising costs. While it was possible that new sources of unconventional supply (shale gas) would be developed, the result was increased uncertainty over the availability of competitively-priced supplies, and hence concerns over the possibility for reduced throughput.
- **Market and competitive risk**: because a large and increased proportion of the pipeline's throughput went to large industrial and electric power generation load, which is more variable than domestic and commercial load. In addition, competition with cheap hydro-power in the Quebec also contributed to increased market risk. Market risk was also increased as a result of the potential for competition with LNG imports in the US market.

Overall, the NEB concluded that business risk had increased as a result of these factors relative to the previous cost of capital decision for the pipeline. Whereas the FERC in the US uses a risk positioning approach to determine the cost of equity relative to a benchmark, the NEB estimated the after-tax weighted average cost of capital directly, principally on the basis of market-based estimates of the cost of capital of various comparator companies. The business risk analysis described above was part of the NEB's determination of where the pipeline's cost of capital should be relative to the sample data.[114]

### 5. Implementation

In the FERC and NEB examples given above, risk positioning of the target utility within the range of comparator or proxy companies is not analytically precise: the regulator considers evidence (which could be quantitative, such as the proportion of price-sensitive industrial load, or more qualitative) as to exposure to various relevant risk factors. Weighing the risk factors, and determining how the analysis of risk should be reflected in the final cost of equity determination is necessarily imprecise, and relies on judgment. For example, a regulator might determine that a

[114] The NEB's analysis is summarized on p.79 of the decision.

particular utility, having an unusually high proportion of industrial load, was of above average risk, and that as a result the cost of equity should be 50 basis points above the mid-point of a range determined for a sample of utilities. The direction of the adjustment (upwards) is clear, but the magnitude is more a matter of judgment than something that can be derived quantitatively.

## APPENDIX: ADDITIONAL TABLES AND FIGURES

**Table A-1: Empirical Evidence On The Alpha Factor in ECAPM**

| AUTHOR | RANGE OF ALPHA | PERIOD RELIED UPON |
|---|---|---|
| Black (1993)[1] | 1% for betas 0 to 0.80 | 1931-1991 |
| Black, Jensen and Scholes (1972)[2] | 4.31% | 1931-1965 |
| Fama and MacBeth (1972) | 5.76% | 1935-1968 |
| Fama and French (1992)[3] | 7.32% | 1941-1990 |
| Fama and French (2004)[4] | N/A | |
| Litzenberger and Ramaswamy (1979)[5] | 5.32% | 1936-1977 |
| Litzenberger, Ramaswamy and Sosin (1980) | 1.63% to 3.91% | 1926-1978 |
| Pettengill, Sundaram and Mathur (1995)[6] | 4.6% | 1936-1990 |

[*] The figures reported in this table are for the longest estimation period available and, when applicable, use the authors' recommended estimation technique. Many of the articles cited also estimate alpha for sub-periods and those alphas may vary.

[1] Black estimates alpha in a one-step procedure rather than in an un-biased two-step procedure.

[2] Estimate a negative alpha for the sub period 1931-39 which contain the depression years 1931-33 and 1937-39.

[3] Calculated using Ibbotson's data for the 30-day treasury yield.

[4] The article does not provide a specific estimate of alpha; however, it supports the general finding that the CAPM underestimates returns for low-beta stocks and overestimates returns for high-beta stocks.

[5] Relies on Litzenberger and Ramaswamy's before-tax estimation results. Comparable after-tax alpha estimate is 4.4%.

[6] Pettengill, Sundaram and Mathur rely on total returns for the period 1936 through 1990 and use 90-day treasuries. The 4.6% figure is calculated using auction averages 90-day treasuries back to 1941 as no other series were found this far back.

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# SCHEDULE 3: The differences between Gas and Electricity Businesses and the impact on the cost of capital to them

## Differing risks for gas and electricity investment

There are many differences across gas and electricity markets and assets. APIA considers that three key differences:

- usage in the economy;
- the contract carriage model of gas; and
- the setting of wholesale price

create substantially different risk profiles for gas and electricity supply infrastructure and mean investments in each are not considered interchangeable by financial and capital markets.

Gas and electricity supply assets have different risks and compete for capital on differing basis. It is evident to APIA that there are materially different risks facing investors in energy supply infrastructure, between electricity and gas assets, between gas transmission and distribution assets and between gas transmission assets.

## Gas and electricity are used differently in the economy

Electricity is a fuel of necessity. Virtually all Australian households and businesses are connected to the electricity supply grid and in all jurisdictions connection is a legislated right. The electricity industry serves all sectors of the economy, including the heavy industrial sectors, manufacturing and processing, retail, schools, hospitals and governments, right down to the individual household level.

In contrast, gas is a discretionary fuel in many markets.

The penetration of gas into the retail marketplace is quite low in Australia, with Victoria enjoying the greatest depth of penetration at the domestic and small commercial level at around 70%. Overall, gas penetration across Australia at the domestic and small commercial level is 41% that of electricity.[45]

Residential and commercial demand accounted for over 58% of total electricity demand in 2009/10 but only 17% of total gas demand in the same year.

The mining and manufacturing industries are large users of gas, accounting for almost 50% of total gas demand in 2009/10.

35% of total gas use in Australia is for electricity generation, and gas faces competitive pressures in the generation market that have no impact on electricity supply infrastructure.

## Energy supply infrastructure has different exposure to revenue risk

The exposure to different sectors varies across energy supply infrastructure. With its universal use and heavy exposure to the residential and commercial sectors, the revenue risk of the electricity supply industry is spread across the fortunes of the economy as a whole. From an economic regulation point of view, various electricity supply infrastructure assets have reasonably equivalent exposure to these risks.

Gas supply infrastructure does not share this characteristic. The utilisation of gas supply infrastructure, and therefore revenue, is more dependent on an individual asset's exposure to large industrial customers.

At the gas distribution level, an asset's utilisation depends on its level of penetration and the number of large industrial and commercial customers connected to the network, and this varies across states. Penetration ranges from 70% in Victoria, around 40% in NSW and WA, to below 10% in QLD. There are over 800 large industrial and commercial customers connected in Victoria, around 450 connected in NSW and less than 200 connected in Queensland, South Australia and Western Australia.[48]

This impact is more pronounced at the gas transmission level, and its fortunes can depend on a relatively small number of very large users unique to the asset. An indication of the customers of regulated gas transmission assets is provided below.

## Revenue models of energy supply infrastructure

There are fundamental differences in the revenue models of gas and electricity supply infrastructure, and these are recognised in the provisions of the NER and NGR in the making of price determinations for electricity supply infrastructure and access arrangements for gas supply infrastructure.

### Access arrangements and bilateral contracts

[48] Electricity Gas Australia 2011, Energy Supply Association of Australia

The gas industry, globally, is driven by bilaterally agreed contracts. This is a feature of the global industry that is also apparent in Australia.

Gas transmission and distribution infrastructure generates revenue through bilateral contracts, negotiated by parties to specifically tailor transportation services to suit the needs of the shippers.

This bilateral contracting feature has been in place much longer than the Australian access regime. For example, the Roma Brisbane pipeline was constructed in 1969, long before Australia's Third Party Access Regime was developed. The RBP has always been an open access pipeline, with that access governed by the bilateral contracts in place.

## Price determinations

The approval of access arrangements by the AER provides a reference service and tariff for shippers to contract capacity on gas supply infrastructure. In some cases, shippers will require the reference service. Often, a shipper will require a specifically tailored service, and the reference service and tariff will provide a starting point for the negotiation of bilateral contracts.

This contrasts with the price determinations for electricity supply infrastructure. In this case, the AER approves an amount of revenue to be recovered from electricity users, which is then drawn from a pool based on usage of an asset. Users of electricity supply infrastructure have no direct relationship with owners.

## Investment

The bilateral contracting process recognises a sharing of risk between project proponent and pipeline owner, where both invest significant capital in plant and equipment and pipeline assets respectively. Each party relies on the other to realise its investment in capital assets.

As gas transmission infrastructure is long lived, investors usually require that a pipeline's capacity is contracted appropriately, such that the investment will be recovered in the required timeframe, prior to committing to invest. In this way, the users of gas transmission infrastructure drive the delivery of gas transmission capacity.

A gas supply pipeline's revenue is determined through its bilateral contracts, and it must invest and operate with the revenue bounds set by its contractual arrangements. This fits in with the 'NPV-positive' requirement in the NGR, as shown in the following excerpt from Rule 79:

*79 New capital expenditure criteria*
*…*
*(2) Capital expenditure is justifiable if:*
*….*

*(b) the present value of the expected incremental revenue to be generated as a result of the expenditure exceeds the present value of the capital expenditure; or*
*…*

This NPV-positive criteria invariably drives transmission pipeline investment to be underwritten by bilateral contracts supporting the revenue side of the equation. Importantly, bilateral contracting is not a feature of the electricity industry. This is clearly reflected in the capital expenditure requirements in the NEL, where the capital expenditure objectives are stated in terms of meeting demand, comply with obligations, maintain quality, reliability, safety and security – there is no revenue discipline in the electricity capex objectives of the NEL sections 6.5.7 and 6A.6.7:

*6.5.7 Forecast capital expenditure*
*(a) A building block proposal must include the total forecast capital expenditure for the relevant regulatory control period which the Distribution Network Service Provider considers is required in order to achieve each of the following (the capital expenditure objectives):*
*(1) meet or manage the expected demand for standard control services over that period;*
*(2) comply with all applicable regulatory obligations or requirements associated with the provision of standard control services;*
*(3) maintain the quality, reliability and security of supply of standard control services;*
*(4) maintain the reliability, safety and security of the distribution system through the supply of standard control services.*

and

*6A.6.7 Forecast capital expenditure*
*(a) A Revenue Proposal must include the total forecast capital expenditure for the relevant regulatory control period which the Transmission Network Service Provider considers is required in order to achieve each of the following ('the capital expenditure objectives'):*
*(1) meet the expected demand for prescribed transmission services over that period;*
*(2) comply with all applicable regulatory obligations or requirements associated with the provision of prescribed transmission services;*
*(3) maintain the quality, reliability and security of supply of prescribed transmission services; and*
*(4) maintain the reliability, safety and security of the transmission system through the supply of prescribed transmission services.*

Differing contractual arrangement across assets also expose assets to different risks. For example, the introduction of the *Clean Energy Act 2011* in November this year introduces a carbon price to the Australian economy from 1 July 2012. The bilateral contracts of the gas transmission industry are not all equipped with the necessary provisions to appropriately allocate this cost, depending largely on the vintage of the contracts. This is not an issue for electricity supply infrastructure or gas distribution infrastructure, which will have the costs managed through regulated revenue.

## Wholesale energy price

The setting of the wholesale energy price in gas and electricity creates different utilisation risk for energy supply infrastructure.

### Electricity

In the National Electricity Market, the wholesale electricity price is set through a centralised bidding process. The process sets a consistent wholesale price across the NEM, and all electricity supply infrastructure shares the same exposure to the (small) impact the wholesale electricity price has on electricity demand.
In Western Australia an alternative system to determine the wholesale price applies, but the effect is the same, electricity supply infrastructure shares the same exposure.

### Gas

The wholesale gas price varies substantially across Australia, with the price of gas produced in each supply basin being influenced by a variety of factors. These factors include:

Exposure to export markets – gas can be exported as Liquefied Natural Gas. Global demand for LNG is predominately in economies reliant on energy imports, and as such LNG commands a significant premium over domestic gas in Australia. This means gas used in Australia sourced from basins with LNG infrastructure must be priced to compete with LNG opportunities.

Basin type – a number of geological and geographical factors influence the cost of gas production from a basin. The most obvious is whether a basin is onshore or offshore, with offshore basins having a much higher unit cost of production.

Basin maturity – the level of understanding of a basin depends on the length and intensity of activity in a basin. Basins that are better understood have lower exploration risk and costs, and typically have lower unit costs of production.

Remoteness –the remoteness of a basin impacts on logistics and production costs for gas, and also on transmission costs.

The price if further influenced by its determination through long-term bilateral contracts, price varies across gas users based on volume, contractual arrangements (take or pay, as available etc) and length and vintage of contracts. The expiry of long-term gas supply contracts can also lead to sharp, increased changes in gas price, as conditions will have varied over the contract period. This has been particularly noticed in WA in recent years, as 20 and 25 year contracts entered into at the commencement on the North-West shelf in 1984 expired.

There is a further variation in Victoria, with the Declared Wholesale Gas Market providing a Victoria market wide price set through centralised bidding.

These variations in wholesale gas price mean that gas is used differently across Australia and across sections of the economy. The utilisation of gas supply infrastructure is dependent on the relative cost of gas to other forms of energy and this varies over regions and time. This is particularly true for gas transmission infrastructure. Large industrial users of gas connected directly to transmission pipelines are more sensitive to the wholesale gas cost as it represents a greater portion of the delivered cost of gas (these users do not require the services of distribution networks or retailers).

## Investment within the gas supply sector

Many of the issues that create different risks between gas and electricity investments apply to investments within the gas supply infrastructure sector, leading to an environment where the risk profile of gas transmission and distribution investments vary. This variation also applies between gas transmission investments.

### Differences between gas transmission and distribution

Gas transmission and distribution assets have two different functions:

- A gas transmission pipeline's primary function is transport gas to a market.
- A gas distribution pipeline's primary function is to reticulate gas within a market.

There are other further fundamental differences between gas transmission and distribution assets that investors consider.

#### *Customer base*

By their nature, gas distribution networks are heavily dependent on residential and commercial load, both of which are small to negligible for the majority of gas transmission pipelines, with the VTS being the main exception.
For gas transmission pipelines, the customer base is typically a small number of large users, of which the load of a gas distribution network may be one.
There is further variation in the customer base between gas distribution networks based on the number of larger industrial and commercial customers connected to the network.

#### *Expansion investment*

Gas transmission relies on discrete large projects to underwrite lumpy capacity increases. Gas distribution businesses are more akin to electricity distribution businesses in that the growth tends to be more organic, related to reticulation into new subdivisions. So while the penetration of gas in the market remains relatively low, its rate of growth is still largely aligned to the rate of population growth in the served urban areas.

### Differences across regulated gas transmission infrastructure

The unique aspects of gas supply assets extend beyond the differences between transmission and distribution. Unlike the electricity transmission and distribution or gas distribution sectors, gas transmission assets are largely unregulated, as they face competition from each other and other energy alternatives.

Each transmission pipeline has its own start and finish point, transporting differently priced gas from different sources to different markets.

Each transmission pipeline has its own customer base, with the majority of capacity typically reliant of a small number of large industrial users. These differing customer bases create unique demand and utilisation profiles for each pipeline. They also impact the 'peakiness' of a pipeline's load, which has a direct impact on pricing as a pipeline must be built to meet the requirements of peak demand, but must generate revenue from utilisation.
Gas transmission is only one component of the delivered cost of gas.

Particularly in times of rising energy commodity process, the cost of gas transportation is a minor component of the delivered cost of gas. For high level comparison purposes, it is reasonable to examine the case of the Roma to Brisbane pipeline: the gas transportation tariff is in the order of 50 cents per GJ, a fraction of the commodity price of gas in the order of $8-$10 per GJ.

Gas transmission is a low cost but high importance link in the supply chain.

Pipeline businesses, like many other infrastructure businesses, are very capital intensive by their nature.

Generally speaking, the regulated return on capital can account for the majority (up to 60%) of the total revenue requirement of the regulated business. This is particularly the case of gas transmission pipelines, whose operating costs tend to be a lower proportion of costs relative to distribution pipelines.

An error in the AER's assessment of the cost of capital can therefore have a significant effect on the revenues of the regulated pipeline businesses.

### *Concentrated costs vs distributed benefits*

As discussed above, the cost of gas transmission is a very small component of the delivered cost of gas.

A reduction in gas pipeline revenues and tariffs will therefore result in very small savings to individual customers – potentially too small to be noticed in light of other input costs. Importantly, this small saving is likely to be too small to influence investment decisions of individual end users.

In contrast, the reduction in revenues caused by a regulatory WACC reduction is concentrated in the pipeline business. As demonstrated above, this concentrated impact is significant.

This concentrated cost would reasonably be expected to have a profound effect on the investment decisions of the pipeline owners, causing them to prefer to invest in non-regulated assets over regulated assets. Ultimately, this will restrict the availability of regulated pipeline capacity.

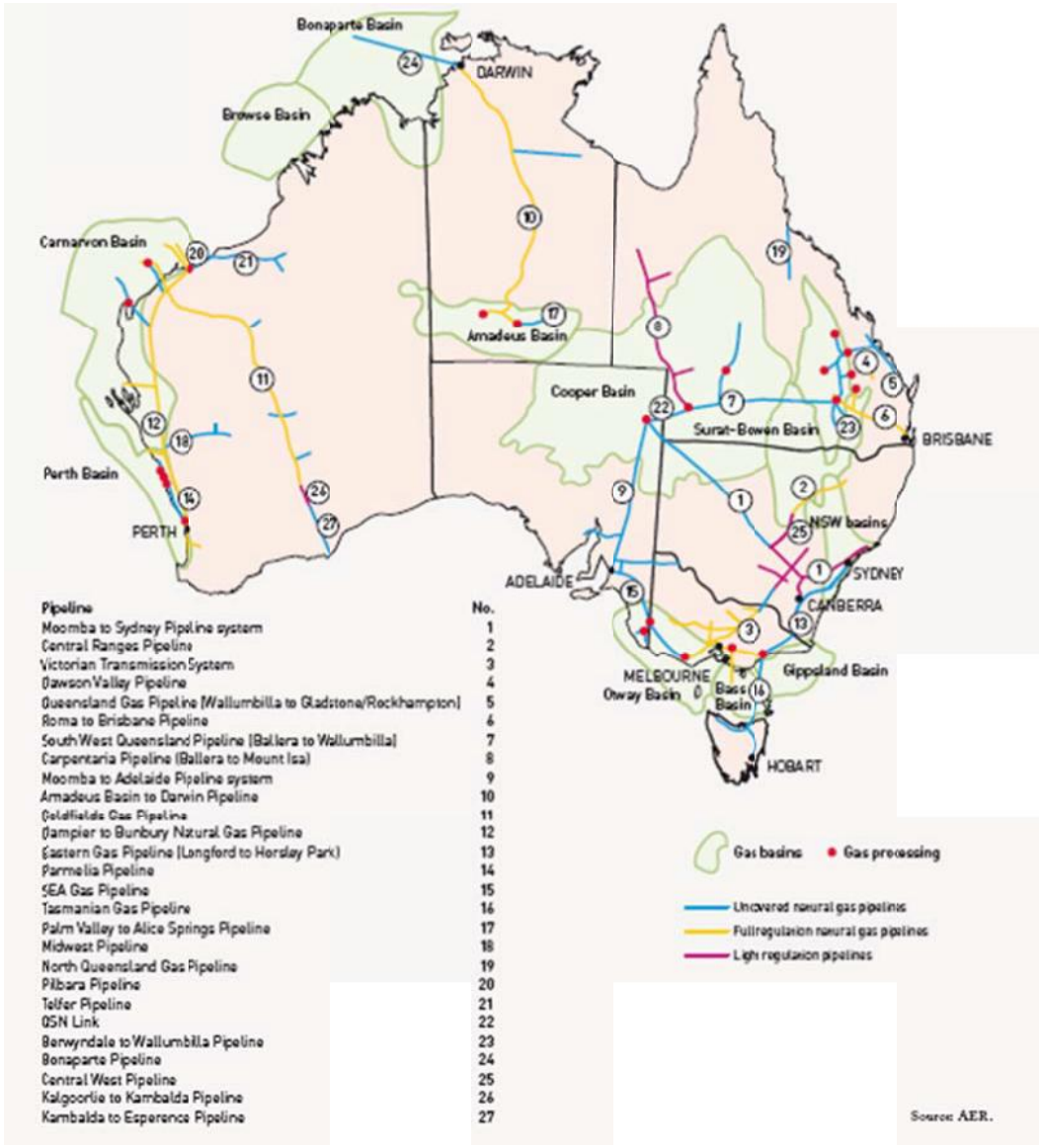
In its *Review of the National Access Regime*, the Productivity Commission acknowledged that there was an "asymmetry in the consequences of regulatory pricing errors":

*…..the Commission accepts that there is a potential asymmetry in effects: Over-compensation may sometimes result in inefficiencies in the timing of new investment in essential infrastructure (with flow-ons to investment in related markets), and occasionally lead to inefficient investment to by-pass parts of a network. However, it will never preclude socially worthwhile investments from proceeding.*

*On the other hand, if the truncation of balancing upside profits is expected to be substantial, major investments of considerable benefit to the community could be forgone, again with flow-on effects for investment in related markets*

*In the Commission's view, the latter is likely to be a worse outcome. Accordingly, it concurs with the argument that access regulators should be circumspect in their attempts to remove monopoly rents perceived to attach to successful infrastructure projects.*[49]

[49] Productivity Commission *Review of the National Access Regime*, Inquiry Report No 17, 28 September 2001. Page 83




| Pipeline | No. |
|---|---|
| Moomba to Sydney Pipeline system | 1 |
| Central Ranges Pipeline | 2 |
| Victorian Transmission System | 3 |
| Dawson Valley Pipeline | 4 |
| Queensland Gas Pipeline (Wallumbilla to Gladstone/Rockhampton) | 5 |
| Roma to Brisbane Pipeline | 6 |
| South West Queensland Pipeline (Ballera to Wallumbilla) | 7 |
| Carpentaria Pipeline (Ballera to Mount Isa) | 8 |
| Moomba to Adelaide Pipeline system | 9 |
| Amadeus Basin to Darwin Pipeline | 10 |
| Goldfields Gas Pipeline | 11 |
| Dampier to Bunbury Natural Gas Pipeline | 12 |
| Eastern Gas Pipeline (Longford to Horsley Park) | 13 |
| Parmelia Pipeline | 14 |
| SEA Gas Pipeline | 15 |
| Tasmanian Gas Pipeline | 16 |
| Palm Valley to Alice Springs Pipeline | 17 |
| Midwest Pipeline | 18 |
| North Queensland Gas Pipeline | 19 |
| Pilbara Pipeline | 20 |
| Telfer Pipeline | 21 |
| QSN Link | 22 |
| Berwyndale to Wallumbilla Pipeline | 23 |
| Bonaparte Pipeline | 24 |
| Central West Pipeline | 25 |
| Kalgoorlie to Kambalda Pipeline | 26 |
| Kambalda to Esperance Pipeline | 27 |

**Map of Australia's gas transmission infrastructure and gas basins**[50]

APIA provides some information of the differing customer bases and gas sources of five regulated gas transmission pipelines, leading to different risks in providing reference services. Further public domain information on the unique aspects for each of these regulated pipelines discussed below can be found in the access arrangement submissions for each pipeline on the AER's website.

### *Dampier to Bunbury Natural Gas Pipeline (DBNGP)*

The DBNGP transports gas from the offshore Carnarvon basin in the north west of Western Australia and the onshore Perth Basin to the demand centres of the south west. It runs from the Burrup Peninsula in the Pilbara region, to Bunbury in the south west of Wester Australia. Domestic gas must travel over 1,500 km via the DBNGP from the largest gas fields.

[50] AER State of the Energy Market 2010, p70

It supplies gas to industrial, commercial and residential customers in Perth and major regional centres along the pipeline route. The DBNGP connects to all other gas transmission pipelines in the state and more than 70% of all gas flows through the DBNGP to get to its intended market.

Customer Base

The DBNGP supplies gas to the major gas users of WA. In Western Australia, 5 major customers account for around 90% of total domestic gas consumption.[51] These are Alcoa, Alinta, Burrup Fertilisers, Verve Energy, and BHP Billiton. Alcoa, Verve Energy and Burrup Fertilisers transport all their on the DBNGP, while Alinta and BHP Billiton transport most of their gas on the DBNGP with supply to some remote areas delivered through other pipeline systems.

Gas transported by the DBNGP is used in 5 main categories:

- Mineral processing 38%
- Power Generation 30%
- Other industrial 15%
- Mining 9%
- Residential and Commercial 8%[52]

The WA retail gas market, while accounting for over 7,000 small industrial and commercial customers and more than 500,000 residential connections, represents only 8% of the gas delivered by the DBNGP.

Gas Source

Gas transported by the DBNGP is sourced from the offshore Carnarvon Basin through three production facilities, the Karratha Gas Plant, owned by North West Shelf Gas (NWSG) and the Varanus Island Facility and newly commissioned Devil Creek Gas Plant, both operated by Apache Energy . The NWSG Facility, in operation since 1984, is also an LNG production facility, and the majority of process in the facility is exported.

### *Goldfields Gas Pipeline (GGP)*

The GGP transports gas from the Carnarvon Basin and Northwest Shelf producers to mining customers in the Pilbara, Murchison and Goldfields mining regions of Western Australia for industrial use and power generation. The majority of usage is linked to the production of nickel, iron ore and gold.

Customer Base

The bulk of the GGP market comprises distinct gas loads. The main loads are either independent power producers or power stations embedded in mining operations.

[51] APPEA, "Fact Sheet, The Western Australian Gas Market", 2007

[52] http://www.dbp.net.au/about-dbp/customers.aspx

Additionally, some mining operations have a requirement for gas for use in their minerals processing plant. Gas transported by the GGP is used predominately for:

- Nickel 41%
- Iron Ore 34%
- Power generation 15%
- Gold 9%

Gas Source

Gas transported by the GGP is sourced from the Varanus Island Facility, operating since 1987, which has limited redundancy. An interconnect to the DBNGP provides some exposure to the NWSG.

### *Roma to Brisbane Pipeline (RBP)*

The RBP transports natural gas from the gas hub near Roma to the markets of Brisbane and the regional centres along the pipeline route. The RBP mainline and metro sections were constructed in 1969 with the Peat Lateral constructed in 2001.

Customer Base

- Industrial ~60%[53]
- commercial and residential gas users 7% [54]
- Gas-fired power generation ~30%[55]

Gas Source

Queensland coal seam gas and conventional gas from the Surat Bowen basins - injected at Roma, Arubial, and other receipt points for fields along the pipeline

### *Amadeus to Darwin Pipeline (ADP)*

The AGP transports gas from the offshore Blacktip gas field to Darwin, Alice Springs and regional centres, principally to fuel power generation in the Northern Territory.

Customer Base

Primarily gas fired power generation serving NT mining operations and Darwin residential and commercial demand.

Gas Source

Gas is delivered into the Amadeus Gas Pipeline via the Bonaparte Gas Pipeline (Energy Infrastructure Investment - EII) at Ban Ban Springs, flowing north to Darwin and south to

[53] Derived from 7&8

[54] APT Petroleum Pipelines Limited Access Arrangement Submission Effective 12 April 2012 – 30 June 2017, page 26

[55] AEMO 2010 GSOO Annual throughput projections

Alice Springs and regional centres. There is also an emergency supply of gas being delivered via the Wickham point pipeline.

The AGP is an interesting case as its source of gas has changed over time. The pipeline was originally constructed to transport gas from the Amadeus basin in central Australia to Darwin. As that reservoir has become depleted, a new source of supply has been connected to the pipeline and gas can flow south to serve markets near Alice Springs. This has required substantial contractual amendments and changes to arrangements for all shippers on the AGP.

### *Victorian Transmission System (VTS)*

The Victorian Transmission System (VTS) comprises high pressure gas transmission pipelines in Victoria, serving an approximate consumption base of 1.4 million residential consumers and 43,000 industrial and commercial users, with an average annual throughput in excess of 220 PJ per annum. Almost all the natural gas consumed in Victoria is transported through the VTS.

Unlike all other gas transmission pipelines, the VTS' revenue is not generated through contract carriage, it is a market carriage pipeline.

Customer Base
Industrial, commercial and residential gas users; gas-fired power generation. Commercial and residential gas use is strongly weather dependent.

Gas source
Offshore Bass Strait gas fields - Gippsland, Otway and Bass basins
LNG - Dandenong LNG Gas Storage Facility
TRUenergy Underground Storage (Port Campbell)
Cooper Basin Gas (and Queensland and NSW coal seam gas) via the MSP and NSW-Victoria Interconnect

To summarise the key differences in the five regulated gas transmission pipelines above:

| Pipeline | Primary customer base | Source of gas | Revenue Model |
|---|---|---|---|
| DPNGP | Minerals processing<br>Gas fired power generation<br>Manufacturing | Offshore Carnarvon basin – NWSG and Varanus Island<br>Export competition | Contract Carriage |
| GGP | Mining | Offshore Carnarvon Basin -Varanus Island | Contract Carriage |
| AGP | Power Generation | Single offshore field – Blacktip<br>Formerly Amadeus Basin | Contract Carriage |
| RBP | Power Generation<br>Large Industrial<br>Residential & Commercial | Surat-bowen Basin<br>Conventional and increasingly coal seam gas | Contract Carriage |
| VTS | Residential & Commercial<br>Small-mid industrial; | Multiple offshore basins<br>Linkages to QLD/SA supply through NSW<br>Storage facilities | Market Carriage |

## Summary

APIA has highlighted the primary risks investors in electricity, gas transmission and distribution face that can be reflected in the regulatory determinations of the AER and result in different WACC parameters. These risks clearly demonstrate it is inappropriate to apply the same benchmark WACC parameters to all determinations.

Rule 87(1) recognises that gas supply infrastructure faces different risks in providing reference services and that the rate of return for each assets must reflect this.
Any process that does not reflect this cannot promote the NGO.

There are many other differences between electricity and gas supply infrastructure, and between gas supply infrastructure assets. APIA considers the narrative provided in the AER's State of the Energy Market 2010 provides an excellent high level overview of the different gas markets in Australia.

the australian PIPELINE industry association Ltd


# Economic Regulation of Network Service Providers

## Response the AEMC Draft Determination on Rule Change Proposal GRC0011

4 October 2012

## Executive Summary

The Australian Energy Market Commission released its Draft Rule Determination on Economic Regulation of Network Service Providers, and Price and Revenue Regulation of Gas on 23 August 2012. The Determination included, *inter alia*, draft Rules for gas, principally a new Rule 87. The Determination set out a set of features that the Commission is seeking to achieve.

APIA is strongly supportive of the features that the Commission is seeking to achieve. However, in APIA's view as drafted the Draft Rule will fall short of the Commission's intent and achievement of the National Gas Objective (NGO) and the Revenue and Pricing Principles. In reaching this conclusion APIA has been advised by Johnson Winter and Slattery (JWS) lawyers and CEG economists. JWS has provided proposed drafting changes for the Commissions consideration.

The key aspects of the draft Rule that APIA believes require reconsideration are:

- The reinstatement of the requirement that the rate of return be "commensurate with the prevailing conditions in the market for funds as part of the overarching objective for the rate of return in Rule 87(2); and
- That the requirement for the regulator to consider all relevant methods, financial models, data and evidence be clarified so that it is understood that multiple methods, models etc are to be weighed up in determining the best estimate for the rate of return.

Other important aspects of the draft Rule that also need reconsideration are:

- Clarification of the terms in Rule "efficient financing cost" and "benchmark efficient entity" neither of which have an agreed clear meaning;
- The rate of return objective require that the allowed rate of return "correspond to" the "best estimate of " the benchmark efficient entity's efficient financing costs, so that the precision implied by the words "corresponds to" are tempered by the recognition of the uncertainty associated with estimating the rate of return;
- Enhancements be made to the process for the development of rate of return guidelines;
- In the event that the Commission decides against APIA's proposed changes to Rule 87(2) that the decision about the cost of debt methodology at very least be a limited discretion decision; and
- There should be transitional provisions for businesses that have had a basis other than a post tax nominal basis for the rate of return that would avoid the confiscation of value associated with the change in basis.

APIA commends these and the more detailed proposals set out in this submission to the Commission for its consideration.

# Contents

# 1. Introduction

The Australian Pipeline Industry Association (APIA) welcomes the opportunity to respond to the Commission's Draft Rule Determination released on 23 August 2012 (**Draft Determination**) setting out draft Rules and the rationale behind its response to the Rule Change proposals made by the AER and the EURCC.

APIA is the peak industry body representing Australian gas transmission industry. The views expressed in this submission are the agreed position of the owners of regulated gas transmission infrastructure in Australia.

APIA acknowledges the assistance of Mr Chris Harvey of Chris Harvey Consulting in preparing this submission and Tom Hird of CEG and Roxanne Smith of Johnson Winter and Slattery (JWS) in preparing the supporting report at Attachments 1 and 2.

As in its previous submissions APIA recognises that, in addition to dealing with the regulated rate of return, these Rule change proposals cover matters surrounding capex incentives, capex and opex forecast and regulatory processes. While APIA is interested in the non rate of return matters, because of the potential to flow on to the NGR, it notes that the Commission has not indicated in the Draft Determination a preference to change any of the provisions in the NGR relating to the non rate of return matters.

Accordingly, this submission will focus on the matters directly related to the NGR, namely the rate of return.

# 2. Does the draft Rule best reflect the key features?

### A common framework

The Commission has determined that there should be a common rate of return framework across gas and electricity transmission and distribution. As indicated in its response to the Directions Paper, APIA considers this to be preferable. APIA has demonstrated that the existing arrangements of the highly prescriptive framework applicable to electricity have had the effect of overriding the flexibility and responsiveness of the gas framework. This appears to be largely because the AER has appeared to feel bound to have all of its decisions on rate of return for energy service providers use the same approach. Inherently the flexible system conforms to the inflexible system. Clearly then, creating a common framework that has flexible features, such as those currently in the NGR, means that the sort of flexible and responsive features that are more likely to result in a reliable rate of return estimate will apply, avoiding the current problems of the NER rate of return provisions in constraining the operation of the NGR.

APIA also notes and endorses the Commission's confirmation of the desirable features of a rate of return framework at 6.3.4 of the Draft Determination. The following is APIA's assessment of the draft Rule in achieving the features, subject to drafting refinements suggested in this submission.

| Feature of the Rate of Return Framework | Achievement of the Feature |
|---|---|
| Estimating a RoR for benchmark efficient service provider | **Largely achieved.** APIA agrees with the adoption of a "model" efficient service provider as the basis for determining the appropriate regulated return. It should not be the return of an actual company and in order to be consistent with the NGO should be the cost of capital a company operating efficiently and raising finance effectively and efficiently.<br><br>The overarching criterion for the rate of return requires [Rule 87(2)] "the allowed rate of return to correspond to the efficient **financing costs of a benchmark efficient entity**". To the extent that the meaning of the terms "efficient financing" and "benchmark efficient entity" are clear this feature is achieved. A more detailed explanation of this concern is provided in section 4.1 below. |
| Methodologies driven by principles and reflecting current best practice | **Potentially achieved.** Consistent with its earlier submissions APIA considers this an essential feature. The current NER prevent such an approach and it is desirable that the Rules provide an environment in which the breadth of methodologies, models data and approaches are considered on the basis of sound economic and analytical principles.<br><br>The allowed rate of return is to be determined [Rule 87 (2)(c)] "taking into account relevant estimation methods, financial models, market data and other evidence. Rule 87 (7) suggests cost of debt methodologies, but does not limit them.<br><br>Rule 87(10) – (16) requiring a rate of return guideline provides for a wide consideration of methodologies for the estimation of the rate of return.<br><br>Together these Rules contribute to an environment where there is wide consideration of methodologies, principles and best practice. The effectiveness of these Rules will depend on the quality of submissions and contributions by participants to the guideline consultation and the willingness of the regulators to fully consider the material put before them and undertake research of their own. This Rule is designed to require the regulators to take a broader view in determining the rate of return than has historically been the case. This approach is considerably different to that required in the current NER Chapter 6 and Chapter 6A. However, as discussed in section 4.2 below, despite the Commission's intent the drafting of the Rules does not preclude the regulators restricting their ultimate consideration to |

| Feature of the Rate of Return Framework | Achievement of the Feature |
|---|---|
| | the Sharpe-Lintner CAPM alone. |
| Flexibility to deal with changing market conditions and new evidence | **Largely achieved.** Similarly in its previous submissions APIA argued for the need for decisions about the regulated rate of return to be made using market evidence available and applicable at the time of the regulatory review.<br><br>The draft Rule provides that the decision on the rate of return is made as part of each regulatory review. No parameters or methods are locked in by the Rules by a periodic WACC review. In theory this should allow for changing market conditions and new evidence. However, the strong role of the rate of return guideline will create considerable inertia, because the regulator is obliged to explain any departure from the guideline. While not required to adhere to the guideline the regulator can be expected to prefer to adhere the guideline outcome rather than depart from it.<br><br>So while there is flexibility to respond to changes and new evidence, APIA expects that there will be inertia on the part of the regulators in responding to them. |
| Inter-relationships between parameter values | **Achieved.** In order to achieve a reliable estimate of the cost of capital it is essential that models and approaches are internally consistent. This requires that inter-relationships between parameter values are properly recognised and taken into account.<br><br>Rule 87(4) specifically deals to the issue of internal consistency and inter-relationships |
| Accountability for both the regulator and the service provider | **Achieved.** APIA has also argued about the need for accountability of all participants in a regulatory review, whether the service provider, the regulator or other parties making submissions to regulatory review.<br><br>The role of the regulator and the service provider is clearly established in the Rules. The Rule provides the criteria for determining the rate of return, the matters that must be taken into account and the role of the guidelines. The role of merits review is critical to achieving regulatory accountability. This has been achieved by move away from the approach under Chapter 6A, and to a lesser extent Chapter 6, of the NER. |
| Regulatory certainty | **Somewhat achieved.** The aspect of regulatory certainty, which APIA sees as being needed, is that the Rules provide a framework where |

| Feature of the Rate of Return Framework | Achievement of the Feature |
|---|---|
| | by the best estimate of the rate of return can be and is likely to be made. APIA is not keen to see the sort of regulatory certainty where the rate of return outcome can be predicted but the outcome is not an accurate estimate of the rate of return.<br><br>Regulatory certainty is provided in the draft Rule 87 through providing clarity to a number of key matters in the regulator's decision making process and through the issuing of the rate of return guideline with its accompanying consultation process providing investors with a strong indication of how the regulator will determine the rate of return. However, there are two uncertainties in the draft Rule that may not be easily resolved. These arise from the apparently intended broad level of discretion given to the regulator in how it will undertake the development of the rate of return guideline and how it will take into account relevant estimation methods, financial models market data and other evidence. There is considerable scope for thorough, rigorous and transparent analysis and decision-making. However, there is scope for something considerably less, as explained in section 4.2 and 4.3 below. |
| More effective customer participation | **Achieved.** APIA sees the main benefit of customer participation is that customers will better understand process and outcomes of a regulatory review and, in particular, the way in which the regulated rate of return is determined. The inclusion of the rate of return guideline with its consultation process provides a more accessible forum for customer participation. This is an additional benefit of the requirement for a guideline. |

# 3. Head Line Issues

## 3.1 The Allowed Rate of Return Objective (Rule 87(2))

Consistent with its earlier submissions, APIA is highly supportive of the inclusion of a rate of return objective that is to be used by the service provider and the regulator to test whether a rate of return determined by applying the other elements of Rule 87 is of necessary quality. It contains significant principles and criteria:

- That the rate of return correspond to the costs of efficient financing practice;
- That the rate of return should relate to a benchmark entity rather actual entity;
- That the benchmark entity be an efficiently run business; and
- That the benchmark company have similar nature and degree of risk as the regulated service provider.

The only element APIA considers missing is the requirement that the rate of return correspond to the prevailing conditions in the market for funds. A more detailed discussion of our concerns on the treatment of this matter is detailed below.

While APIA is supportive of the Commission's Rate of Return objective, we have concerns about the meaning of two particular terms in Rule 87(2): "efficient financing" and "benchmark efficient entity".

### "Efficient financing"

APIA is concerned that this term is new to the regulatory arena and does not have readily recognised meaning in the context of economic regulation. APIA also notes that the proposed words leave considerable room for interpretation about the meaning of the individual words "efficient " and "financing" and how they should be interpreted together.

"Efficient" is not a term used in financial theory and practice in respect of a company's financing practices. Efficiency is normally applied to markets and investment portfolios.

"Financing" is probably clearer in meaning and should naturally be understood to be the provision of funds or finance necessary for a company to operate and invest and would include a number of sources of funds, but would typically be through debt and equity.

APIA assumes the intent behind the words "efficient financing cost" is the lowest sustainable cost for obtaining debt and equity necessary for the business to operate efficiently in the sense of economic efficiency. It is likely that the Commission has in mind inclusion of the benchmark level of gearing for businesses of similar type and risk as the service provider. APIA suggests that clarity would substantially reduce the potential for disputes arising from uncertainty in respect of the term.

### "Benchmark efficient entity"

The term "benchmark efficient entity" is found in the NER Chapter 6[1] and Chapter 6A[2]. Despite its use in the NER, in APIA's view the meaning of this phrase is not precise and the intent behind has not been precisely articulated in this context. The Draft Determination does not provide an explanation of the Commission's intent, presumably because it considers the meaning is common ground. It is not clear to APIA that it is common ground. APIA's understanding is that the intended meaning of the words is a notional corporate entity that acts as a benchmark and is assumed to be operating at the lowest sustainable cost in terms of investment and operation and financial arrangements. However, it is important that the Commission clarifies the meaning of the phrase.

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[1] National Electricity Rules, Rule 6.5.2, various references

[2] National Electricity Rules, Rule 6A.6.2,various references

APIA suggests the following words provided by JWS[3], which are based on those in the current Rule 87(2)(ii) "the costs capital for debt and equity using a financing structure that meets benchmark standards as to gearing and other financial parameters for an entity that meets benchmark levels of efficiency" be applied in Rule 87(3)(a) to bring clarity to the phrases "efficient financing costs of a benchmark efficient entity".

### "Correspond to"

APIA's legal advice from JWS[4] is that while the meaning of "correspond to" can vary, depending on its context and the legislative purpose, in the case of the proposed Rule 87 (2) that phrase means the determination of a rate of return that is the best equivalent of what is experienced by the benchmark entity. That is, there must be a strong alignment between the rate of return determined and those estimated for an efficiently financed benchmark entity.

Importantly, JWS highlights the mismatch between the intended level of precision of the words "correspond to" and the imprecision associated with the task of estimating the rate of return. JWS recommend the addition of the words "best estimate" to proposed Rule 87(2) to better achieve the Commission's intent.

### "Prevailing conditions in the market for funds"

APIA notes that the draft Rule has not included a key element of the current Rule 87(1), which establishes the primary objective in setting the rate of return. In APIA's view, the phrase "prevailing conditions in the market for funds" is of key importance in establishing the regulated rate of return, and it is essential that it remain part of the allowable rate of return objective. APIA's rationale relates to the components of the phrase:

- **The market for funds:** this emphasises that cost of capital finance are to be determined from actual market information, not from theoretical sources.
- **Prevailing conditions:** this phrase highlights the fact that costs of debt and equity must be those prevailing at the time of the Access Arrangement review. It is essential to a service provider's capacity to raise funds that the rate of return fully reflect the cost of raising those funds at the time that the Access Arrangement Decision is made and does not relate to earlier periods. This was one of the major problems with the Statement of Regulatory Intent process in Chapter 6 of the NER and the Statement of the Cost of Capital in Chapter 6A.

The Commission itself notes the importance of this point in the draft Rule where it says,

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[3] Memorandum from JWS to APIA, 3 October 2012, page 4

[4] Memorandum from JWS to APIA, 3 October 2012, page 3

*"If the allowed rate of return is not determined with regard to the prevailing market conditions, it will either be above or below the return that is required by capital market investors at the time of the determination".*

CEG supports this view[5]:

*"To the extent that it [the term prevailing conditions in the market for funds] as part of the objective and not simply a requirement to achieve when estimating the rate of return, gives primacy to the need to estimate a prevailing rate of return (rather than this being one of a range f potentially conflicting objectives we consider that it is more likely to achieve the NGO".*

APIA observes that the draft Rule includes this phrase in proposed Rule 87(5)(b) in relation to the cost of equity, although it is noted that the regulator is required to take into account the prevailing conditions in the market for equity funds for the cost of equity. JWS points out that this is not as strong a requirement as under the current Rule 87 and proposes that if the prevailing conditions in the market for funds is not added to proposed Rule 87(2) then it is essential that the words "take into account" should be replaced with stronger words from the existing Rule 87 "be commensurate with".

APIA also observes that the draft Rule does not apply the phrase "prevailing conditions in the market for funds" in respect of the cost of debt. APIA assumes that this is because the Commission has formed the view that the trailing average methodology to the cost of debt is not consistent with the use of the phrase "commensurate with the prevailing conditions in the market for funds" and the Commissions wishes to ensure that the Rule 87 allows the use of the training average methodology.

Consistent with its previous submissions APIA does not consider the trailing average methodology to the cost of debt to be relevant or applicable to its members. However, it does consider that it is essential that the allowable rate of return objective includes the requirement that the rate of return be commensurate with the prevailing conditions in the market for funds. The logical consequence is that if the trailing average methodology is precluded that those provisions of draft Rule 87 that have been designed to facilitate the trailing average approach become redundant.

JWS has developed drafting to reflect the inclusion of the phrase "commensurate with the prevailing conditions in the market or funds" in the allowable rate of return objective[6]. In APIA's view, while drastic and clearly not the Commission's intention, inclusion of the phrase "prevailing conditions in the market for funds" are so important as to consider such a change to the draft Rule as necessary.

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[5] Proposed AEMC changes to the National Gas Rule 87, CEG, page 13

[6] Memorandum from JWS to APIA, 3 October 2012, Attachment 1

However, if the Commission considers that the use of the trailing averages methodology to the cost of debt must be included in the Rule (thereby requiring it not be included in the allowable rate of return objective) then as identified in section 4.5 below, it is essential that the service provider be given discretion about the methodology to be applied to the cost of debt. Ideally this would be at the sole discretion of the service provider, but if this is not acceptable to the Commission APIA submits sub-Rules (6) and (7) at least be limited discretion decisions under Rule 40. JWS has also prepared drafting[7] consistent with this approach also.

## 3.2 Use of a range of methodologies, models, market data and other evidence

APIA notes the Commission's consideration of the Australian Competition Tribunal's decisions in respect of ATCO Gas and DBP's applications for merits review. In particular, the Tribunal's interpretation of Rule 87 that led to it accepting the ERA's exclusive consideration of the CAPM in determining the cost of equity. In particular, APIA notes and agrees with the Commission in saying,

> *"that requiring the regulator to have regard for more relevant information methods, financial models and other market data and allowing the regulator more capacity to achieve the overall objective, combined with a strengthen emphasis on achieving this objective, is more likely to achieve the NEO and the NGO that current approaches[8]."*

The Commission has given effect to this intent in proposed Rule 87 (3)(c) requiring that,

> *"the allowed rate of return …… is to be determined: …..(c) taking into account relevant estimation methods, financial models, market data and other evidence".*

As identified above this Rule provides the opportunity for the Service Provider and the regulator to rigorously and thoroughly consider a broad range of theory, research, practice, data and analysis to inform a rate of return estimate. Consistent with APIA's submission in response to the Directions Paper this is a highly desirable outcome.

APIA is concerned that in providing such broad discretion through the words "taking into account relevant" there is scope not only for thorough and rigorous assessment of the various estimation methods, financial models, market data and other evidence, but also scope for valid and relevant information to be discounted or its importance diminished or for non-rigorous methods of assessment to be applied. That is, the requirement to take into account a broad range of relevant material does not give certainty about whether the

[7] Memorandum from JWS to APIA, 3 October 2012, Attachment 2

[8] Draft Rule Determinations, Draft National Gas Amendment (Price and Revenue Regulation of Gas Services) Rue 2012, 23 August, AEMC, page 56

appropriate weight will be given to any particular piece of evidence. In particular, the regulator could consider all of the relevant material and decide to adopt a single model for example in the case of the cost of equity, the Sharpe Lintner CAP{M.

Advice from JWS[9] is that the Rule as currently drafted[10]

> *"could result in the Regulator considering other estimation methods, financial models, etc, but then putting to one to the side and continuing to estimate the cost of debt and the cost of equity using its preferred approach (ie the Sharpe Lintner CAPM), which would appear to be contrary to the objective of the rule change."*

CEG confirms APIA's view that the potential adoption of s single model is problematic its report[11].

> *We stated at section 3.2 of our previous report that approaches that rely on a single methodology will not meet the NGO. Accepted use of financial models has evolved over time with experience and research and this evolution continues. There remains a great deal of disagreement in the finance literature over which models best explain risk-adjusted returns. "Locking in" a particular implementation of just one model and assuming that only the output of this model is relevant to assessing the rate of return or cost of equity, cannot give rise to the best and most reliable estimates of the rate of return and will not meet the NGO>"*

APIA recognises that the latter outcome is not what the Commission intends, and that care must be taken in any revision of proposed Rule 87(3)(c) to avoid undesirable consequences through significantly greater prescription. APIA considers that there are two actions that the Commission can take to help avoid the possibility of too narrow a consideration of the range of methods, models data etc described above. Firstly, the Final Determination can make it abundantly clear that "relevant" is intended to be a low threshold for consideration and that a rigorous assessment of the various estimation methods, financial models market data, and other evidence is to be applied, by both the service provider and the regulator. Secondly, APIA proposes the following words developed by JWS be added to proposed Rule 87(3)(c)[12] to assist:

> *based on relevant estimation methods, financial models, market data and other evidence. <u>The allowed rate of return should be estimated using multiple relevant estimation methods, financial models, market data and evidence.</u>*

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[9] Memorandum from JWS to APIA, 3 October 2012, page 5, 6

[10] Memorandum from JWS to APIA, 3 October 2012, page 6

[11] Proposed AEMC changes to the National Gas Rule 87, CEG, page 4

[12] Memorandum from JWS to APIA, 3 October 2012, Attachment 1 and 2

CEG confirms the desirability of adding second sentence[13]:

> *"We believe this clarification does assist the AEMC's objective by ensuring that the status quo of sole reliance on a single implementation of the CAPM cannot continue to be the basis of future decision making."*

## 3.3 Guidelines

APIA can see value in the regulator issuing guidelines. It will provide an opportunity for a thorough consideration of the breadth of rate of return issues outside of the specific focus of an Access Arrangement. It will also provide investors with a clear picture of how the regulators intend to assess the regulated rate of return. There are however, some features of the proposed guidelines and the consultation process to achieve them that need adjustment.

### Consultation Timetable and Process

APIA is of the view that the proposed timetable for the first set of guidelines is too short. Given the introductory nature of the first guideline and the fact that the matters to be considered under the new guidelines are by intention much broader than that under the SOCC/SORI process in the NER, more time should be provided to allow for undertaking the research, data gathering and analysis to allow the full range of estimation methods, financial models, market data and other evidence to be considered properly.

In addition, the process of consultation and evaluation required for the guidelines has not been undertaken under the NGR or the Gas Code. To the extent that there has been a broader consideration of different models, methods, data and other evidence, it has arguably been a cursory consideration and not the broad ranging and thorough consideration contemplated by the Commission. This is arguably true of the SORI and SOCC processes which were truncated by the narrow and prescriptive provisions of Chapter 6 and 6A of the NER.

APIA is sympathetic the need to minimise the need for and extent of deferrals of regulatory processes under the proposed transitional arrangements. APIA understands that these are designed to minimise delay in the application that the new Rule 87 to regulated energy infrastructure businesses. APIA considers the addition of one month in order avoid compromise in the development of high quality guidelines is to be preferred.

APIA suggests the following periods for the first guideline consultation:

- Proposed Rule 87(13)(b) – period to be 40 business days instead of 30 business days

[13] Proposed AEMC changes to the National Gas Rule 87, CEG, page 13

- Proposed Rule 87(13)(d) – period to be 40 business days instead of 30 business days

The dates in proposed Rule 87 (13) would need to be amended to take account of these changes.

APIA also wishes to raise one concern about the Guideline Process in Rule 9B. That is the absence of a consultation step before the regulator issues its draft revised Guidelines. The absence of this step truncates the process. In almost all regulatory processes there is an opportunity for airing of issues before a draft decision is made. This is the case in an Access Arrangement decision; it is the case in Revenue and a price Determinations for electricity. It is also the case in the Rule change process, most notably the Commission provided additional consultation on the initial Rule change proposal through the Directions Paper before arriving at its Draft Determination. In the light of the breadth and complexity of issues around the rate of return APIA considers such a process step as essential. In fact it is particularly so, because there is no process for review or appeal of the guideline by a third party.

This is also important for the regulators. It is well understood that a Draft decision by a regulator is one from which it will not quickly depart and will typically feel compelled to only make fine tuning changes in arriving at a final decision. APIA considers inclusion of a consultation step, before the regulator starts to formula clear views, to be significantly more conducive to an open consideration of the issues and a healthier, less adversarial debate. APIA commends the addition of a step as in Rule 87(13)(a) into Rule 9B.

## Focus on estimation methods, financial models, market data and other evidence

The Draft Determination conveys the clear intent that the guidelines to be developed by the AER/ERA should focus on the financial models, methodologies, estimation techniques, information the AER/ERA will have regard to, guidance on how it will use, information models etc, weight to be given to various model estimates and data. It also indicates that the AER/ERA may provide current estimates of relevant parameters.

APIA notes in particular the Commission's comment in the Draft Determination:

> *The Commission anticipates that the guidelines would allow a service provider or stakeholder to make a reasonably good estimate of the rate of return that would be determined by the regulator if the guidelines were applied. In other words, the methodologies to be adopted and the information sources to be used should be sufficiently well explained such that they could be applied with a reasonable degree of accuracy*[14].

APIA endorses this intention and notes that while the Commission envisages that current estimates of parameters may be included to assist service providers and other stakeholders,

[14] Draft Rule Determinations, Draft National Gas Amendment (Price and Revenue Regulation of Gas Services) Rue 2012, 23 August, AEMC, page 60

it does not suggest that the guidelines should in anyway lock in parameter values as is currently done as part of the SOCC and SORI processes for electricity transmission and distribution. This is a crucial point for APIA. It is the locking in of parameter values that prevents a rate of return decision at the time of an Access Arrangement review being commensurate with the prevailing conditions in the market for funds.

While it seems clear to APIA that proposed Rule 87(11) only requires the guidelines to set out methodologies and the manner of their use, estimation methods, financial models, market data and other evidence and how these will be taken into account in estimating the cost of capital, they do not prevent the AER/ERA from going beyond this to establishing parameter values, that by virtue of proposed Rule 87(16) will implicitly be locked in. APIA does not think that this is what the Commission intends, but considers it a real possibility and an undesirable outcome.

To the extent possible, without introducing unnecessary prescription, it would be desirable to signal to the AER/ERA that the guidelines should not establish specific parameter values. This would mean that the inclusion of current estimates of relevant parameters would be indicative rather than prescriptive, which appears to be the Commission's intention.

### Guidelines or de facto rules

While there are clear benefits of requiring the regulators to develop and consult on the rate of return guidelines, as alluded to in the previous section, the guidelines have the potential to lock in the various matters that the regulators must consider in developing the guidelines. As discuss above there are real benefits in the regulator considering the range of matters around methods, models, data etc and to set out how it will approach these matters. The problem arises in that in producing the guideline and having to explain any departure from it as required by Rule 87(16) the tendency will be for the regulators to adhere to the guidelines, even in the face of evidence for departure at the time of an Access Arrangement review.

Departure may be indicated because of a change of circumstances in either markets of in the development of new research or practice. However, it may also be because the regulator may have erred in developing the guidelines. In the event that there is an error in the guidelines, the service provider is burdened with demonstrating that the guideline was in error as well as making a case for correcting it. The fact that the regulator applied the guidelines in an Access Arrangement decision will make it harder to demonstrate error, if a party decides that recourse to merits review is warranted.

APIA is not aware of any clear remedy, other than the fact that the more the regulator addresses the issues of methodologies, models, data, weightings etc and avoids prescriptive setting out of parameter values and locking in the more detail elements of the rate of return, the less likely that these issues of inertia will arise.

### Clarity about reasons

While the drafting of proposed Rule 87(11) requires that the guidelines are to set out the methodologies the regulator proposes to use in estimating the allowed rate of return and the methods, financial models, market data and other evidence the regulator proposes take into account in determining the rate of return. It would be appear to be implied that the regulator must give reasons for these decisions and for decisions about the weigh to be given to particular evidence and reasons why some evidence may not be considered relevant. However, APIA considers that it would be beneficial if the Rules also require the regulator to include reasons for its various decisions. This would be consistent with other places in the Rules where the regulator must give reasons. For example, Rule 59(4) and 62(4) requires the regulator to include a statement of reasons as part of its Access Arrangement Draft and Final Decisions.

In addition, it is important to both regulator and the service provider that in the event either of them decides to depart from the guidelines, at the time of an Access Arrangement Review, that the reasons for that departure can be clearly tied back to the reasoning that was the basis of the guidelines.

JWS has proposed a brief additional clause that would provide clarity about including reasons in the guidelines[15].

## 3.4 Transition to post-tax nominal basis

APIA's submission in response to the Directions Paper was that there was no need to prescribe the basis of the rate of return. That is it could be on a post –tax or pre-tax basis or a real or nominal basis and the Rules do not need to prescribe this matter. APIA accepts that the Commission has elected to adopt a consistent approach of a post tax nominal basis. However, APIA is concerned that, where businesses have had a pre-tax real basis applied to date there be an appropriate transition to the post-tax nominal arrangements.

It is likely that to simply apply the post tax nominal basis to the service providers Capital Base will create a discontinuity in the cashflows, because the implicit tax asset base under the pre-tax real calculations will not be the same as the Capital Base. The effect may be an immediate confiscation of business value from the particular service provider, simply through the transition from pre-tax real to post-tax nominal.

To avoid this transitional provisions need to be available for businesses that have had a pre-tax real rate of return applied, the regulators should be required to calculate the implicit tax asset base implied by the pre-tax real calculations and apply this for post tax modelling at the commencement of the next access arrangement period to be phased out over two access arrangement periods.

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[15] Memorandum from JWS to APIA, 3 October 2012, Attachment 1 and 2

It should also be made clear that the actual tax position of the service provider is not relevant for the purposes of calculating tax to be considered under Rule 87A.

## 3.5 Cost of debt methodology – Limited discretion decision

As discussed in section 4.1 above APIA is of the view that proposed Rule 87(2) should provide that the allowable rate of return should "be commensurate with the prevailing conditions in the market for funds. APIA also recognises that the Commission may view this as being inconsistent with allowing a trailing average methodology and therefore elect not to add the proposed words into proposed Rule 87(2). If this is the case APIA makes the following comments and suggested changes to proposed Rule 87(6) – (9).

### Drafting matters

Proposed Rule 87(6)-(9) set out the requirements for the cost of debt and provide for some elections in proposed Rules 87(6) and (7) about the methodology for estimating the cost of debt. Rule 87(7) provides illustrative methodologies, which appear to be directed to

(a) the current methodology of applying the current cost of debt at the time of the Access Arrangement,

(b) a trailing average methodology, or

(c) a combination.

However, given the words "without limitation" in the preamble of Rule 87(7) the intention appears to be to allow other unspecified methodologies. JWS has identified some practical difficulties with achieving the Commission's intent. It has also identified a number of suggested refinements to the Rule 87(6) – (9)[16].

One element discussed by JWS[17], but not included in the drafting changes is the removal of Rule 87(8). JWS' advice is that the matters covered are duplicative of the requirements of the NGO and the RPP, creating potential ambiguity about how they should be applied or "double legislation" and therefore redundant. In either case the Rule would be enhanced by the removal of Rule 87(8). JWS has provided some drafting proposals that would go some way to removing some of the ambiguity/"double legislation" issues should the Commission consider it necessary to maintain Rule 87(8).

[16] Memorandum from JWS to APIA, 3 October 2012, Attachment 1 and 2

[17] Memorandum from JWS to APIA, 3 October 2012, page 9

### Discretion about cost of debt methodology

The election to move from the historic forward looking methodology is a significant step and has potentially significant ramifications for service providers, both in terms of the rate of return determined and in the incentives for debt management. The effect of this decision may have profound impact on the operation of the service provider's business. Depending on the nature of the service provider, its debt management policy may reflect one or other of the two identified cost of debt methodologies, or something else. It is therefore appropriate that the service provider has the right to choose the methodology that best reflects its business operation.

Moreover, the training average methodology has been likened to a treating the cost of debt as an operating cost, both by the Commission's consultant SFG and by CEG. If it was an operating expenditure it would be a limited discretion decision.

In the light if this APIA is of the firm view that the discretion about which debt estimation methodology is to be applied must be with the service provider, which is best placed to understand how the cost of debt methodology will best relate to its own debt management practices. In APIA's view there are arguments that this should be a "no discretion decision" as set out in Rule 40(1). However, if the Commission is of the view the regulator should have some discretion then at most it should be a "limited discretion decision" pursuant to Rule 40(2).

# 4. Consistency with the National Gas Objective and the Revenue and Pricing Principles

APIA has sought advice from economic consultants CEG about the extent to which the draft Rules are consistent with the National Gas Objective and the Revenue and Pricing Principles. CEG's advice is found in Attachment 2.

CEG is of the view that the drafting changes proposed by JWS are more likely to be consistent with the NGO and RRP, and also with the Commission's intent as articulated in the Draft Determination.

# 5. Drafting Issues

## 5.1 Tests of importance of factors

The Draft Rule applies a range of tests of importance of factors to be considered as follows:

- "correspond to" - Rule 87(2)
- "regard is to be had to" – Rule 87 (4), Rule 87(8)
- "taking into account" – Rule 87(3) (c), Rue 87(5)(b)
- "in a way that is consistent with" – Rule 87(5)(a), Rule 87(6)(a
- "reflecting" – Rule 87(7)

Each of these appears to have a different level to which the factor being considered is to apply and that the Commission has sought to apply a hierarchical structure of importance. Presumably this is because some factors may be in tension and those that have the strongest importance will be given the greatest weight in any decision making process. APIA agrees with this intention but is concerned about the number of apparent levels and whether the level of hierarchy intended will actually be achieved. APIA has obtained advice from JWS to ascertain how each of these terms may be interpreted and the impact on the interpretation an application of Rule 87. JWS's advice is contained in Attachment 1 to this submission. The following summarises that advice and raises issues that arise from it.

### "Correspond to"

AS discussed above JWS's advice[18] is that while the meaning of "correspond to" can vary depending on its context and the legislative purpose, in the case of Rule 87 (2) that the phrase means that the determination of a rate of return that is the best equivalent of what is experienced by the benchmark entity. That is there must be a strong alignment between the rate of return determined and those estimated for an efficiently financed benchmark entity.

### "Have regard to"

This phrase is often used in legislation and has been frequently interpreted. JWS considers[19] that a court would interpret the words "have regard to as the regulator is required to take the specified matters into account as fundamental elements in its determinations and that to fail to actively turn its mind to each of those factors would be an error.

### "Taking into account"

JWS's advice[20] is that the phrase "taking into account" has the same meaning as "having regard to".

From this analysis it is clear that the top of the hierarchy of important is Rule 87(2) the rate of return objective. Accordingly, the use of the term "corresponds to" is appropriate. As identified in Section 4.1 above APIA's only misgiving is that the term suggests that the efficient financing costs of a benchmark efficient entity" can be known with precision. This is well known not to be the case. The implied expectation puts the regulator and the service provider in an position being required to determine a rate of return that corresponds precisely to an value that cannot known with precision.

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[18] Memorandum from JWS to APIA, 3 October 2012, page 3

[19] Memorandum from JWS to APIA, 3 October 2012, page 6

[20] Memorandum from JWS to APIA, 3 October 2012, page 5

APIA proposes that the addition of the words “the best estimate of” before the words “the efficient financing costs”. This would be consistent with Rule 74 and appropriately recognised that fact that the determination of the allowed rate of return is an estimation process of an imprecise parameter.

The terms “have regard to” and “taking into account” have the same meaning as a matter of legal precedent. However, the fact that the Commission has used both terms suggests that it considers them to be different. This leaves room for confusion. If the historic precedent were to be applied then a courts would consider them as having the same effect. If this is the case, it would be better to use one or the other term, but not both. Alternatively, a court may take the view that because the AEMC had chosen different terms it intended different meanings. However, legal precedent would be of no help in deciding the relative weights to be applied in the event of a conflict.

APIA suggests that the Commission review its use of these terms and either apply a single term where both have been applied or adopt another phrase in place of one or other that properly reflects its intended hierarchy of importance.

### 5.2 Other Drafting Proposals

As indicated above JWS has provided APIA advice on the drafting of the new Rule 87. The more significant elements of its advice has been referred to in sections above. The most significant of these revolves around the inclusion of the phrase “commensurate with the prevailing conditions in the market for funds”. This has resulted in two versions of proposed drafting. Version one (including the phrase in Rule 87(2)) is in Attachment 1 to JWS advice. Version 2 (not including the phrase in Rule 87(2)) is in Attachment 2 to JWS advice.

There are a number of minor suggested drafting changes proposed in JWS’ advice and included in the two versions of drafting proposals. APIA commends the whole of the JWS advice to the Commission for its consideration and the associated drafting proposals.

## 6. Conclusions

APIA is strongly supportive of the intention behind Commission’s proposed Rule change but has a number of reservations about the implementation in the Draft Rule 87. It has sought advice from lawyers JWS and economists CEG about the drafting and the likelihood that the draft Rule will achieve the Commission’s intent and, importantly, the NGO and RPP. Based on the advice from JWS and CEG APIA believes that the draft Rule needs to be modified to better meet both the Commission’s intent and the NGO and RPP.

APIA provides JWS’ drafting proposals and commends them to the Commission for its consideration.

## Attachment 1 – Memorandum of Advice from Johnson Winter and Slattery

JOHNSON WINTER & SLATTERY

LAWYERS

**Memorandum**

**Date:** 4 October 2012

**To:** Mr Steve Davies, Australian Pipeline Industry Association (**APIA**)

**From:** Roxanne Smith and Chris Beames

**Subject:** **Proposed AEMC changes to National Gas Rule 87**

**Our Ref:** A8302

On 23 August 2012, the Australian Energy Market Commission (**AEMC**) published Draft Rule Determinations with proposed changes to the National Electricity Rules and the National Gas Rules (**NGR** or **Rules**).

The proposed rule changes include proposed amendments to Rule 87 of the NGR relating to the rate of return to be calculated on the projected capital base. APIA has sought our advice on the interpretation of the new Rules and whether the proposed new Rules meet the objectives stated by the AEMC in the Draft Rule Determinations. Our advice on those matters is set out below.

We also set out in Attachments 1 and 2 to this memorandum suggested amendments to draft Rule 87, as discussed further below.

## 1 Executive summary

We have considered in detail the Draft Rule Determinations and the proposed new Rule 87. We understand your instructions to be that APIA is generally satisfied with the AEMC's overall approach and objectives. However, in a number of respects we consider the drafting of the new Rule 87 does not accurately reflect the discussion and objectives set out in the Draft Rule Determinations. In other cases, we consider the drafting can be clarified to avoid confusion or issues of interpretation. This is reflected in our suggested drafting alternatives in Attachments 1 and 2 and is explained in detail in this memorandum.

## 2 Rule 87(2) – Allowed rate of return objective

The proposed new Rule 87(2) requires that the allowed rate of return "*correspond to the efficient financing costs of a benchmark efficient entity with a similar nature and degree of risk as that which applies to the service provider in respect of the provision of reference services*". This is defined as the "*allowed rate of return objective*".

### *2.1 Change in priority*

We note that the structure of the proposed new Rule 87 (and sub-Rule 87(2) in particular) reflects a subtle, though important, re-arrangement of the order of priority of different factors in the determination of the allowed rate of return as compared to the existing Rule 87.

In the proposed new Rule, the primary objective in the setting of the rate of return is set out in Rule 87(2) – i.e. that the rate of return is to correspond to the efficient financing costs of the benchmark efficient entity with a similar nature and degree of risk as applies to the service provider. The following sub-Rules then set out a number of specific requirements that are to be satisfied,[1] or factors to which regard is to be had or which are to be taken into account,[2] in determining a rate of return that meets the objective in sub-Rule (2).

In this sense, the "*allowed rate of return objective*" set out in sub-Rule (2) takes priority over the requirement in latter sub-Rules that regard be had to certain factors, or that certain factors be taken into account. These factors are to be considered or mobilised not as an end in themselves, but in the achievement of the allowed rate of return objective.

In the existing Rule 87 the primary objective in determining the rate of return is that it be "*commensurate with prevailing conditions in the market for funds and the risks involved in providing reference services*" (Rule 87(1)).

Whilst consideration of the risks experienced by the service provider in the provision of the reference services remains a part of the primary objective in the proposed new Rule 87(2) (as the benchmark entity is required to exhibit a similar nature and degree of risk), the requirement that the rate of return be commensurate with prevailing conditions in the market for funds is no longer part of the primary rate of return objective. It only appears in the proposed new sub-Rule 87(5)(b) which requires that, when estimating the return on equity,[3] prevailing conditions in the market for equity funds are to be "*taken into account*".

On the current drafting, the overall rate of return is not required to reflect prevailing conditions in the market for funds. This appears to be inconsistent with the achievement of the national gas objective (**NGO**) and the revenue and pricing principles (**RPP**), insofar as it is an allowance that reflects prevailing conditions in the market that will incentivise investment funds being attracted to pipeline services.

The requirement that prevailing conditions in the market for equity funds be taken into account by the Regulator will mean that the Regulator is required to consider that requirement as a fundamental element in the estimation of the return on equity.[4] However, this consideration is now somewhat secondary to the primary objective in the proposed sub-Rule 87(2).

The AEMC in its Draft Rule Determinations reasons that a robust and effective rate of return framework must be capable of responding to changes in market conditions: "*If the allowed rate of return is not determined with regard to the prevailing market conditions, it will either be above or below the return that is required by capital market investors at the time of determination*".[5] The importance of a rate of return reflecting prevailing market conditions is acknowledged, however this is not reflected in the rate of return objective.

It appears from the Draft Rule Determinations that the reason the requirement that the cost of debt and overall rate of return reflect prevailing conditions in the market for funds has not been reflected in the rule changes, is to enable the use of trailing averages in respect of the

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1 E.g., sub-Rules (3)(a) and (b) which require the rate of return to be determined as a weighted average of the return on equity and return on debt and the use of a nominal post-tax basis.

2 E.g., sub-Rules (3)(c) and (4)(a) and (b).

3 There is no requirement in the proposed new Rule 87 to consider prevailing conditions in the debt market.

4 The meaning of "*taken into account*" is addressed further in section 4.1.

5 Page 49.

cost of debt. The AEMC seems to proceed on the basis that there are three options for estimating the cost of debt, namely what it calls the prevailing cost of funds approach, an historical trailing average approach or a combination of these two approaches.[6]

While the use of historical trailing average approaches may be appropriate for the purposes of estimating the cost of debt, it remains that the cost of debt is a forward looking estimate. You have instructed us that it will be just as important for the cost of debt to reflect prevailing conditions in debt markets expected over the relevant regulatory period as it will be for the cost of equity. In our view a submission could credibly be made that such an objective needs to be included in the allowed rate of return objective in order to ensure a rate of return that meets the NGO and RPP. Including a requirement to reflect prevailing conditions in the market for funds further aligns with the AEMC's objective of ensuring the rate of return is capable of responding to changes in market conditions and is consistent with the idea of estimating the rate of return using a broad range of estimation methods, financial models, market data and other evidence.

However, given the AEMC already has in its mind that a test of the prevailing conditions in the market for funds is not compatible with the trailing average approach, it may be difficult to have the AEMC accept the submission. There is no discord between APIA and the AEMC – at page 92 of the Draft Rule Determinations the AEMC speaks of "*the funding costs expected to be incurred by a benchmark efficient service provider over the regulatory period*". In other words, the AEMC accepts that the benchmark cost of debt is a forward looking concept. The difficulty is that such a concept has now become captured in the language of "*prevailing conditions in the market*", conditions which, based on the current drafting, the AEMC appears to believe are not reflected in a historical trailing average approach.

On the assumption that the AEMC will maintain its view that the use of a trailing average approach means the cost of debt and overall rate of return will not reflect prevailing conditions in the market for funds, we have prepared two alternative versions of the new Rule 87:

1 Attachment 1 to this memorandum includes a requirement in Rule 87(2) that the rate of return reflect prevailing conditions in the market for funds, but amends the cost of debt rules to reflect the AEMC's apparent view that it is not consistent with the use of historical trailing averages.

2 Attachment 2 maintains the current drafting of Rule 87(2) (except for slight wording changes) but, on your instructions, makes Rules 87(6) and (7) rules of limited discretion under Rule 40(2).

### *2.2 "Correspond to"*

The authorities suggest that this phrase can have varying meanings depending upon its context and the legislative purpose – it can vary from "*exact likeness to broad similarity*" (*Samarkos*) – see the authorities extracted in Attachment 3 to this memorandum.

In the proposed new Rule 87(2), the allowed rate of return is to "***correspond** to the efficient financing costs of a benchmark efficient entity*" (emphasis added). This suggests that such a benchmark efficient entity can be identified (even if hypothetically) and its efficient costs determined. In our view, this suggests that a Court or Tribunal would apply a stricter

[6] Page 90.

interpretation of the phrase in this Rule; i.e. that the allowed rate of return must be equivalent to those efficient costs.

While, in practice, determining the efficient costs of a benchmark efficient entity is not going to be an exact science (because, for example, of the complexity in identifying such an entity and its efficient costs – see section 2.3 below), the phrase (in this context) seems to suggest more than just, for example, the determination of a rate of return that falls within a range, or is similar to a rate that might be experienced by the benchmark entity. Rather, the proposed Rule appears to envisage the determination of a rate of return that is the best equivalent of what would be experienced by the benchmark entity.

This view is to some extent supported by the Draft Rule Determinations in which the AEMC states several times[7] that the objective of this sub-Rule is to determine the "*best possible*" estimate of the rate of return and the benchmark efficient financing costs. Elsewhere, the AEMC refers to the objective that the rate of return "*best reflects*"[8] (although it also simply refers to "*reflects*"[9]) efficient financing costs. This gives some indication as to the AEMC's intention in Rule 87(2), although is likely to be of limited assistance to the Courts/Tribunal in interpreting the meaning of the words used in the actual Rule.

In circumstances where the AER is being given a wide discretion in the proposed new Rule 87, we consider a requirement to arrive at a rate of return which corresponds to the "*best estimate*" is appropriate, meets the AEMC's intention as noted above and is consistent with the requirement that already exists in Rule 74(2). The words "*correspond to*" could also be replaced simply with "*be*".

### *2.3 "Benchmark efficient entity"*

There is no definition in the proposed Rules of the "*benchmark efficient entity*". Nor is there much discussion in the AEMC's Draft Rule Determinations about what this phrase is meant to mean, or how the benchmark efficient entity is to be identified.[10]

It is apparent that regard is intended to be had to a hypothetical entity other than the provider itself that exhibits benchmark efficiency but which also is subject to a "*similar nature and degree of risk as that which applies to the service provider in respect of the provision of reference services*".

Whilst it is obviously difficult to provide too much definition or prescription in the Rules as to how the "*benchmark efficient entity*" is to be identified, the use of such a concept is likely to lead to differences of opinion as to what the benchmark efficient entity is or what characteristics it possesses and, in practice, is likely to leave the Regulator with a broad discretion in determining whether the allowed rate of return objective has been satisfied (notwithstanding the stricter requirements introduced by the other language in sub-Rule (2) – see section 2.1 above).

Moreover, we consider that further clarity around the concept of the benchmark efficient entity could be achieved by linking the best estimate of the cost of capital to an entity that meets benchmark levels of efficiency, has a similar nature and degree of risk as the service provider, using a financing structure that meets benchmark standards as to gearing and other

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7 See, for example, pages 44 and 46.

8 See, for example, pages 51 and 55.

9 See, for example, page 55.

10 There is some discussion on pages 45-46, but it provides limited guidance as to how the AEMC envisages the benchmark entity is to be defined or identified.

financial parameters (concepts already picked up in the existing Rule 87(2)). We consider these concepts to be best captured in Rule 87(3)(c) as reflected in our proposed drafting change in Attachments 1 and 2.

It is also unclear what is meant by the "*efficient financing costs*" of a benchmark efficient entity and how they would be established. We have addressed these issues in our proposed drafting changes.

### *2.4 Proposed drafting*

For the reasons outlined above we consider the current drafting of Rule 87(2) is difficult to interpret and does not reflect the intention of the AEMC to ensure the rate of return reflects prevailing conditions in the market for funds and is capable of responding to changes in market conditions. We have included alternative formulations of Rule 87(2) in Attachments 1 and 2.

## 3. Rule 87(3)(a)- weighted average

This sub-rule requires the allowed rate of return for a regulatory year to be determined as a weighted average of the return on equity and the return on debt for that regulatory year, where the weights applied reflect the relative proportions of equity and debt finance that would be "*employed and efficiently financed"* by a benchmark efficient entity with a similar nature and degree of risk as that which applies to the service provider in respect of the provision of reference services.

The difficulty with the drafting in this clause is that it is unclear what is meant by "*reflect the relative proportions of equity and debt finance that would be employed an* [sic] *efficiently financed by a benchmark efficient entity*". It appears to us to be introducing further uncertain concepts and discretion in the Regulator. Uncertainty as to the interpretation and application of the Rules would not be consistent with the achievement of the NGO and RPP and the desirability of regulatory certainty and transparency recognised by the AEMC.

We consider the clause can be more simply drafted requiring the weighted average using a financing structure which meets benchmark standards as to gearing and other financial parameters. We have included the proposed alternative drafting in Attachments 1 and 2.

## 4. Rule 87(3)(c) – "Relevant" methods, models, market data etc. to be "taken into account"

The proposed new Rule 87(3)(c) provides that the allowed rate of return for a regulatory year is to be determined "*taking into account relevant estimation methods, financial models, market data and other evidence*".

The AEMC's explanation surrounding this provision is that achieving the NGO and RPP requires the best possible estimate of the benchmark efficient financing costs. "*This can only be achieved by ensuring that the estimation process is of the highest possible quality. It means that a range of estimation methods, financial models, market data and other evidence should be considered, with the Regulator having discretion to give appropriate weight to all the evidence and analytical techniques considered*".[11]

[11] Draft Rule Determinations, page 46.

The AEMC further states that the estimation approach to equity and debt components should include "*consideration of available estimation methods, financial models, market data and other evidence to produce a robust estimate that meets the overall rate of return objective.*"[12] The premise for the rule change is the view that estimates are more robust and reliable if they are based on a range of estimation methods, financial models, market data and other evidence while giving the Regulator capacity to exercise regulatory judgment.[13]

### *4.1 "Taking into account"*

The rule as currently drafted only requires the Regulator to "*take into account*" the relevant estimation methods, financial models, market data and other evidence.

In the context of new Rule 87(3)(c), it is likely that a Court/Tribunal will interpret the requirement to take into account the factors specified as a requirement in accordance with Mason J's formulation in *R v Hunt; ex parte Sean Investments*; i.e. that the Regulator is required to take the specified matters into account as fundamental elements in making its determination. The Regulator must actively turn its mind to each of the factors listed and would fall into error if it failed to do so.[14]

However, as long as the Regulator has taken into account the specified factors, it remains in the Regulator's discretion how those factors influence its decision. The practical application of this rule could result in the Regulator considering other estimation methods, financial models, etc. but then putting all but one to the side and continuing to estimate the cost of debt and cost of equity using its already stated preferred approach (ie the Sharpe Lintner CAPM), which would appear to be contrary to the objective of the rule change.[15]

### *4.2 "Relevant" methods, models, etc.*

Rule 87(3)(c) requires the Regulator to take into account all "*relevant*" estimation methods, financial models, market data and other evidence. The Regulator will therefore fall into error if it fails to give proper consideration to any "*relevant*" evidence.

The Regulator is not required to consider all evidence put before it under Rule 87(3)(c). If evidence is "irrelevant", the Regulator will not fall into error by failing to "*take it into account*".

In practice, of course, this will require some form of value judgment by the Regulator about whether evidence put before it is relevant or not. This appears to be consistent with the very broad discretion envisaged by the AEMC in the Draft Rule Determinations

We consider the "relevance" test in this context to be a reasonably low threshold and appropriate in the circumstances.

### *4.3 Proposed drafting change*

Given the possibility of an approach where the Regulator may "*take into account*" relevant estimation methods, financial models, market data and other evidence and then continue to

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12 Ibid, page 47.

13 Ibid, pages 48 and 49.

14 A more detailed explanation of the authorities supporting this view is set out in Attachment 3.

15 Note the AER's submission strongly rejecting any approach other than the CAPM referenced at page 47 of the Draft Rule Determinations.

apply the historical approach to the cost of equity and cost of debt, we have suggested some possible drafting changes to Rule 87(3)(c) to better reflect the objective stated by the AEMC, to ensure the most robust and best estimate of the rate of return is achieved through consideration of a broad range of information. The proposed drafting change is set out in Attachments 1 and 2.

## 5 Rule 87(4) – "Regard to be had" to certain factors

The proposed new Rule 87(4) requires "*regard to be had*" to certain factors in the determination of the allowed rate of return (in addition to the information in sub-rule 87(3)(c)), being those factors listed in sub-paragraphs 87(4)(a) and (b).

### *5.1 "Have regard to"*

The authorities suggest that in an administrative law context, this phrase has the same meaning as "*take into account*" (see Attachment 3). In the context of Rule 87(4), we think the Courts/Tribunal will interpret the requirement to have regard to the factors specified in a way that requires the Regulator to take the specified matters into account as fundamental elements in making its determination.

As noted above, the Regulator must actively turn its mind to each of those factors and would fall into error if it failed to do so. However, as long as the Regulator has regard to all of the factors, it remains in the Regulator's discretion how those factors influence its final decision.

It is unclear if the AEMC intends the term "*taking into account*" to have a different meaning to factors to which "*regard must be had*". In our view, introducing different language (with the same legal meaning) will lead to uncertainty and difficulty in application of the Rules. Consistent language should be used in the Rule (either "*having regard to*" or "*taking into account*") and this is reflected in our proposed drafting changes in Attachments 1 and 2.

## 6 Rule 87(5) – Return on equity

Pursuant to the proposed new Rule 87(5)(b), the return on equity for an access arrangement period is to be estimated in a way that is consistent with the allowed rate of return objective and "*taking into account the prevailing conditions in the market for equity funds*".

We consider that the words "*in a way that is consistent with*" can be more directly expressed as "*to achieve*".

In respect of the requirement to "*take into account*" the prevailing conditions in the market for equity funds, as noted above, the existing Rule 87(1) requires the rate of return "*to be commensurate*" with the prevailing conditions in the market for funds.

In our view the use of the words "*to be commensurate with*" is preferable to "*taking into account*". It requires the return on equity to be more directly equated with the prevailing conditions in the market for funds, not just to be taken into account as a factor. This wording better reflects the AEMC's reasons about the importance of a rate of return reflecting prevailing conditions in the market and being capable of responding to changes in market conditions. We do not consider that "*taking into account*" the prevailing conditions in the market for equity funds gives that requirement sufficient prominence in the estimation of the return on equity. We have suggested a drafting change to this sub-rule in Attachments 1 and 2.

## 7 Rule 87(6) and (7) – Return on debt

Rule 87(6) requires the return on debt for a regulatory year to be estimated in a way that is consistent with the allowed rate of return objective and using a methodology that complies with paragraph (b) of the sub-Rule.

The proposed new Rule 87(7) provides that, subject to sub-Rule (6), "*the methodology adopted to estimate the return on debt may, without limitation, be designed to result in the return on debt reflecting*" two approaches set out in paragraphs (a) and (b) or some combination of the two (paragraph (c)).

### *7.1 Rule 87(6)(a)*

This proposed new Rule presently requires the return on debt to be estimated "*in a way that is consistent with*" the allowed rate of return objective. We consider the requirement to meet the objective should be more strongly stated by using the words "*to achieve*" the allowed rate of return objective.

### *7.2 Rules 87(6)(b) and (9)*

The proposed new Rule 87(6)(b) provides that the methodology used must be one under which:

> "*(i) the return on debt for each regulatory year in the access arrangement period is the same; or*
>
> *(ii) the return on debt for a regulatory year (other than the first regulatory year in the access arrangement period is estimated using a methodology which complies with subparagraph (i).*"

In the Draft Rule Determinations, the AEMC states that:[16]

> "*The proposed draft rule includes a provision to allow an annual adjustment to the allowed revenue for the service provider in circumstances where the regulator decides to estimate the return on debt using an approach that requires the return on debt to be updated periodically during the regulatory period. The formula for calculating the updated return on debt must be specified in the regulatory determination or access arrangement and must be capable of applying automatically.*"

In our view the drafting of both Rule 87(6)(b) and the related Rule 87(9) is nonsensical and circular and does not appear to reflect the above explanation of the AEMC. Given the policy intention and application of proposed new Rule 87(6)(b) is uncertain, there is a risk that a re-drafting of that clause by the AEMC will produce an outcome that is not satisfactory to APIA. We would suggest seeking clarification from the AEMC in respect of the intent of this provision.

### *7.3 Rule 87(7) – "Without limitation"*

As noted above, this rule provides that the methodology adopted to estimate the return on debt may, without limitation, be designed to result in the return on debt reflecting the approaches set out in sub-rules (a) and (b) or a combination of the two.

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[16] Page 91.

Strictly speaking, the use of the words "*without limitation*" in Rule 87(7) is sufficient to allow the use of alternative methodologies that do not reflect the factors set out in paragraphs (a) to (c) of that sub-rule.

That said, the practical effect of such a prescription as set out in Rule 87(7) is that the Regulator may tend to adopt one of the prescribed methodologies as a matter of course, or may tend to prefer that prescribed methodology over another methodology proposed by a service provider, on the basis that the methodology prescribed in the Rule should be preferred in all but exceptional circumstances.

There is therefore a risk in practice (if not on the strict wording of the proposed Rule) that the proposed Rule will not achieve the result sought to be achieved by the AEMC (i.e. encouraging the consideration of a range of methodologies rather than being too prescriptive).

The AEMC appears to be suggesting that it does intend sub-rule 87(b)(7) to list three options "*to make it clear that all of them are available to the Regulator if it considers they best meet the overall allowed rate of return objective. The Commission accepts that it could also have chosen not to describe any approaches, but it considers that there is benefit of certainty in stating clearly the range of available options*".[17]

However, we consider the clause could be better drafted to reflect flexibility in the approach to the cost of debt by removing the reference to "*without limitation*" and providing an additional sub-paragraph enabling use of other methods derived from relevant debt management strategies that are consistent with the rate of return objective. This will avoid difficulties with the use of the words "*without limitation*" and the practical limitation imposed on the methods currently identified. This change is reflected in our proposed amendments in Attachment 2 to this memorandum.

### *7.4 Proposed Drafting change*

We note that Attachment 1 proposes the deletion of subclause 87(7) as a result of the inclusion of the requirement to reflect prevailing conditions in the market for funds in Rule 87(2). Attachment 2 proposes the changes reflected in our comments above.

## 8 Rule 87(8)

Rule 87(8) provides further factors to which regard must be had in estimating the return on debt. The preamble to the Rule can be more directly expressed to ensure that in estimating a return on debt *to* "*achieve*" the allowed rate or return objective, regard must be had to the matters listed in the sub-Rules. We have reflected this proposed change in Attachments 1 and 2.

There are also some difficulties with the drafting in sub-rules (a) to (d). As an overall comment, it does not appear that the factors in (a) to (d) add anything to the requirements that already exist in the allowed rate of return objective and the NGO and RPP. The drafting of the sub-paragraphs raises the possibility of the clauses being interpreted as having some additional meaning or work to do in addition to the allowed rate of return objective and the NGO and RPP. More specifically :

1 Paragraph (a) simply picks up the heading to the discussion of this topic at page 92. As drafted it seems to contemplate a comparison of the benchmark cost of debt with

[17] Draft Rule Determinations, page 90.

the estimated cost of debt of the service provider. The discussion speaks of "*the extent to which the methodology matches the funding costs expected to be incurred by a benchmark service provider over the regulatory period*". The AEMC's intention is unclear and the reference to the matching to the funding costs of the benchmark service provider is already required by the Rule 87(2). The clause does not appear to add anything and it could be deleted. Alternatively, if this was not acceptable to the AEMC, the sub-Rule should more clearly state that the consideration is by reference to the benchmark efficient entity, not the actual cost of debt of the service provider.

2 Again, paragraph (b) simply picks up the heading to the discussion of this topic but the discussion focuses instead on either the increase or decrease in financing risk. Arguably the considerations sought to be captured by this sub-rule are already captured in the NGO and RPP and, on that basis, a submission could be made that this sub-clause is not necessary and creates confusion.

3 Again, paragraph (c) simply picks up the heading to the discussion of this topic but the application of the discussion about the mismatch between the regulatory allowance and the actual costs of debt is unclear. It is unclear what the consideration of incentive effects could add to the NGO.

4 Again, paragraph (d) simply picks up the heading to the discussion and would allow the AER in the exercise of discretion to consider a very broad range of topics. The discussion is more limited to the costs and confidence and the clause should be confined to the "investment incentives" identified in the discussion. The concepts appear to already be covered by the NGO and the RPP and the sub-clause does not appear to add anything.

Attachments 1 and 2 to the memorandum include suggested drafting changes to Rule 87(8) reflecting our comments above.

## 9 Rules 87(11)-(13) – Rate of return guidelines

The proposed new Rules 87(10) to (16) set out the requirement and process for the AER to issue "*rate of return guidelines*" at least every three years.

### *9.1 Rule 87(11) – Contents of guidelines*

Rule 87(11) specifies the requirements for the contents of the guidelines, namely they are to set out:

> "*(a) the methodologies that the AER proposes to use in estimating the allowed rate of return, including how those methodologies are proposed to result in the determination of a return on equity and a return on debt in a way that is consistent with the allowed rate of return objective;*
>
> *(b) the estimation methods, financial models, market data and other evidence the AER proposes to take into account in estimating the return on equity, the return on debt and the value of imputation credits referred to in rule 87A.*"

It appears that the distinction between "*methodologies*" in paragraph (a) and "*estimation methods, financial models, market data and other evidence*" in paragraph (b) is deliberate. The Rules require the AER to identify the methods/models/data/evidence it proposes to take into account (paragraph (b)) and then to set out methodologies that describe how all of the

information is to be used to determine the rate of return (paragraph (a)). For example, it is conceivable the "methodology" could involve the calculation of a rate of return using the results from several different financial models, cross-checked against certain specified types of market data or evidence.

This also appears consistent with the AEMC's intention as set out in the Draft Rules Determinations. On page 59, the AEMC says the guidelines allow discussion about "*the choice of estimation methods, financial models, types of information that may be used*" (i.e. the methods, models, etc.) and "*how the regulator intends to apply them*" (i.e. the methodology). On page 60, it states that the regulator is expected to "*detail the financial models that it would take into account in its decision*" and "*detail any other information that it would expect to have regard to*" (i.e. the methods, models, etc.) and "*provide guidance on how it would use such models and information in reaching its decision, including matters such as... the relative weight... it would expect to place on various model estimates; and what market data (or similar) it would use to ascertain lower bounds and/or reasonableness checks on the estimates*" (i.e. the methodology).

However, there is still some uncertainty about what a "methodology" is for the purposes of paragraph (a). For example, its is unclear whether the AEMC, for example, intends that the use of a weighted average cost of capital (WACC) *approach* would constitute a "methodology" If something different is envisaged (for example, that the use of a WACC approach could be only part of some larger "methodology"), then this is not also not clear from the Rule as currently drafted.

### *9.2 Rules 87(12)-(13) – Initial guidelines*

Under Rule 87(10), the first guidelines issued are to be made in accordance with the process set out in Rule 87(13), rather than the "*rate of return consultative procedure*" which is to be used for successive versions.

The proposed new Rule 87(13) sets out a timetable for issuing a consultation paper and draft guidelines (and making them available for comment), but does not refer to the timing for the finalisation of the guidelines. Rather, this is found in Rule 87(12) which requires the AER to "*make the first rate of return guidelines by [29 August 2013]*". We consider it would be preferable and more logical for this step to be included in the timetable set out in Rule 87(13).[18] We have addressed this issue in our proposed drafting changes.

## 10 Suggested amendments to Rule 87

Having regard to the matter discussed above, we set out in Attachments 1 and 2 some alternative amendments to the drafting of the proposed new Rule 87 (with the amendments marked-up).

**Johnson Winter & Slattery**

[18] Note this numbering has changed in our proposed drafting due to suggested deletion of other paragraphs.

## ATTACHMENT 1

## Rule 87 Rate of return

(1) The return on the projected capital base for each regulatory year of the *access arrangement period* is to be calculated by applying a rate of return that is determined in accordance with this rule 87 (the *allowed rate of return*).

(2) The *allowed rate of return* is to:

(a) correspond to the best estimate of the efficient financing costs of a benchmark efficient entity with a similar nature and degree of risk as that which applies to the service provider in respect of the provision of reference services; and

(b) be commensurate with prevailing conditions in the market in which a benchmark efficient entity competes for funds.

(the *allowed rate of return objective*).

(3) The *allowed rate of return* for a regulatory year is to be determined:

(a) as a weighted average of the return on equity for the *access arrangement period* (as estimated under subrule (5)) and the return on debt for that regulatory year (as estimated under subrule (6)) where the weights applied to compute the average reflect the relative proportions of equity and debt finance that would be employed and efficiently financed by a benchmark efficient entity with a similar nature and degree of risk as that which applies to the service provider in respect of the provision of reference services;

**SUGGESTED ALTERNATIVE TO 87(3)(a)**

(a) as a weighted average of the return on equity for the *access arrangement period* (as estimated under subrule (5) and the return on debt for that regulatory year (as estimated under subrule (6)) using a financing structure that would be employed by a benchmark efficient entity with a similar nature and degree of risk as that which applies to the service provider in respect of the provision of reference services and meets benchmarks standards as to gearing and other financial parameters;

(b) on a nominal post-tax basis that is consistent with the estimate of the value of imputation credits referred to in rule 87A; and

(c) taking into account relevant estimation methods, financial models, market data and other evidence.

**SUGGESTED ALTERNATIVE TO 87(3)(C)**

(c) based on relevant estimation methods, financial models, market data and other evidence. The *allowed rate of return* should be estimated using multiple relevant estimation methods, financial models, market data and evidence.

(4) In determining the *allowed rate of return*: ~~, regard is to be had to~~:

(a) ~~the desirability of using~~it is desirable that there be ~~an approach that leads to the~~ consistent application of ~~any~~ estimates of financial parameters ~~that are~~ relevant to the estimates of, and that are common to, the return on equity and the return on debt; and

(b) regard is to be had to any interrelationships between estimates of financial parameters ~~that are~~ relevant to the estimates of the return on equity and the return on debt.

**Return on equity**

(5) The return on equity for an access *arrangement period* is to be estimated:

(a) ~~in a way that is consistent with~~to achieve the *allowed rate of return objective*; and

(b) to be commensurate with ~~taking into account~~ the prevailing conditions in the market for equity funds.

**Return on debt**

(6) The return on debt for a regulatory year is to be estimated:

(a) ~~in a way that is consistent with~~to achieve the *allowed rate of return objective*; and;

(b) using a methodology under which the return on debt for each regulatory year in the access arrangement period is the same; or

~~(ii) the return on debt for a regulatory year (other than the first regulatory year in the access arrangement period) is estimated using a methodology which complies with subparagraph (i)~~

~~.~~(c) to reflect a return that would be required by debt investors in a benchmark efficient entity if it raised debt at the time or shortly before the time when the AER's decision on the access arrangement for that access arrangement period is made.

(7) ~~Subject to subrule (6), the methodology adopted to estimate the return on debt may, without limitation, be designed to result in the return on debt reflecting~~must result in an estimate of~~:~~

~~(a) the~~ a ~~return that would be required by debt investors in a benchmark efficient entity if it raised debt at the time or shortly before the time when the AER's decision on the access arrangement for that access arrangement period is made;~~

~~(b) the average return that would have been required by debt investors in a benchmark efficient entity if it raised debt over an historical~~a period prior to the time when the when the AER's decision on the access arrangement for that access arrangement period is made;~~a return on debt derived from or~~

~~(c) some combination of the returns referred to in subparagraphs (a) and (b).~~

(8) In estimating a return on debt to achieve the ~~determining whether the return on debt for a regulatory year is estimated in a way that is consistent with the~~ allowed rate of return objective, regard must be had to~~ the following factors~~:

(a) the likelihood of any significant differences between the costs of servicing debt of a benchmark efficient entity referred to in subrule (~~3~~2)(a) and the methodology used to estimate the return on debt over the access arrangement period;

(b) the impact on gas consumers, including due to any impact on the return on equity of a benchmark efficient entity referred to in subrule (3)(a);

(b~~c~~) the incentive effects of inefficiently delaying or bringing forward capital expenditure; and

(~~d~~c) the impact on investment incentives of changing the methodology for estimating the return on debt across access arrangement periods.

~~(9) A methodology referred to in subrule (6)(2)(ii) must provide for any change in total revenue for the regulatory year that would result from a change to the allowed rate of return for that~~

~~regulatory year, as a result of the return on debt for that regulatory year being different from that estimated under subrule (6), to be effected through the automatic application of a formula that is specified in the access arrangement~~.

**Rate of return guidelines**

(~~10~~9) The AER must, in accordance with the *rate of return consultative* procedure, make guidelines (the *rate of return guidelines*), except that the first *rate of return guidelines* are to be made in accordance with subrule (13) and not the *rate of return consultative procedure*.

(10~~1~~) The *rate of return guidelines* are to set out:

(a) the methodologies that the AER proposes to use in estimating the *allowed rate of return*, including how those methodologies are proposed to result in the determination of a return on equity and a return on debt in a way that is consistent with the *allowed rate of return objective*;

(b) the estimation methods, financial models, market data and other evidence the AER proposes to ~~take into account~~ have regard to in estimating the return on equity, the return on debt and the value of imputation credits referred to in rule 87A; and

(c) reasons for the AER's proposals in (a) and (b) above.~~.~~

~~(12) The AER must make the first *rate of return guidelines* by [29 August 2013] and there must be *rate of return guidelines* in force at all times after that date.~~

(11~~2~~) For the purposes of making the first *rate of return guidelines* the AER must:

(a) by no later than [29 March 2013], publish on its website a consultation paper that sets out its preliminary views on the material issues that are to be addressed by the *rate of return guidelines;*

(b) publish on its website an invitation for written submissions on the consultation paper, with such submissions to be made within the time specified in the invitation (which must not be earlier than 30 business days after the invitation for submissions is published);

(c) by no later than [31 July 2013], publish on its website a draft of the *rate of return guidelines*; and

(d) publish on its website an invitation for written submissions on the draft rate of return guidelines, with such submissions to be made within the time specified in the invitation (which

must not be earlier than 30 business days after the invitation for submissions is published).

(e) make the first rate of return guidelines by [29 August 2013] and there must be *rate of return guidelines* in force at all times after that date.

(124) The AER must, in accordance with the rate of return consultative procedure, review the *rate of return guidelines*:

(a) at intervals not exceeding three years, with the first interval starting from the date referred to in subrule (12); and

(b) at the same time as it reviews the *rate of return guidelines* under clauses 6.5.2 and 6A.6.2 of the National Electricity Rules.

(135) The AER may, from time to time and in accordance with the *rate of return consultative procedure*, amend or replace the *rate of return guidelines*.

(146) The *rate of return guidelines* are not mandatory (and so do not bind the AER or anyone else) but, if the AER makes a *decision* in relation to the rate of return (including in an access arrangement draft *decision* or an access arrangement final *decision*) that is not in accordance with them, the AER must state, in its reasons for the *decision*, the reasons for departing from the guidelines.

## ATTACHMENT 2

## Rule 87 Rate of return

(1) The return on the projected capital base for each regulatory year of the *access arrangement period* is to be calculated by applying a rate of return that is determined in accordance with this rule 87 (the *allowed rate of return*).

(3) The *allowed rate of return* is to correspond to the best estimate of the efficient financing costs of a benchmark efficient entity with a similar nature and degree of risk as that which applies to the service provider in respect of the provision of reference services;
(the *allowed rate of return objective*).

(3) The *allowed rate of return* for a regulatory year is to be determined:

(a) as a weighted average of the return on equity for the *access arrangement period* (as estimated under subrule (5)) and the return on debt for that regulatory year (as estimated under subrule (6)) where the weights applied to compute the average reflect the relative proportions of equity and debt finance that would be employed and efficiently financed by a benchmark efficient entity with a similar nature and degree of risk as that which applies to the service provider in respect of the provision of reference services;

**SUGGESTED ALTERNATIVE TO 87(3)(a)**

(a) as a weighted average of the return on equity for the *access arrangement period* (as estimated under subrule (5) and the return on debt for that regulatory year (as estimated under subrule (6)) using a financing structure that would be employed by a benchmark efficient entity with a similar nature and degree of risk as that which applies to the service provider in respect of the provision of reference services and meets benchmarks standards as to gearing and other financial parameters;

(b) on a nominal post-tax basis that is consistent with the estimate of the value of imputation credits referred to in rule 87A; and

(c) taking into account relevant estimation methods, financial models, market data and other evidence.

**SUGGESTED ALTERNATIVE TO 87(3)(C)**

(c) based on relevant estimation methods, financial models, market data and other evidence. The *allowed rate of return*

should be estimated using multiple relevant estimation methods, financial models, market data and evidence.

(4) In determining the *allowed rate of return*: ~~regard is to be had to:~~

(a) ~~the desirability of using~~ it is desirable that there be ~~an approach that leads to the~~ consistent application of ~~any~~ estimates of financial parameters ~~that are~~ relevant to the estimates of, and that are common to, the return on equity and the return on debt; and

(b) regard is to be had to any interrelationships between estimates of financial parameters ~~that are~~ relevant to the estimates of the return on equity and the return on debt.

**Return on equity**

(5) The return on equity for an access *arrangement period* is to be estimated:

(a) ~~in a way is consistent with~~ to achieve the *allowed rate of return objective*; and

(b) to be commensurate with ~~taking into account~~ the prevailing conditions in the market for equity funds.

**Return on debt**

(6) The return on debt for a regulatory year is to be estimated:

(a) ~~in a way that is consistent with~~ to achieve the *allowed rate of return objective*; and;

(b) using a methodology under which:

(i) the return on debt for each regulatory year in the access arrangement period is the same; or

(ii) the return on debt for a regulatory year (other than the first regulatory year in the access arrangement period) is estimated using a methodology which complies with subparagraph (i).

(7) Subject to subrule (6), the methodology adopted to estimate the return on debt ~~may, without limitation, be designed to result in the return on debt reflecting~~ must result in an estimate of:

(a) ~~the~~ a return that would be required by debt investors in a benchmark efficient entity if it raised debt at the time or shortly before the time when the AER's decision on the

access arrangement for that access arrangement period is made;

(b) the average return that would have been required by debt investors in a benchmark efficient entity if it raised debt over ~~an historical~~ a period prior to the time ~~when the~~ when the AER's decision on the access arrangement for that access arrangement period is made; or

(c) a return on debt derived from another relevant debt management strategy consistent with the *allowed rate of return objective*; or

(~~c~~d) some combination of the returns referred to in subparagraphs (a) and (b) and (c).

The AER's discretion under sub-rules (6) and (7) is limited.

(8) In estimating a return on debt to achieve the ~~determining whether the return on debt for a regulatory year is estimated in a way that is consistent with the~~ allowed rate of return objective, regard must be had to ~~the following factors~~:

(a) the likelihood of any significant differences between the costs of servicing debt of a benchmark efficient entity referred to in subrule (~~3~~2)(a) and the methodology used to estimate the return on debt over the access arrangement period;

(b) the impact on gas consumers, including due to any impact on the return on equity of a benchmark efficient entity referred to in subrule (3)(a);

(b) the incentive effects of inefficiently delaying or bringing forward capital expenditure; and

(c) the impact on investment incentives of changing the methodology for estimating the return on debt across access arrangement periods.

(9) A methodology referred to in subrule (6)(~~2~~b)(ii) must provide for any change in total revenue for the regulatory year that would result from a change to the allowed rate of return for that regulatory year, as a result of the return on debt for that regulatory year being different from that estimated under subrule (6), to be effected through the automatic application of a formula that is specified in the access arrangement.

**Rate of return guidelines**

(10) The AER must, in accordance with the *rate of return consultative* procedure, make guidelines (the *rate of return guidelines*), except that the first *rate of return guidelines* are to be made in accordance with subrule (13) and not the *rate of return consultative procedure*.

(11) The *rate of return guidelines* are to set out:

(a) the methodologies that the AER proposes to use in estimating the *allowed rate of return*, including how those methodologies are proposed to result in the determination of a return on equity and a return on debt in a way that is consistent with the *allowed rate of return objective*;

(b) the estimation methods, financial models, market data and other evidence the AER proposes to ~~take into account~~ have regard to in estimating the return on equity, the return on debt and the value of imputation credits referred to in rule 87A; and

(c) reasons for the AER's proposals in (a) and (b) above.

~~(12) The AER must make the first *rate of return guidelines* by [29 August 2013] and there must be *rate of return guidelines* in force at all times after that date.~~

(12~~3~~) For the purposes of making the first *rate of return guidelines* the AER must:

(a) by no later than [29 March 2013], publish on its website a consultation paper that sets out its preliminary views on the material issues that are to be addressed by the *rate of return guidelines;*

(b) publish on its website an invitation for written submissions on the consultation paper, with such submissions to be made within the time specified in the invitation (which must not be earlier than 30 business days after the invitation for submissions is published);

(c) by no later than [31 July 2013], publish on its website a draft of the *rate of return guidelines*; and

(d) publish on its website an invitation for written submissions on the draft rate of return guidelines, with such submissions to be made within the time specified in the invitation (which must not be earlier than 30 business days after the invitation for submissions is published).

(e) make the first rate of return guidelines by [29 August 2013] and there must be *rate of return guidelines* in force at all times after that date.

(134) The AER must, in accordance with the rate of return consultative procedure, review the *rate of return guidelines*:

(a) at intervals not exceeding three years, with the first interval starting from the date referred to in subrule (12); and

(b) at the same time as it reviews the *rate of return guidelines* under clauses 6.5.2 and 6A.6.2 of the National Electricity Rules.

(145) The AER may, from time to time and in accordance with the *rate of return consultative procedure*, amend or replace the *rate of return guidelines*.

(156) The *rate of return guidelines* are not mandatory (and so do not bind the AER or anyone else) but, if the AER makes a *decision* in relation to the rate of return (including in an access arrangement draft *decision* or an access arrangement final *decision*) that is not in accordance with them, the AER must state, in its reasons for the *decision*, the reasons for departing from the guidelines

## ATTACHMENT 3 – EXTRACT FROM RELEVANT AUTHORITIES

**"Correspond to"**

- Per Asche CJ in *Samarkos v Commissioner for Corporate Affairs (NT)*:[19]

> *The Oxford English Dictionary gives various definitions of "correspond" such as "to be congruous or in harmony with"; "to be similar or analogous to". The Macquarie Dictionary defines it as "to be in agreement or conformity"; "to be similar or analogous". The range is from exact likeness to broad similarity.*

- Per Lord Cairns of the House of Lords In *Sackville-West v Viscount Holmesdale*:[20]

> *'To correspond' does not usually or properly mean 'to be identical with', but 'to harmonize with' or 'to be suitable to'.*

- In dissent in the same case, Lord Hatherly LC:

> *I cannot admit that the proper meaning of 'corresponding' is 'harmonizing with', or 'being suitable to'. I think such meaning is secondary only. A footmark 'corresponds' with the foot when it has been made by it. A copy of an instrument corresponds with the original when the wording and paging, and, if possible, the handwriting agree.*

- In the *Samarkos* case, Asche J preferred Lord Cairns' interpretation:

> *…the word may well in some contexts have the exactitude which [Lord Hatherly] suggests, I would be more inclined to the broader interpretation espoused by Lord Cairns, and (although this is no doubt somewhat subjective) I am confident that in common parlance the word is used more generally in what Lord Hatherly refers to as its secondary meaning. Furthermore, if the intent of s562a(1)(b) was to confine that sub-section to exact counterparts of s418(1), it would have been a simple exercise to use an expression such as "sub-section 418(1) or a provision in the same terms", and this has not been done.*

**"Have regard to"**

- Per Stone, Foster and Nicholas JJ in *Minister for Immigration and Citizenship v Khadgi* (emphasis added):[21]

> *Section 109(1)(c) of the Act obliges the Tribunal to "have regard to" the prescribed circumstances set out in reg 2.41. The consideration of those prescribed circumstances is thus a jurisdictional prerequisite to the exercise of the Ministerial discretion to cancel a visa under s109. In order to comply with that prerequisite, the decision-maker must* ***engage in what has been described as "an active intellectual process" in which each of the prescribed circumstances receives his or her "genuine" consideration****: Tickner at 462 (per Black CJ) and Minister for Immigration and*

[19] (1988) 12 ACLR 764, 772.

[20] (1870) LR 4 HL 543.

[21] (2010) 190 FCFR 248, [57]-[60].

*Multicultural Affairs v Jia Legeng (2001) 205 CLR 507 at [105] (p 540) (per Gleeson CJ and Gummow J).*

***In the absence of any statutory or contextual indication of the weight to be given to factors to which a decision-maker must have regard, it is generally for him or her to determine the appropriate weight to be given to them****: Minister for Aboriginal Affairs v Peko-Wallsend Ltd (1986) 162 CLR 24 at 41 (per Mason J). The failure to give any weight to a factor to which a decision-maker is bound to have regard in circumstances where that factor is of great importance in the particular case may support an inference that the decision-maker did not have regard to that factor at all.*

*Similarly, a decision-maker does not take into account a consideration that he or she must take into account if he or she simply dismisses it as irrelevant. On the other hand, it does not follow that a decision-maker who genuinely considers a factor only to dismiss it as having no application or significance in the circumstances of the particular case will have committed an error. A decision-maker is entitled to be brief in his or her consideration of a matter which has little or no practical relevance to the circumstances of a particular case. A court would not necessarily infer from the failure of a decision-maker to expressly refer to such a matter in its reasons for decision that the matter had been overlooked. But if it is apparent that the particular matter has been given cursory consideration only so that it may simply be cast aside, despite its apparent relevance, then it may be inferred that the matter has not in fact been taken into account in arriving at the relevant decision: Elias v Cmr of Taxation (2002) 123 FCR 499 at [62] (p 512) (per Hely J). Whether that inference should be drawn will depend on the circumstances of the particular case.*

*In some cases it may be apparent that amongst the factors to which a decision-maker is bound to have regard, there is one factor (or perhaps more than one) which is critical or fundamental to the making of the decision in question. This was true of the particular matter referred to by Mason J in R v Toohey; Ex Parte Meneling Station Pty Ltd (1982) 158 CLR 327 at 338. As his Honour's reasons in R v Hunt; Ex Parte Sean Investments Pty Ltd (1979) 180 CLR 322 at 329 show,* ***the relevant statutory provisions may make clear that a particular factor is "a fundamental matter for consideration"****. But the converse is also true.* ***The relevant statutory provisions may show that a particular matter to which a decision-maker must have regard is not fundamental to the decision-making process*** *in the sense discussed by his Honour: see, for example, Singh v Minister for Immigration and Multicultural Affairs (2001) 109 FCR 152 at [57] (p 164) (per Sackville J).*

- Per Sackville J in *Singh v Minister for Immigration and Multicultural Affairs* (emphasis added):[22]

  *…a statutory obligation to have regard to specified matters when making an administrative decision may require the decision-maker* ***to take the matters into account and "give weight to them as a fundamental element in making his [or her] determination"****: R v Hunt; Ex parte Sean Investments Pty Ltd (1979) 180 CLR 322 at 329 per Mason J. Indeed, this is the meaning that was given to the predecessor of s 501(6)(c) of the Migration Act (relating to*

[22] (2001) 109 FCR 152, [57].

> *the character test): Minister for Immigration and Ethnic Affairs v Baker (1997) 73 FCR 187 at 194.* ***But the phrase "have regard to" can simply mean to give consideration to something*** *(Shorter Oxford English Dictionary). In this sense a direction to a decision-maker to have regard to certain factors may require him or her merely to consider them, rather than treat them as fundamental elements in the decision-making process.*

- Per Lindgren, Rares and Foster JJ in *Lafu v Minister for Immigration and Citizenship* (emphasis added):[23]

> *In circumstances where a decision-maker is required to have regard to several specified or prescribed mandatory considerations, he or she must* ***genuinely have regard to each and every one of those considerations and must engage actively and intellectually with each and every one of those considerations by thinking about each of them and by determining how and to what extent (if at all) each of those criteria might feed into the deliberative process and the ultimate decision****; and*

- Per Mansfield J in *Australian Competition and Consumer Commission v Leelee Pty Ltd* (emphasis added):[24]

> *The expression "have regard to" is a common one.* ***It means no more than to take into account or to consider****: The Macquarie Concise Dictionary, 2ed, 831. "A" v Pelekanakis [1999] FCA 236 concerned, inter alia, the obligation of the Minister for Immigration and Multicultural Affairs under s54 of the Migration Act 1966 (Cth) to have regard to all the information in the application for a visa when considering that application. Weinberg J said at para 58:*
>
> > *"****The expression "have regard to" must, in context, mean "take into account"****. It does not, of course, require the recipient of the information to accept it as true, to act upon it, or even ultimately to be influenced by it – Hoare v The Queen (1989) 167 CLR 348 at 365. It does, however,* ***require the recipient of the information to consider it properly in the context of performing the statutory duty imposed upon him****, and to which the information to be considered is directed, ..."*
>
> *That commonsense and practical approach is reflected in many decisions of the Court under that Act: see e.g. per Wilcox J in Lek v Minister for Immigration Local Government and Ethnic Affairs (1993) 43 FCR 418.*
>
> *The expression was also considered by O'Loughlin J in Reid v Vocational Registration Appeal Committee (1997) 73 FCR 43 at 53-54. His Honour said at 54:*
>
> > *"The expression "must have regard to", which is found in statutory instruments from time to time,* ***will always take its meaning from the context in which it appears****. Thus the matters to which a decision-maker, such as the Appeal Committee, "must have regard to" might be exhaustively listed: see, for example, Re BHP Petroleum Pty Ltd and Minister for Resources (1993) 30 ALD 173 at 180. Alternatively, the relevant provisions might be "so generally*

[23] (2009) 112 ALD 1, [47].

[24] [1999] FCA 1121, [81]-[84].

> *expressed that it is not possible to say that he is confined to these… considerations…": Re Hunt; Ex parte Sean Investments Pty Ltd (1979) 180 CLR 322 at 329 per Mason J. But whether the listed subject matters are or are not exhaustive, they are matters to which regard must be had by the decision-maker.* ***It is essential that the decision-maker, to adopt the words of Gibbs CJ in R v Toohey; Ex parte Meneling Station Pty Ltd (1982) 158 CLR 327 at 333, "give weight to them as a fundamental element" in coming to a conclusion.****"*

*The issue in that case was the obligation imposed upon the decision maker by the use of the word "must", but his Honour's views also indicate that it is necessary to give weight to a matter if there is an obligation to have regard to it. O'Loughlin J expressed similar views in Fitti v Minister for Primary Industries (1993) 40 FCR 286 at 299. His Honour applied the words of Mason J in The Queen v Hunt; ex parte Sean Investments Pty Ltd (1979) 180 CLR 322 at 329 that the obligation to have regard to the matter obliges the decision maker*

> *"…to take [that matter] into account and to give weight to [it] as a fundamental element in making his determination".*

**"Take account of"**

- Per Parker J (with whom Malcolm CJ and Anderson J agreed) *Re Michael; Ex parte Epic Energy (WA) Nominees Pty Ltd*, consider section 2.24 of the *National Third Party Access Code for Natural Gas Pipeline Systems*, which required the regulator to "take into account" a number of factors when assessing a proposed Access Arrangement (emphasis added):[25]

> *The submissions of the parties in this regard proceeded by analogy with legislative requirements such as "must have regard to" or "shall have regard to". The researches of counsel had not identified any decision in which the precise phrase used in s2.24 had been the subject of judicial consideration. In R v Hunt; Ex parte Sean Investments Pty Ltd (1979) 180 CLR 322 the question arose in the context of a statutory requirement that a departmental head "have regard to costs necessarily incurred" when determining the scale of fees. At 329 Mason J (Gibbs J concurring), said:*
>
> > *"When subs(7) directs the Permanent Head to 'have regard to' the costs, it requires him to take those costs into account and to give weight to them as a fundamental element in making his determination. There are two reasons for saying that the costs are a fundamental element in the making of the determination. First, they are the only matter explicitly mentioned as a matter to be taken into account. Secondly, the scheme of the provisions is that, once the premises of the proprietor are approved as a nursing home, he is bound by the conditions of approval not to exceed the scale of fees fixed by the Permanent Head… In the very nature of things, the costs necessarily incurred by the proprietor in providing nursing home care in the nursing home are a fundamental matter for consideration."*

[25] (2002) 25 WAR 511, [52]-[55].

*In the R v Toohey & Anor; Ex parte Meneling Station Pty Ltd & Ors (supra) the issue arose in the context of s50 of the Aboriginal Land Rights (Northern Territory) Act 1976 (Cth) which, in subs(3), required that the Commissioner in making a report in connection with a traditional land claim "shall have regard to the strength or otherwise of the traditional attachment by the claimants to the land claimed, and shall comment on" each of a number of matters. At 333 Gibbs CJ observed:*

> *"…the section draws a clear distinction between those matters to which the Commissioner 'shall have regard' and those upon which he 'shall comment'. When the section directs the Commissioner to 'have regard to' the strength or otherwise of the traditional attachment by the claimants to the land claimed… it requires him to take those matters into account and to give weight to them as a fundamental element in making his recommendation. (His Honour referred to R v Hunt). When the section directs him to comment on the matters mentioned in para(a) to para(d) of subs(3), it requires him to remark upon those matters and to express his views upon them. The change in language is so significant that notwithstanding the difficulties of the section I find it impossible to reach any conclusion other than that a significant change of meaning is intended, and that the matters which form the subject of the comment are not matters to which the Commissioner is bound to have regard in making his recommendation."*

*However, as Sackville J observed in Singh v Minister for Immigration and Multicultural Affairs [2001] FCA 389 at [54] the expression "have regard to" is capable of different meanings, depending on its context, and*

> *"…can simply mean to give consideration to something (Shorter Oxford English Dictionary). In this sense a direction to a decision-maker to have regard to certain factors may require him or her merely to consider them, rather than treat them as fundamental elements in the decision-making process."*

*In that case, the learned Judge was persuaded that the requirement in s54(1) of the Migration Act 1958 (Cth) that the Minister, in determining a visa application, must have regard to all the information in the application, did not require the Minister to take into account the information in the application as a fundamental element in the decision-making process because at [57]:*

> *"It could hardly have been contemplated by the drafters that every piece of information selected for mention by an applicant, no matter how marginal its relevance to the issues to be determined, must be treated by the decision-maker as a 'fundamental element' in making the determination."*

*…It is clear that an expression such as "have regard to" is capable of conveying different meanings depending on its statutory context. In s2.24 the phrase "must take the following into account" is apt to convey as an ordinary matter of language that* ***the Regulator must not fail to take into account each of the six matters stipulated in (a) to (f), and by (g) any other matter the Regulator considers relevant. If anything, "take into account" appears, as a matter of language, little different from "have regard to"****.*

*Indeed, in R v Hunt the expression "have regard to" was understood as requiring that the specified matters be taken into account. The matters specified in (a) to (f) appear, by their nature, to be highly material to the task of assessing a proposed Access Arrangement, given the legislative purpose and objects of the Act and the Code in this regard. It is difficult to conceive that it could have been intended that the Regulator might decide to give no weight at all to one or more of the factors stipulated in s2.24(a) to s2.24(f). In my view, in the context of the Act and the Code, the Regulator is required by s2.24 to take the stipulated factors into account and to give them weight as fundamental elements in assessing a proposed Access Arrangement with a view to reaching a decision whether or not to approve it.*

## Attachment 2 – Advice on Proposed Rule Changes to National Gas Rule 87 by CEG

ceg COMPETITION ECONOMISTS GROUP

# Proposed AEMC changes to National Gas Rule 87

October 2012

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# Table of Contents

# 1 Introduction

1. The Australian Pipeline Industry Association (APIA) has asked CEG to assess whether the regulator's current application of a single model for determining the rate of return (in particular the cost of equity) will achieve the intent expressed by the AEMC in its Draft Determination or the best estimate of the rate of return of capital which is consistent with the National Gas Law (NGL), specifically the National Gas Objective (NGO) and revenue and pricing principles (RPP).

2. In answering this question, CEG has been asked to take into account legal advice obtained by APIA's legal advisors Johnson, Winter and Slattery (JWS) on how the AEMC's proposed revisions to NGR 87 would affect interpretation of this regulation, advice previously provided by CEG to APIA and recent regulatory precedent on these issues. CEG has also been asked to consider whether alternative drafting for NGR 87 prepared by JWS would, from an economic perspective, be more likely than the AEMC's drafting to achieve the NGO and the RPP.

3. The remainder of this report is set out as follows:

   - Section 2 draws from the Draft Determination in assessing what the objectives of the AEMC were in formulating the new Rules relating to the rate of return;
   - Section 3 briefly summarises the legal advice provided by JWS as it relates to these objectives;
   - Section 4 presents a case study demonstrating the problem with the implementation of the existing Rules that needs to be addressed; and
   - Section 5 assesses whether JWS's alternative drafting would be more likely to achieve the NGO and RPP than the AEMC's proposed drafting.

# 2 AEMC's objectives

4. The AEMC's intentions in its Draft Determination on proposed changes to the National Electricity Rules (NER) and NGR are highlighted in its executive summary. The AEMC states:[1]

> *The Commission proposes to amend the rate of return provisions in the NER and NGR to provide for a common framework that enables the regulator to make the best possible estimate of the rate of return at the time a regulatory determination is made. When making the estimate the regulator must take into account the market circumstances, estimation methods, financial models and other relevant information.*

5. Within this broad statement of intentions, there are two components to the AEMC's objectives. Firstly, it has amended both the NER and the NGR to ensure that the best estimate of the rate of return is made at the time of each regulatory determination. This reflects a movement away from current provisions of the NER where five-yearly WACC reviews can "lock in" certain parameters over many individual regulatory reviews. Secondly, the AEMC expresses a clear intention to require the regulator to take into account a wider range of methods, models, data and other evidence in its decision-making. This compares to the current situation where, for cost of equity, reliance is in essence placed solely on a particular implementation of the CAPM.

6. We consider these objectives in more detail below.

## 2.1 Objective to reflect prevailing conditions

7. The AEMC is unequivocal that the allowed rate of return must be estimated having regard to prevailing market conditions:[2]

> *A robust and effective rate of return framework must be capable of responding to changes in market conditions. If the allowed rate of return is not determined with regard to the prevailing market conditions, it will either be above or below the return that is required by capital market investors at the time of the determination. Neither of these outcomes are efficient and neither is it in the long term interest of energy consumers.*

8. We consider that this objective is sensible and it is appropriate that the AEMC expresses it in these terms. In order to achieve the NGO it is necessary that investors have an expectation that, on any capital supplied to the regulated business,

[1] AEMC Draft Determination, p. ii

[2] AEMC Draft Determination, p. 49

they will recover a cost of capital that is commensurate with the market return they can achieve elsewhere for exposure to similar risk. If this is not the case then investors will not willingly invest in the assets of the regulated business. In this respect that AEMC's conclusion is consistent with the advice we gave in our earlier report for APIA.[3]

9. Similar advice was provided by the AEMC's consultant, SFG, which noted that the first feature of a high quality WACC estimate was that it comes from a process that "reflects current market circumstances":[4]

> *By definition, the WACC is a forward-looking opportunity cost. It is an estimate of the expected return that investors would require in order to commit capital to the firm in the current environment. Since market circumstances vary over time, a firm's cost of capital will also vary over time. For this reason it is important that any WACC estimate properly reflects the current market circumstances. The current Rules recognise this where they refer to the need for the regulatory rate of return to be "a forward looking rate of return that is commensurate with prevailing conditions in the market for funds."*

## 2.2 Objective to take into account a range of approaches

10. The AEMC is also very clear that it intends to require the regulator to consider *"a range of estimation methods, financial models, market data and other evidence"* in coming to its estimate of the allowed rate of return. It considers that this is the only way of ensuring that *"the estimation process is of the highest possible quality"*.[5]

11. It expresses concern that the current Chapter 6 NER framework takes too prescriptive an approach, locking in the use of particular methodologies and parameters with no or limited scope for review. It rejects the prescription of 'formulaic' approaches to determining the cost of debt and cost of equity:[6]

> *An example of an estimation process that has become formulaic is the mandatory use of the CAPM under the NER and the view that appears to be adopted in practice that CAPM is the only "well accepted" model under the NGR, despite the flexibility to consider other models.*

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3 CEG, *Proposed changes to the National Gas Rules: A report for APIA*, December 2011, Section 3.1

4 SFG, *Preliminary analysis of rule change proposals: Report for AEMC*, 27 February 2012, p. 17

5 AEMC, Draft Determination, p. 46

6 AEMC, Draft Determination, p. 47

12. In particular, the AEMC notes that an important motivation for having regard to a wide range of evidence is that:[7]

> *A framework that eliminates any relevant evidence from consideration is unlikely to produce robust and reliable estimates, and consequently is unlikely to best meet the NEO, the NGO and the RPP.*

13. We consider that the AEMC's concerns about reliance upon prescribed approaches are warranted. In our opinion, consistent with the views expressed in our earlier report for APIA, it is appropriate to be informed by all reliable information relevant to estimating the allowed rate of return. This provides the best possible opportunity to arrive at an accurate estimate of a rate of return.

14. We stated at section 3.2 of our previous report that approaches that rely upon a single methodology will not meet the NGO. Accepted use of financial models has evolved over time with experience and research and this evolution continues. There remains a great deal of disagreement in the finance literature over which models best explain risk-adjusted returns. "Locking in" in a particular implementation of just one model and assuming that only the output of this model is relevant to assessing the rate of return or cost of equity, cannot give rise to the best and most reliable estimates of the rate of return and will not meet the NGO.[8]

15. This advice is also consistent with the recommendations of SFG, which emphasises that the best estimate of the WACC requires utilisation of all relevant data and consideration of all relevant estimation methods.[9]

7 AEMC Draft Determination, p. 48

8 CEG, *Proposed changes to the National Gas Rules: A report for APIA*, December 2011, Section 3.2

9 SFG, *Preliminary analysis of rule change proposals: Report for AEMC*, 27 February 2012, p. 17

# 3 Interpretation of proposed Rule

16. APIA has provided us with legal advice given to it by JWS that indicates that the AEMC's proposed changes to the NGR may not give effect to the intentions that are summarised at section 2.

## 3.1 Objective to reflect prevailing conditions

17. JWS note that in the existing Rule 87, the rate of return is to be estimated "*commensurate with prevailing conditions in the market for funds and the risks involved in providing reference services*".

18. By contrast, the proposed new drafting will require the rate of return to "*correspond to the efficient financing costs of a benchmark efficient entity with a similar nature and degree of risk as that which applies to the service provider in respect of the provision of reference services*". In the revised drafting the reference to a requirement for the estimate to be based on 'prevailing conditions' is no longer contained within the objective of the Rule but as one of the items that must be considered in its implementation. JWS advise that this in effect makes it secondary to the primary objective of Rule 87.[10]

19. JWS also observe that the new Rule 87(5)(b) requires the return on equity to be estimated in a way that *"is consistent with"* the allowed rate of return objective and "*taking into account the prevailing conditions in the market for equity funds*". In this construction, JWS advise that the requirement to "take into account" prevailing conditions does not reflect the prominence given by the AEMC to this factor in its Draft Determination. Furthermore, JWS note that the requirement for the rate of return estimated "to be consistent with" the rate of return objective could more directly be expressed as "to achieve" that objective.

20. Use of "to be consistent with" and "taking into account" prevailing conditions do not reflect the importance accorded by the AEMC to this factor. JWS state that "commensurate with" and "to achieve" is a more direct expression of the AEMC's intentions. [11]

## 3.2 Objective to take into account a range of approaches

21. The proposed new Rule 87(3)(c) provides that the allowed rate of return for a regulatory year is to be determined *"taking into account relevant estimation methods, financial models, market data and other evidence"*.

[10] JWS, *Proposed changes to National Gas Rule 87*, 25 September 2012, pp. 1-2

[11] Op cit, pp. 5-6

22. JWS note that the requirement to "take into account" alternative models and approaches requires the regulator to give consideration to those matters but that does not require the regulator to rely upon or give weight to any one of them:[12]

> *However, as long as the Regulator has taken into account the specified factors, it remains in the Regulator's discretion how those factors influence its decision. The practical application of this rule could result in the Regulator considering other methodologies but continuing to estimate the cost of debt and cost of equity using traditional approaches (eg the Sharpe Lintner CAPM), which would appear to be contrary to the objective of the rule change.*

[12] Op cit, p. 5

# 4 RFR/MRP case study

23. A number of recent AER decisions, most specifically the AER's recent final decision for the Roma to Brisbane Pipeline (RBP), highlight the need for clear guidance in the Rules as to what is required of the regulator and what is within its discretion to do.

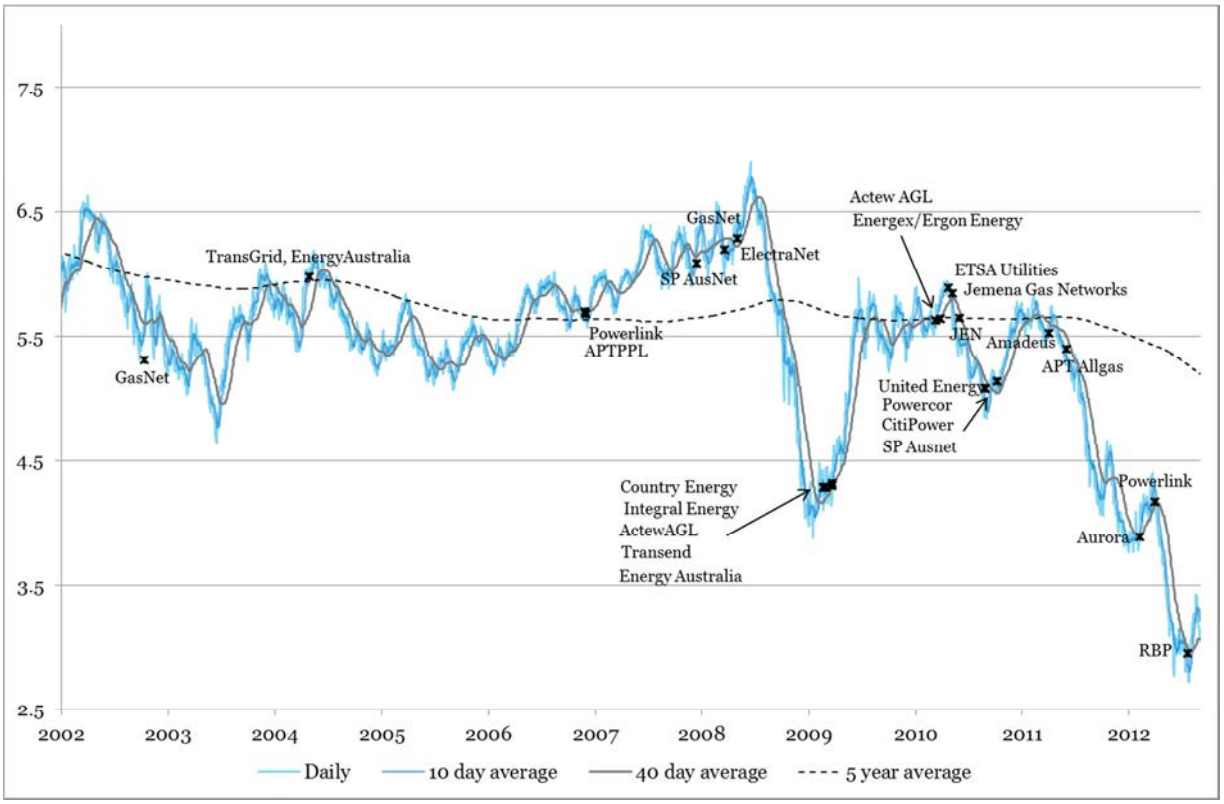
24. In particular the RBP decision demonstrates the possibility that requiring the regulator to have regard to a wide range of methods, models, data and other information may not be enough to ensure that it gives these matters due consideration. This is because ultimately the AEMC's proposed drafting leaves the regulator with the discretion to place little or no weight on these matters. In this respect, the proposed Rules may not result in an outcome any different to what has happened in recent decisions, such as the final decision on RBP.

25. In the RBP review, a specific area of disagreement between the pipeline owner APTPPL and the AER was the level of the MRP. APTPPL proposed an MRP of 8.5%, whereas the AER's final decision imposed a value of 6%. The value of the risk-free rate was agreed by both parties to be 2.95%, being the annualised yield on 10-year CGS.

## 4.1 Volatile risk free rate with fixed MRP

26. The 10 year Commonwealth Government Security (CGS) risk free rate proxy has been extremely volatile since the global financial crisis as is evidenced by the following figure which show a time series for this measure along with corresponding regulatory decisions marked on the same figure.

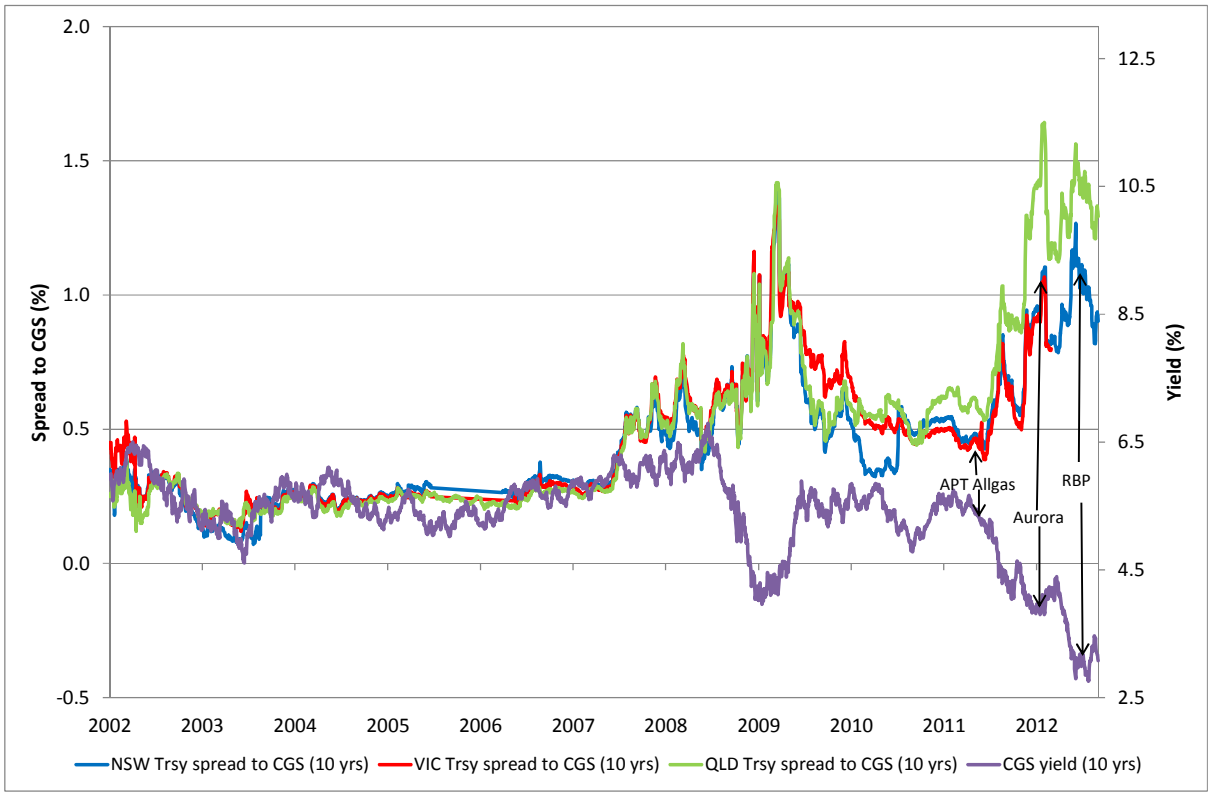
**Figure 1: Risk free rate decisions for regulated energy businesses**




*Source: ACCC/AER decisions, CEG analysis*

27. CEG has presented what we regard as compelling evidence that the MRP and risk free rate tend to be inversely related such that when the risk free rate is low the MRP tends to be high (and *vice versa*). This included, for example, evidence that spreads between CGS and other assets (even other AAA rated Government debt) tended to be highest when CGS was lowest (and *vice versa*). The following chart shows an updated version of a figure put before the AER prior to the RBP final decision (obviously the RBP final decision point and data was not in that chart).

**Figure 2: Inverse relationship between risk premia on state Government debt and CGS yield**

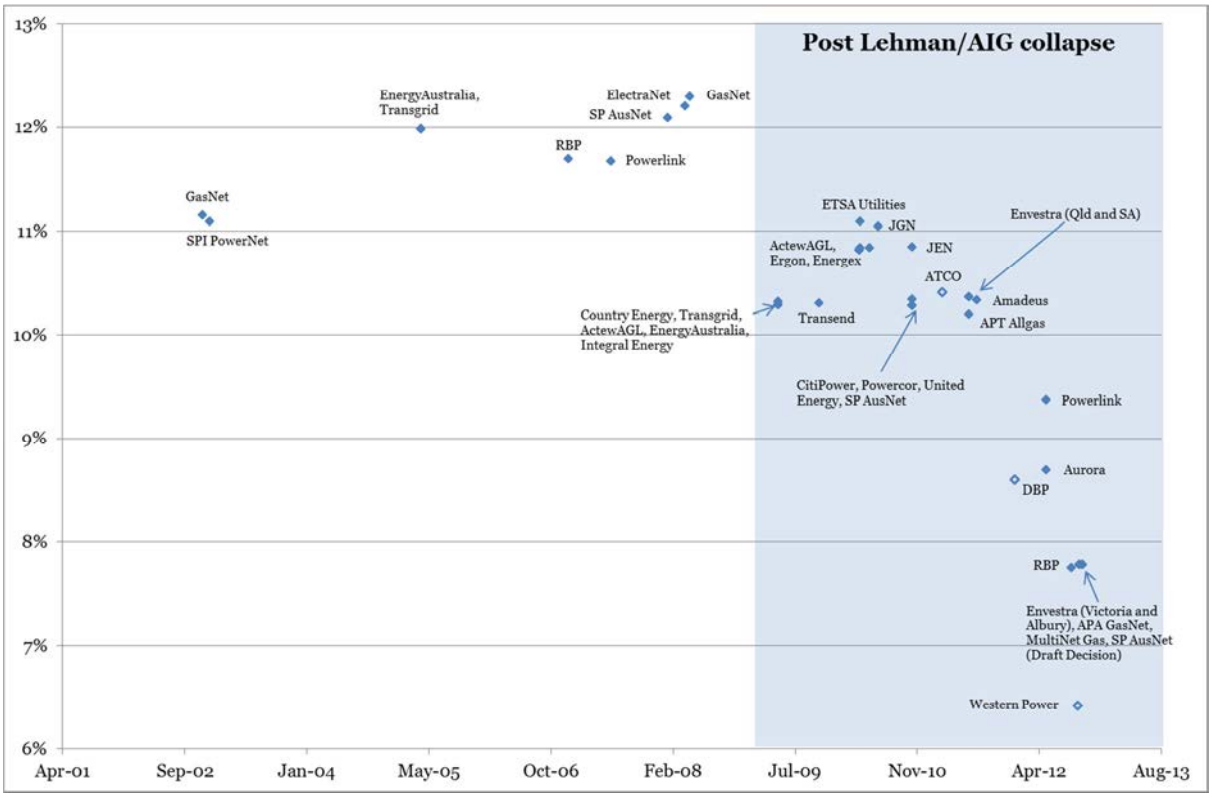



*Source: CEG analysis, Bloomberg data*

28. This evidence was put before the AER in the RBP process but was dismissed with the AER choosing to set a constant MRP in the face of a historically unprecedented (at least in the last 50 years) risk free rate. Indeed, the AER actually reduced the MRP from 6.5% to 6.0% in its Aurora decision just as risk free rates were plummeting and risk premiums rising (as evidenced by risk premiums on state Government debt).

29. The effect of this is that the AER has estimated that RBP's cost of equity is the lowest cost of equity for any energy business regulated by it. Similarly, for very similar reasons the ERA in Western Australia has estimated that Western Power has an even lower cost of equity (partly reflecting the ERA's choice of a 5 year CGS proxy for the risk free rate).

## Figure 3: History of allowed cost of equity




*Source: ACCC/AER/ERA decisions*

30. APTPPL's proposed MRP of 8.5% was based upon advice prepared by CEG for the Victorian gas distributors, also submitted as part of APTPPL's revised access arrangement proposal. In that report we made a detailed survey of general conditions relevant to assessing the cost of equity and the MRP, and proposed two quantitative methodologies by which the cost of equity and MRP could be estimated based on dividend growth models (DGM).

31. We considered that a range of information in addition to the spreads to CGS on AAA rated state Government debt instruments described above. These all suggested that risk premiums in the general economy were elevated relative to historical averages. Moreover, the AER received advice from the RBA that confirmed this view of heightened risk premiums. Assistant Govenor Guy Debelle, when asked by the AER to review the CEG report, essentially agreed with CEG's core view when he stated:

> *As a result, there has been a widening in the spreads between CGS yields and those on other Australian dollar-denominated debt securities. This*

*widening indeed confirms the market's assessment of the risk-free nature of CGS and reflects a general increase in risk premia on other assets.*[13]

32. Our evidence was confirmed by our estimate of the current cost of equity for regulated energy network businesses. [14]

33. A key component of our advice was that the methodology that was being applied by the AER effectively combined a current estimate of the risk-free rate with an historically averaged estimate of the MRP. Given that measures of the risk-free rate were historically low, this combination resulted in a very low overall cost of equity that was not reflective of the prevailing conditions in financial markets.

## 4.2 AER final decision

34. Evidence that the AER had regard to in coming to its estimate of 6% included:

- historical excess returns;
- survey evidence;
- the practice of other Australian regulators and recent Tribunal decisions;
- DGM estimates; and
- other financial indicators, including:
  - credit spreads; and
  - dividend yields.

35. The AER's decision gives overwhelming weight to the evidence sourced from historical excess returns. The AER itself admits that these are not "strictly forward looking".[15] It is a contradiction in terms for the AER to refer to *"the best estimate of a 10 year forward looking MRP based on historical excess returns"*.[16] An additional assumption is required that future expectations of MRP are best measured by average historical measures, and not through direct estimates of the expected MRP such as DGM estimates.

[13] http://www.aer.gov.au/sites/default/files/RBA%20letter%20concerning%20the%20Commonwealth%20Government%20Securities%20Market%20-%2016%20July%202012.pdf

[14] CEG, *Internal consistency of risk free rate and MRP in the CAPM: Prepared for Envestra, SP AusNet, Multinet and APA*, March 2012

[15] AER, *Final Decision: APT Petroleum Pipeline Pty Ltd: Access arrangement final decision Roma to Brisbane Pipeline 2012–13 to 2016–17, August 2012*, p. 67

[16] Op cit, p. 69

36. By comparison, the AER states that DGM estimates "can provide some information" on the expected MRP. It immediately qualifies this view by casting doubt on the robustness of such estimates:[17]

> *However, the AER considers that the DGM based estimates of the return on equity and inferred estimates of the MRP are highly sensitive to the assumptions made. It is necessary that all assumptions made have a sound basis, otherwise estimated results from DGM analysis may be inaccurate and lead analysts into error.*

37. Of course, precisely the same is true of interpretations of any evidence – including historical evidence relied on by the AER.

38. The AER admits that DGM estimates currently give high estimates of the MRP. However, by setting the overall MRP at 6%, it clearly has chosen to give very little weight to this information. The AER disputes the reliability of other information that could be looked at to assess the level of volatility or risk premiums.[18]

39. The above discussion shows, in our view, that while a regulator may *have regard* or *take account of* a great deal of information, much of which may be very relevant to assessing a particular WACC parameter, it will not necessarily place significant weight on this information. In this sense, the AEMC's proposed Rule changes do not appear to require the regulator to do anything different from what it is currently doing and will not necessarily resolve its reliance on a single financial model

40. We understand that the AEMC's intention in drafting its proposed Rule changes was that the regulator would be required to have active regard and place appropriate weight on a variety of approaches to assessing the rate of return. However, if no words or framework are provided to allow a review body to assess whether the regulator has exercised its discretion reasonably then it is not clear that the proposed Rules will have the effect that was intended.

17 Op cit, pp. 74-75

18 Op cit, pp. 76-77

# 5 Alternative drafting

41. CEG has been asked to consider whether alternative drafting for NGR 87 prepared by JWS would, from an economic perspective, be more likely than the AEMC's drafting to achieve NGO and the RPP.

42. In this section we restrict our attention to the changes proposed by JWS which we believe have implications for economic interpretation of the requirements of the Rules.

43. In our view, the changes recommended herein will better achieve the NGO and the RPP for the reasons outlined in section 2 above.

## 5.1 87(2)

44. We consider that JWS's reinstatement of the words *"be commensurate with prevailing conditions in the market for Funds"* in the allowed rate of return objective at Rule 87(2) is more likely to achieve the NGO.

45. This is reflected in the opinions we expressed in our earlier report for APIA that in order to achieve the NGO it is necessary that investors have an expectation that, on any capital supplied to the regulated business, they will recover a cost of capital that is commensurate with the market return they can achieve elsewhere for exposure to similar risk. If this is not the case then investors will not willingly invest in the assets of the regulated business. [19]

46. To the extent that including it as part of the objective, and not simply a requirement to achieve when estimating the rate of return, gives primacy to the need to estimate a prevailing rate of return (rather than this being simply one of a range of potentially conflicting requirements) we consider that it is more likely to achieve the NGO.

## 5.2 87(3)

47. JWS provides a number of drafting alternatives, all of which clarify that the regulator is not just *required to take into account* a range of methods, models and data, but is *expected to utilise several* of these in support of its estimate. We believe that this clarification does assist the AEMC's objective by ensuring that the status quo of sole reliance on a single implementation of the CAPM cannot continue to be the basis of future decision making.

[19] CEG, *Proposed changes to the National Gas Rules: A report for APIA*, December 2011, Section 3.1

48. This is consistent with the observations of the AEMC, CEG and SFG summarised at section 3.2 above that wider regard to methods, models and data would result in an estimate that would be more likely to achieve the NGO.

## 5.3 87(5)

49. JWS's redrafting of the Rule 87(5) to guide estimation of the return on equity replaces:

    - *"to be consistent with"* the allowed rate of return objective with *"to achieve"* that objective; and
    - *"taking into account"* the prevailing conditions in the market for equity funds with *"to be commensurate with"* those conditions.

50. JWS's proposed revisions appear to provide clearer guidance to the importance of achieving the allowed rate of return objective, and place greater importance on reflecting the prevailing conditions in financial markets. Since reflecting prevailing conditions is important to achieving the NGO, as summarised at section 3.1, we consider that JWS's draft Rule would be more likely than the AEMC's proposed Rule to achieve the NGO.

## 5.4 87(b)

51. Consistent with the views of JWS it does not appear that there is any reasonable economic or logical interpretation for the proposed requirements of 87(6)(b).

the australian PIPELINE industry association Ltd

4 October 2012

Australian Energy Market Commission
PO Box A2449
Sydney South NSW 1235
Submitted via web portal

**Consultation on Draft Determination on Rule Change GRC0011**

Dear Commissioners

The Australian Pipeline Industry Association (APIA) welcomes the opportunity to comment on the Commission's Draft Determination on the Economic Regulation of Service Providers rule change proposals. APIA's submission focuses on the rate of return changes proposed for the National Gas Rules (NGR), the rule change identified as GRC0011.

APIA is pleased that the Commission has formed a view that the more flexible approach to determining the rate of return embodied and intended under the current NGR has features consistent with those determined to be desirable by the Commission and should form the basis of a new framework. The need to ensure that the framework requires the regulators to use all available evidence and market data in estimating the rate of return, rather than adopting a formulaic approach that relies on a single model in that estimation process will not only ensure that the most accurate outcome is achieved, it will give the greatest confidence to investors that the national gas objective will be achieved. The features of a desirable framework set out by the Commission are strongly supported by APIA.

Notwithstanding this, APIA does have some concerns that there are aspects of the proposed preferred rule outlined by the Commission in the draft determination which may not accurately embody the key features identified by the Commission.

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The attached submission seeks to address these issues. We are also conscious that there is a relatively short timetable proposed to complete the rule change assessment process so as to not adversely impact on the pricing determination process that must be commenced by some regulated businesses in 2013.

Accordingly, APIA proposes the following:

- the attached submission contains specific re-drafting of the preferred rule for the Commission's consideration.
- as every word used in a rule can impact the meaning of a rule, APIA suggests that the Commission form a Drafting Committee, with representatives from key stakeholders, to review the final set of words decided upon by the Commission prior to the release of the Final Determination. This will provide an opportunity for a range of experts to review the final wording of the rules to ensure the Commission's intent is achieved as closely as possible.

The submission will also address APIA's concerns with aspects of the Guidelines process proposed in the Draft Determination. These concerns primarily focus on the timing and process of the first Guideline and ensuring that the Guideline does not become a more prescriptive than intended instrument a regulator feels bound to follow.

In terms of transitional issues, this submission will address only those that relate to transitioning to the mandatory use of a post-tax basis for estimating the rate of return. Transitional issues that relate to the timing of the next round of pricing approvals in access arrangements relative to the guidelines process will be addressed by APIA as part of the separate consultation process currently being conducted by the Commission.

If you would like any further information please contact me on (02) 6273 0577 or sdavies@apia.asn.au.

Yours sincerely

STEVE DAVIES
Policy Adviser

# Attachment 3: Response to ERA Questions 1 - 59

***The ERA's approach to developing the RoR Guidelines***

1. Is it reasonable to focus on the overall RoR methodologies in developing the RoR guidelines, and not develop specific parameter values within the RoR guidelines?

1.1. DBP has provided a detail response to this issue in section 3 of its submission. In summary, the key point is that the focus should be on the overall rate of return methodologies (including establishing the benchmark efficient entity with similar degree of risk as that which applies to the service provider in respect of the provision of reference services), and the rate of return informative material relevant to the estimation of the rate of return on equity and the rate of return on debt. This is so for the following reasons:

(a) It is clearly not the AEMC's intention for the guidelines to be a determinative instrument, as stated in its reasoning in the final Rule Determination.

(b) Additionally, APIA's Submission (at page 14) submits that the guidelines now required by Rule 87(13) are important in providing both market and information responsiveness (flexibility) and confidence without an overly rigid prescriptive approach.[1] Their role is to provide service providers, investors and consumers with certainty on the methodologies of the various rate of return components and how the ERA will assess the relevant financial models, estimation methods, market data and other evidence in meeting the ARORO.[2]

(c) The requirement in the NGR is that the guidelines must identify the methodologies that the ERA proposes to use in estimating the rate of return, including how those methodologies are proposed to result in the determination of a return on equity and a return on debt in a way that is consistent with the ARORO.

(d) The ARORO by itself is such that it is focused on the risks involved in a service provider's provision of reference services and what are the efficient financing costs of a benchmark efficient entity with similar risks. Accordingly, unless the guidelines make this assessment on a service provider by service provider basis, the guidelines will, of necessity, need to be limited to focusing on the overall rate of return methodologies and the relevant rate of return informative material relevant to the estimation of the rate of return on equity and the rate of return on debt rather than on the specific parameter values for each model or methodology.

(e) The guidelines are not intended to explicitly lock-in any methods of rate of return determination, or specific parameters and parameter values, from which departure would not be permitted. Their purpose is to "narrow the debate" at the time of a specific determination or access arrangement revisions decision.[3]

[1] Rule Determination, page 46.

[2] Rule Determination, page 57

[3] Rule Determination, page 58.

(f) The guidelines also provide the ERA with the opportunity to specify how it might deal with unpredictable changes in market conditions at the time of a specific regulatory determination or access arrangement revisions decision.

(g) As to the content of the guidelines, DBP refers the ERA to its detailed response in paragraph 3.48 to 3.61 of section 3 of its main submission.

***Efficient Financing costs***

2. What constitutes 'efficient financing costs', and how should this inform the approach to estimating the RoR?

1.2. DBP's detailed response to this issue is outlined in section 3 of its submission. The key points raised by DBP are that:

(a) It is inappropriate to assess the meaning of "efficient financing costs" without understanding that it needs to be defined in the context of the ARORO – therefore it must be the efficient financing costs of a benchmark efficient entity with a similar degree of risk as that which applies to the service provider in respect of the provision of reference services.

(b) The task therefore is for the ERA to first assess the degree of risk involved in the provision by each service provider of each reference service on each covered pipeline. To the extent that the risks are not similar, the regulator will need to identify in the guidelines different benchmark efficient entity or entities with similar risks to each service provider. Once this established, the ERA will need to assess the efficient financing costs of each benchmark efficient entity. DBP is of the view that establishing those costs may be quite difficult. Ascertaining the lowest costs of financing reliable service provision in any specific circumstances will generally be a matter of judgment because it will not be feasible to identify all of the possible costs of a benchmark efficient entity with a similar degree of risk as that which applies to the service provider in respect of the provision of reference services, and to choose the lowest among those possible costs.

(c) In that regard, "efficient financing costs" are not determined solely (or even mainly for that matter) by reference to the weighting to be given to each of the cost of debt and the cost of equity. As noted by the Brattle Group in the Brattle Debt Report:

*the overall cost of capital of a company is the weighted average of the cost of debt and the cost of equity. As the leverage increases, larger weight is placed on the cost of debt. Therefore, risk of default increases and the cost of debt (and equity) increases. This change in relative weight generally does not change the overall cost of capital (absent taxes) and says nothing about the efficiency of an entity.*

*3.* What elements need to be considered 'jointly' under the WACC and what does this mean in practice?

1.3. DBP refers the ERA to section 6 of its main submission which outlines a practical way to achieving a rate of return that best achieves the ARORO. Consistent with the requirements of the NGR and the NGL, the ERA must:

(a) First estimate a rate of return on equity and a rate of return on debt. That process requires the ERA to assess for consistency and parameter interrelationships (as required by Rule 87(5))

(b) Then determine a rate of return which can be one of a multiple possibilities because of the range of outcomes that will be delivered in estimating the return on equity and the return on debt.

(c) The ERA will then need to "circle back" and assess if further adjustment is required based on the unique risks of each service provider and the unique characteristics of each model and methodology relied on by the regulator – this is the process known as "risk positioning" in DBP's submission

1.4. So, there is a continual joint estimation process required to assess for consistency and interrelationships.

1.5. As noted by the Brattle Group in the Brattle Debt Report:

*It is imperative that the choice of model(s) and their implementation take into account the prevailing economic conditions, industry specifics as well as characteristics of the firm for which the cost of debt is being determined, because, according to the circumstances, each model can show bias. Because the cost of debt interacts with the cost of equity and could impact capital expenditures, a decision maker must take into account specifics about the company, industry and economy. For example, we expect a company with a higher leverage to have a higher cost of debt (and equity) than a company with lower leverage, but the weights assigned to the cost of debt and equity differ, so that the overall cost of capital (absent taxes) is the same.*[4]

*4.* Are there other methods which provide information on efficient financing costs, which need to be taken into account?

1.6. Again, DBP refers the ERA to section 3 of its submission and the points made under the heading "ARORO" in that section.

1.7. The task for the ERA is to consider what are the efficient financing costs in the context of the ARORO.

1.8. DBP does not underestimate the difficulty of this task.

[4] The Brattle Group, Estimating the Cost of Equity for Regulated Companies (2012), page 1

***Benchmark Efficient Entity***

> 5. What elements of the evaluation of the rate of return should be informed by benchmarking?

1.9. DBP has provided a detailed response in section three on the issue of benchmark efficient entities. It is outlined in section 3 of the submission under the heading "ARORO". In particular:

(a) It is wrong to proceed on the assumption that only certain elements of the evaluation process that need to be informed by "benchmarking". Rather, the ERA must assess what is the benchmark efficient entity with similar degree of risk as that which applies to the service provider in respect of the provision of reference services and then assess the rate of return by reference to the efficient financing costs of this entity.

(b) The rate of return therefore cannot be applied in a "one size fits all" manner. Nor can it be the starting premise that there is only one benchmark efficient entity. This is abundantly clear from the use of the words in Rule 87(3) "*with a similar degree of risk which applies to the service provider*".

(c) This conclusion is supported by the AEMC's statements that:

*"the objective is focus on the rate of return required by the benchmark efficient service provider, with similar risk characteristics as the service provider the subject of discussion"*[5];

*"the regulator must determine a rate of return that is consistent with that is consistent with that required by the benchmark efficient firm with similar risk characteristics to the service provider in question"*[6] and

*"the [ARORO] incorporates the concept of a benchmark efficient service provider, which means that the regulator can conclude that the risk characteristics of the benchmark efficient service provider are not the same for all service providers across the electricity transmissions, electricity distribution and gas and / or within those sectors"*[7]

(d) Further, it would be wrong for the ERA to simply use a range of companies with a certain credit rating and assume that this is the benchmark entity. Credit ratings are imperfect indicators of risk.

There are examples in other jurisdictions of where regulators have assessed for the similarity between the degree of risk of the service provider and the degrees of risk of comparable entities for which data are independently available, and which might be used in rate of return determination. Examples provided in section 3 of the main submission are the FERC in USA and the NEB in Canada.

[5] Rule determination, page iii

[6] Rule determination, page 65

[7] Rule determination, page 67

6. What considerations are relevant when estimating the associated parameters for the benchmark efficient service provider?

1.10. DBP's main submission (at sections 3 and 6) outlines in detail the considerations relevant to the benchmark efficient entity.

1.11. In relation to estimating the rate of return on equity, DBP refers the ERA to section IV.D of the Brattle Equity Report where it has regard to risk positioning of the target entity.

1.12. DBP also notes the regulator may also be required to consider the risk of the service provider when determining specific inputs required for some estimations methods such as equity beta and the debt risk premium.

1.13. In relation to estimating the rate of return on debt, regard should be had to the factors outlined in sections III and IV of the Brattle Debt Report which outlines a range of factors relevant to estimating the cost of debt. These include:

(a) Leverage

(b) Variability of a company's cash flow

(c) The magnitude of capital expenditure

(d) Fundamental supply/demand dynamics

(e) Particular industry factors such as fundamental oil and gas prices and the level of inflation in the region where funds are raised.

1.14. Regard should also be had to the types of risks that regulators in other jurisdictions have identified as being relevant to assess what is the benchmark efficient entity relevant under the ARORO. These are outlined in section 3 of DBP's main submission.

1.15. These factors are relevant to determining not only the benchmark efficient entity for the purposes of estimating the cost of debt but also what may be the relevant efficient financing costs (in particular the cost of debt).

***Degree of risk associated with provision of reference services***

7. How may the degree of risk for a benchmark service provider be measured? What does this imply for the estimation methods, models, data sets and other information required to determine the RoR?

1.16. This is one of the key tasks of the regulator under the new NGR.

1.17. DBP considers that the approach adopted by regulators to date, being to limit its analysis of capital risks to those of Australian energy utilities and to reflect those risks only in the

beta (for equity) and the debt margin (for debt), is not consistent with the new requirements of Rule 87. The regulator must assess the degree of risk associated with the service provider in providing reference services. To simply assess the degree of risk associated with the industry, as opposed to the relevant service provider, is wrong. This is outlined in more detail in section 3 of DBP's main submission, under the heading "ARORO".

1.18. Accordingly, a process that could be used to determine risk levels for service providers is:

a) Define the risks for a service provider;

b) Identify whether they are systematic or non-systematic;

c) Examine the risks of comparator service providers;

d) Assess the relevance of the risks to the established benchmark.

1.19. It should be noted that DBP and the APIA are in the process of commissioning further work in this regard and expect to be in a provision to make a further submission to the ERA on this issue shortly.

*8.* Does a current estimate of the degree of risk of a service provider provide a reasonable proxy for risk over the course of a future access arrangement? Should any expected new risks be accounted for? What are the implications for the return on equity and debt?

1.20. DBP submits that information that establishes a 'current day' risk profile will provide a good starting point for establishing the likely risk over the access period.

1.21. However, it should be noted that a company's current credit rating is a useful piece of information to take into consideration in order to understand the degree of risk faced by the service provider in the provision of reference services, but it is not the sole basis for assessing the degree of risk to which a particular business is exposed. For this reason, it is wrong to assume that any other entity with a similar credit rating to the service provider should be considered as a benchmark entity with a similar degree of risk. This is discussed in section 3 of DBP's main submission.

1.22. As outlined above, the current day risk profile of a business is a good starting point. However, given the ERA is tasked with assessing the rate of return for the access arrangement period, if a service provider can identify any expected new risks over the forward regulatory period, those risks should be should be taken into consideration.

1.23. DBP has submitted that the risk positioning step outlined by the Brattle Group in the Brattle Equity Report is the preferred approach for taking into account such risks in relation to the cost of equity. This is discussed in more detail in sections 3 and 6 of DBP's main submission.

***Criteria for exercise of discretion in determining the rate of return***

> *9.* Is it reasonable to consider criteria when evaluating alternative RoR methodologies?

1.24. A criteria or principles -based approach could be appropriate to ensure the methodology used to determine the allowed rate of return meets the objective and is applied consistently and transparently. However, DBP does not consider the current set of proposed criteria outlined in Box 1 of the Consultation Paper to be complementary to the NGO, RPP and ARORO.

1.25. In approaching the task of developing criteria, it is appropriate to be cognisant of the hierarchy of objectives that must be met when determining the allowed rate of return. In the case of gas decisions, the overarching priority is meeting the NGO. Under the NGO sits the Revenue and RPP. Then there are the requirements of the NGR, primarily set out in rule 87.

1.26. A high level set of principles for the rate of return are already set out by 87(5) of the NGR. This is further supported by specific principles for the return on equity (87(6)-(7)) and debt (87(8)-(12)) already provided.

1.27. Any further subset of criteria or principles regarding the rate of return developed by a regulator should be explicitly referenced back to the principles contained in the rules and be focused on how the decision maker intends to ensure its thought process in making rate of return decisions is rigorous and meets the requirements of the rules.

1.28. It is imperative that the criteria must not:

a) be inconsistent with this hierarchy of objectives; and

b) limit the consideration of matters that are required to be considered in order to ensure the NGO, RPP, ARORO and principles already established by rule 87 are being met.

1.29. At this time, DBP's comments on the ERA's set of proposed criteria are provided in table 1.

**Table 1: DBP comment on proposed criteria**

| # | Proposed criteria for assessing rate of return methodologies (Box 1) | DBP comment on proposed criteria |
|---|---|---|
| **1.** | have a strong theoretical underpinning;<br><br>• recognise that the RoR methodologies ideally should be supported by theory; | • DBP's view it that this criterion would be inconsistent with rule 87 and unnecessarily restricts the types of evidence the regulator would consider if the principle is to be applied. Rule 87(5)(a) requires that regard must be had to relevant estimation methods, financial models, market data and other evidence in determining the allowed rate of return. While financial models are likely to have 'strong theoretical underpinning' it is conceivable that estimation methods, market data and other evidence may not be based in theory but are no less valid. DBP notes that most cost of debt methodologies including the ERA's bond yield approach is empirically based rather than backed by any particularly theory.<br><br>• A better criterion would be one that gives weight to rate of return informative material that has a theoretical and/or empirical foundation. |
| **2.** | are well-accepted;<br><br>• acknowledge that approaches which have widespread application and acceptability are more likely to enhance the credibility and acceptability of a decision; | • "well-accepted" is not a term used the new rule 87 and is likely to be inconsistent with the rule 87(5)(a) where regard must be had to 'relevant' estimation methods, financial models, market data and other evidence.<br><br>• It is DBP's view that the regulator would be beyond power if it maintained its establish approach to determining whether a model is 'well-accepted' as it has done under the old rule 87. The pursuit of the most "well-accepted" model assumes that one single model can determine a rate of return that is consistent with the objective. The AEMC was at pains in its reasoning in the final Rule Determination to move away from this approach in the new NGR.<br><br>• DBP submits that a methodology which takes into account relevant estimation methods, financial models, market data and other evidence as clearly required by the AEMC's rule change determination is more likely to meet the ARORO and enhance the credibility and acceptability |

| # | Proposed criteria for assessing rate of return methodologies (Box 1) | DBP comment on proposed criteria |
|---|---|---|
| | | of a decision (although these are not explicit aims or objectives of rule 87). |
| **3.** | are supported by robust, transparent and replicable analysis that is internally consistent and is derived from available, current and credible datasets;<br>• are derived from analysis and estimation methods that are transparent and replicable;<br>• are derived from analysis and estimation methods that are internally consistent;<br>• lead to outcomes from quantitative modelling that are sufficiently robust as to not be sensitive to small changes in the data;<br>• recognise that while some approaches may be sound, there may be insufficient data to allow their use, or the available data may be out of date;<br>• recognise that arbitrary filtering of data, or adjustment to the data, is undesirable; | • as "*estimation methods that are internally consistent*" is already a requirement of rule 87(5)(b) it is unnecessary to include as a subordinate 'criteria'.<br>• Criteria which requires "*lead to outcomes from quantitative modelling that are sufficiently robust*" fails to recognise that the rule does not prescribe a mechanical process and will require the regulator to apply its judgment at a number of qualitative steps in the process. It is clear that the AEMC was not envisaging a mechanical approach to distilling information from a number of methods when it said –<br>"*In many circumstances it could be the case that the likelihood of achieving the NEO or the NGO may be increased by examining a range of methods and data and making judgements aided by, for example, the location and/or clustering and/or statistical precision of estimates. That is, formulaic rules such as giving particular methods a fixed weighting may not be the best way to assess the information*"[8]. |
| **4.** | have the flexibility to reflect changing market conditions and new information as appropriate;<br>• recognise the need to deal with uncertainty; | • In DBP's view flexibility and the ability to deal with changing market conditions are reasonable aims. However, including such a criteria creates uncertainty in how they may operate with rule 87 as (1) the AEMC's has clearly designed the rule to allow the regulator the flexibility to address changing market conditions and therefore unnecessary to |

[8] Rule Determination, page 57

| # | Proposed criteria for assessing rate of return methodologies (Box 1) | DBP comment on proposed criteria |
|---|---|---|
| | • give confidence that the RoR will reflect actual conditions prevailing in the market over the access arrangement period; | include as a criteria, and (2) rule 87(7) already includes the requirement that in estimating the return on equity under subrule 87(6), regard must be had to the prevailing conditions in the market for equity funds. |
| **5.** | lead to consistent regulatory decisions across industries, service providers and time;<br><br>• recognise the desirability of a common approach to regulation, so as to avoid distortions in investment decisions. | • It is unclear what is meant by the use of the term 'consistent'. DBP would have significant concern if the use of consistent meant that the regulator envisages a 'one size fits all' process applied at each determination and failed to address the ARORO.<br><br>• It is also unclear what the ERA intends as a 'common to approach regulation' does the ERA intend to apply a common approach across all entities regulated by the ERA including gas, electricity and rail despite operating under significantly different regimes? Or does the ERA suggest that commonalities should exist between the ERA and AER?<br><br>• DBP fails to see the requirement in either the NGO, RPP the ARORO or Rule 87 that would require a common approach to regulation, rather the rule promotes a flexible approach to the determination of rate of return ensuring that the ARORO is met in each determination for each service provider. |

*10.* Is the decision framework identified robust? Are the criteria identified consistent with the RoR objective and requirements? Are there other criteria that might be considered?

1.30. DBP refers to its response to ERA's question 9 above.

1.31. A high level set of principles for the rate of return are already set out by 87(5) of the NGR. This is further supported by specific principles for the return on equity (87(6)-(7)) and debt (87(8)-(12)) already provided.

1.32. In their current form, DBP does not consider the criteria or decision framework to be a robust way forward. They are not likely to be consistent with the ARORO as a number of inconsistencies have been identified.

1.33. If the ERA is of the view that it requires a set of criteria that provides a framework that allows it to achieve the requirements of rule 87 and particularly the ARORO it is incumbent on the ERA to demonstrate how each would assist in achieving the ARORO.

1.34. Instead, DBP has outlined, in section 6 of its main submission, a practical approach to the estimation of the rate of return that does not seek to introduce another layer of principles or criteria to the estimation process.

*11.* What other means might be used to evaluate alternative RoR methodologies to ensure that the RoR objective is best met?

1.35. To ensure that the relevant estimation methods, financial models, market data and other evidence (that will make up a methodology) best meets the ARORO the regulator must consider all relevant evidence estimating the cost of equity and the cost of debt and how they inform each other in determining a rate of return.

1.36. DBP will outline the relevant rate of return informative material in further detail in response to questions later in submission. However, for current purposes, it is important to note that the Brattle Equity Report and the Brattle Debt Report both outline a number of different types of rate of return informative material that a regulator should have regard to and the factors to be taken into account when determining how to weigh up each type of material for the purposes of assessing the rate of return on equity, the rate of return on debt and the overall rate of return. Copies of both reports are attached to DBP's main submission.

***A nominal vanilla rate of return***

> *12.* Are there any significant transitional issues associated with adopting the nominal vanilla WACC? Do these matters concern the RoR itself, or are they related to other aspects of the revenue model?

1.37. Whether issues will arise in the transition to the nominal vanilla WACC approach is not, at present clear, to DBP. DBP refers the ERA it is response to question 13.

> *13.* Would there be any issues with the ERA adopting AER's current nominal post tax revenue model?

1.38. DBP considers that the issue of the particular revenue model to be used is not something that can be included in the rate of return guidelines.

1.39. Nevertheless, to the extent that there is some uncertainty as to whether issues associated with a revenue model can be the subject of the guidelines, DBP offers the following response:

1.40. Firstly, whether issues might arise if the ERA were to adopt the AER's Post Tax Revenue Model (PTRM) is not, at present clear, to DBP.

1.41. Secondly, DBP understands that Rule 87(4)(b), when considered with Rule 87A, has the effect requiring a post-tax approach to total revenue determination. A post-tax approach to total revenue determination would, the AEMC advised, address the issue of service provider overcompensation for the cost of tax when the rate of return is estimated as a pre-tax weighted average cost of capital calculated using the statutory corporate tax rate and the tax rate applicable to the service provider is less than the statutory corporate tax rate.[9] A post-tax approach explicitly recognised the benefits to the service provider of accelerated depreciation of some assets for tax purposes.

1.42. A post-tax approach was, the AEMC noted, already consistently applied under the National Electricity Rules (NER). Incorporation of that approach into the regime of the NGR would:

(a) streamline the access arrangement review process;

(b) provide gas pipeline service providers with certainty about the basis of rate of return determination;

(c) allow convergence in modelling approaches across sectors; and

[9] Rule Determination, page 47.

(d) improve the ability to compare returns across sectors.[10]

1.43. Thirdly, the AEMC intended continued use of the definition of WACC that was found in the NER, and which was used in the AER's Post Tax Revenue Model (PTRM).[11] Rule 87(4)(a) provides for the use of the weighted average of the return on equity and the return on debt, subject to achieving the ARORO. This definition of the WACC implies a post-tax approach to total revenue determination, but the AEMC did not mandate use of the PTRM. The PTRM is a model of regulated revenue determination which was designed for the electricity sector, and which necessarily incorporates a great deal more than a WACC calculation.

1.44. Accordingly, DBP would caution the ERA against adoption of a model developed under another regulatory regime for another industry. Although that model may incorporate the "right" WACC calculation, it may have other implications for regulated gas transmission and distribution service providers, and for the tariffs paid by the users of their pipeline systems. One obvious area of difference which may well have tariff impacts is the use of current cost accounting depreciation in the PTRM. Wholesale adoption of the PTRM would mean adoption of its approach to depreciation.

1.45. DBP notes that depreciation remains governed by rules 88 and 89 (which have not been amended), and the regulator's discretion under rule 89 is limited.

***Gearing***

> *14.* What criteria could be used to select an appropriate methodology for deriving the gearing level?

1.46. DBP is of the view that the answer to this question must be guided by Rule 87, and not by reference to criteria external to the regulatory regime of the NGR.

1.47. Since the WACC to be calculated using the gearing is to be a candidate rate of return, the financial risk represented by the gearing should be the financial risk of the benchmark efficient entity with a similar degree of risk as that which applies to the service provider in respect of the provision of reference services.

> *15.* What are the key characteristics or the selection criteria for companies to be included in the benchmark sample?

1.48. As outlined in detail in section 3 of DBP's main submission (under the heading ARORO), the answer to this question must be guided by Rule 87, and not by reference to criteria external to the regulatory regime of the NGR.

[10] Rule Determination, page 47.

[11] Rule Determination, page 63.

1.49. This therefore means that the ERA must assess the degree of risk of the service provider in the provision of reference services provided using the service provider's pipeline system. The focus therefore needs to be on the specific risks. It can not be limited to generic risks of the type to which pipeline service providers might generally be exposed. Rule 87(3) should be read in the context of the revenue and pricing principles of the NGL. In that regard, section 24(2) of the RPPs requires that the service provider be provided with a reasonable opportunity to recover at least the efficient costs which the service provider incurs in providing reference services. Section 24(5) of the RPPs is also another provision which demonstrates that the risks in question are the specific risks to which the service provider is exposed in its provision of reference services using the pipeline with which the service provider provides reference services.

1.50. Only once these risks have been identified can the benchmark efficient entity be identified because it must have similar degree of risk to the particular service provider's risk profile.

1.51. It is wrong therefore for the ERA to continue with its current practices where:

(a) In relation to many aspects of the rate of return on equity estimation process, the ERA simply looks to a set of Australian energy utilities as the benchmark efficient entity without assessing whether each of these utilities has a similar degree of risk to the particular service provider concerned

(b) In relation to the rate of return on debt estimation process, the ERA simply assumes that a benchmark efficient entity has a credit rating within the range of BBB – BBB+ and then forms a sample comprising all business with a credit rating in that range in order to estimate the debt risk premium. Under (new) Rule 87, the ERA will need to show that, firstly, it is right for an entity with the risk profile of the service provider concerned to have a particular credit rating. Secondly, the ERA will need to demonstrate that credit ratings are the sole basis for assessing the risk profile of an entity – DBP submits they are not. Thirdly, to the extent that they are, the regulator will need to assess whether each company within the sample has a similar risk profile to that of the service provider in the provision of reference services.

*16.* What are the appropriate time periods and the methodology for determining the benchmark gearing ratio from available market data?

1.52. DBP understands that the gearing to be used in the calculation of a weighted average cost of capital is to be the ratio of the market value of debt to the market value of equity, that these market values may be difficult to establish because debt is not frequently traded, and that book values must sometimes be used in determining the gearing. DBP is also aware that the gearing might be an average over a period of time to reduce the effect of transient changes in the market values of equity and debt.

1.53. Although any assumption about gearing should now be formulated in a way which ultimately leads to a rate of return which achieves the allowed rate of return objective of rule 87(3), DBP notes that the AER and the ERA have required, for over a decade, that a gearing of 60:40 debt to equity be used in regulated price determination.

1.54. Accordingly, DBP and, it believes, other regulated pipeline service providers, have over time, sought to align their actual gearings with the regulatory norm. This has required careful financial planning and has been achieved at some cost although the costs have largely been the costs of effort and are not easily quantified. We would not expect to see a rapid shift away from the assumed 60:40 gearing in subsequent applications of rule 87.

*17.* Would a methodology other than the benchmarking approach for assessing gearing better meet the NGR RoR objective and requirements?

1.55. In view of the requirement of rule 87(3) for the rate of return to be commensurate with the efficient financing costs of a benchmark efficient entity with a similar degree of risk as that which applies to the service provider in respect of the provision of reference services, DBP does not see that there can be an alternative methodology to benchmarking.

***The risk free rate***

*18.* What criteria should be used to determine an appropriate method/model to estimate the nominal risk free rate of return?

*19.* What is the best proxy for the nominal risk free rate of return in the context of the Australian regulatory environment?

*20.* Are there any viable alternatives to the Commonwealth Government Securities as an appropriate proxy for the nominal risk free rate of return in Australia?

*21.* Should the long-term average or the prevailing risk free rate be used as a proxy for a forward looking estimate of the next five years?

]

*22.* Is there a proxy for the risk free rate, other than the 5 year CGS estimated over the 20 to 40 days just prior to the commencement of the regulatory period, which would better meet the new NGR RoR objective and requirements?

1.56. DBP has not considered the questions associated with the risk free rate for the purpose of responding to the ERA's guidelines consultation paper. As outlined in section 3 of its main submission and in response to question 1, the guidelines should not focus on parameter values.

***Return on Equity***

*23.* What criteria could be used to select a model for estimating the return on equity that best meets the RoR objective and requirements?

1.57. The ERA's question presumes that a single model will best meet the ARORO and requirements of rule 87. As is outlined in section 4 of DBP's main submission, this is a major concern for DBP. In DBP's view, the ARORO will be best achieved by a methodology that:

(a) Uses a wide range of relevant rate of return informative material

(b) Weights each piece evidence according to its merits at the time of determination; and

(c) Uses the weighted evidence to provide a transparent and clear decision on the allowed rate of return.

1.58. DBP notes that this position is supported by the conclusions of Professor Stewart Myers[12]:

"*Use more than one model when you can. Because estimating the opportunity cost of capital is difficult, only a fool throws away useful information. That means that you should not use any one model or measure mechanically and exclusively*".

[12] Estimating the cost of equity: Introduction and overview, page13

1.59. Section 6 of DBP's submission outlines a practical guide to the estimation of a rate of return on equity and on debt which is consistent with the ARORO.

> *24.* Is it reasonable to rely on a single internally consistent model for determining the return on equity, or should a broader range of models and methods be used? If so, how might internal consistency be retained for the overall method?

1.60. DBP is clearly of the opinion that 'all relevant estimation methods, financial models, market data and other evidence' and therefore a broad range of models and methods as per rule 87(5)(a) should be used in the determination of cost of equity. This is outlined in more detail in sections 4 and 6 of DBP's main submission.

1.61. DBP's view on this matter is confirmed by the AEMC's rule determination:

"*Achieving the NEO, the NGO, and the RPP requires the best possible estimate of the benchmark efficient financing costs. The Commission stated that this can only be achieved when the estimation process is of the highest possible quality. The draft rule determination stated that this meant that a range of estimation methods, financial models, market data and other evidence must be considered*"[13].

1.62. And further, that accountability for both the regulator and the service provider would be achieved by:

"*the return on equity estimate was proposed to be derived from a range of different estimation methods, financial models, market data and other evidence, ensuring that it is informed by and tested against the range of relevant evidence*"[14].

1.63. In DBP's view input parameters must be applied consistently across financial models i.e if more than one financial model required an equity beta estimate it would be applied consistently. This view is consistent with subrules 87(5)(b) and 87(5)(c):

*that regard must be had to the desirability of using an approach that leads to the consistent application of an estimates of financial parameters that are relevant to the estimates of, and that are common to , the return on equity and the return on debt*; and

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

1.64. DBP does acknowledge that if the regulator were to mechanically average the outcome of two or more models then an internal consistency issue is likely to arise. This was recognised by the AEMC is the rule determination:

"*In many circumstances it could be the case that the likelihood of achieving the NEO or the NGO may be increased by examining a range of methods and data and making judgements aided by, for example, the location and/or clustering and/or statistical precision of estimates. That is,*

[13] Rule Determination, page 43

[14] Rule Determination, page 45

*formulaic rules such as giving particular methods a fixed weighting may not be the best way to assess the information*"[15].

1.65. An approach that is most likely to achieve the ARORO, and therefore the NGO, is one where the regulator qualitatively assesses all relevant estimation methods, financial models, market data and other evidence based on their relative strengths and weaknesses and then apply its regulatory judgment in a clear and explicitly reasoned approach when distilling down all relevant information to determine a point estimate that achieves the objectives.

1.66. DBP refers the ERA to Section IV the Brattle Equity Report attached to the APIA submission included as attachment 1 for further discussion on how best to use the models and other information for the rate of return on equity.

1.67. DBP also refers to the Brattle Debt Report as to the relevant characteristics of each relevant rate of return informative material and how they can be used in estimating the rate of return on equity.

*25.* Is the adoption of a domestic form of the CAPM – with foreign investors recognised only to the extent that they invest within Australia – appropriate from a theoretical and practical point of view? If not, what are the alternatives?

1.68. See DBP's response to question 26 below.

*26.* Would it be appropriate, feasible and practical to adopt either a fully segmented (domestic) or a fully integrated (international) version of the CAPM?

1.69. Both question 25 and 26 address issues which arise in the practical application of the CAPM[16] and which are not envisaged in the derivation of the model. The issues they raise should, in DBP's view, be addressed in the broader context of the requirements of rule 87.

1.70. Rule 87 now admits all relevant financial models, estimation methods, market data and other evidence. There is no presumption that the SLCAPM is a relevant model (in whatever way it is applied) and, if it is a relevant model, that it produces an estimate of the rate of return on equity which contributes to achievement of the allowed rate of return

[15] Rule Determination, page 57

[16] References to CAPM in this paper are to the SLCAPM, unless the context otherwise requires

objective. There is no presumption that when an estimate of the rate of return on equity made using the SLCAPM, in whatever way it is applied, is used to calculate a nominal vanilla WACC, that that WACC is the allowed rate of return of rule 87.

1.71. Whether the SLCAPM is a relevant model, whether it produces – in whatever way it is applied – an estimate of the rate of return on equity which contributes to achievement of the allowed rate of return objective, and whether a nominal vanilla WACC calculated using that estimate of the rate of return on equity achieves the allowed rate of return objective, are all questions which must now be asked explicitly, and to which reasoned answers must be given, when determining the allowed rate of return.

1.72. Rule 87 now requires the use of relevant financial models, estimation methods, market data and other evidence. It does not restrict the process of estimating the rate of return on equity to use of a single financial model. In its examination of these essentially technical questions about a specific financial model, the Consultation Paper fails to address, in the context of estimation of the rate of return on equity, the critical issues of the requirements of rule 87, and how the ERA intends to weigh the evidence from models, methods and data so as arrive at a rate of return which achieves the allowed rate of return objective of rule 87(3).

*27.* What other evidence on return on equity might be used as a cross-check to the estimates from financial models? What criteria might be applied to select these types of evidence?

1.73. It is important that the regulator have full regard to all relevant evidence and this could include a top down approach. However, there are significant problems with obtaining top down WACC estimates, both in terms of relevance and quality.

1.74. It is worthwhile reviewing the issues of relevance and reliability/quality for each of the methods that may be employed:

(a) Brokers' reports: The relevance of brokers' reports is doubtful, but should not be excluded. Broker reports should be considered in the context that the brokers provide recommendations to hold, buy or sell for the purposes of advising clients that generally have a portfolio of stocks and are looking at the issues of asset allocation. That is, investors have a certain amount of capital available and seek to optimise their returns by allocating their capital in a way that is designed to give them the best risk-weighted return. Thus analyst estimates are focussed on the relative value of a stock rather that their absolute value. APIA refers to Brattle's consideration of other evidence at Section III.F.5 of the Brattle Equity Report.

(b) Trading multiples: In the Brattle Equity Report to APIA, Brattle[17] identifies a number of "conceptual problems with this approach, so that it has no value as a cross check against the regulator's cost of capital determination. Brattle identifies two main assumptions that render this approach of no value: (i) the company to which the approach is applied is likely not to consist entirely of a regulated

[17] Estimating the Cost of Equity for Regulated Companies, The Brattle Group, February 2013, pages 37,38

business and (ii) that the regulator's cost of capital determination is the only factor impacting the market value of the stock. Further to this advice, the effect of market cycles and volatility must be properly considered. Depending where the market is in it's cycle – "bear" or "bull" a regulated utility stock may appear undervalued or overvalued relative to its regulatory value. Market volatility must also be properly considered. In sum, trading multiples can neither be considered as having much relevance or quality as top down estimates of the WACC.

(c) Financibility tests: These tests were developed by IPART, not to determine the rate of return, but to assess whether the revenue allowances in its determinations would undermine the financial viability and financibility of regulated businesses. That is, it wanted to make sure that regulatory outcomes would not jeopardise the viability of the business or have the effect of increasing, inadvertently the cost of debt through reduced credit ratings. The intent of such an approach is laudable, but the modelling approach designed to reflect the way credit ratings agencies determine credit ratings is problematic, given (i) that credit ratings agencies do more than mechanical modelling exercises and (ii) such approaches say nothing about the cost of debt and equity. Consequently, such tests are not relevant and, even if they were are not reliable, even in attempting to achieve the goal of determining the impact of a regulatory decision on credit ratings.

(d) Estimates of other regulators: This method is clearly fraught in terms of relevance and reliability/quality. Regulators' decisions are made at a time and for a particular asset. Therefore they are relevant to that time and asset and not to another. Moreover, if regulators were to base rate of return decisions either on their own previous decisions or another regulator's decisions they will suffer the problem of regulatory group think. It is essential that regulators start afresh each time they undertake a review of the Rate of Return to properly consider the question: what is the rate of return that meets the ARORO for this business at this point in time?

1.75. On top of all of this, if any of these methods were to be used as part of developing a top down estimate it would then be necessary to convert them (with appropriate weightings) into a cost of equity and a cost of debt in a manner that is consistent with the Rules. Significantly, the WACC implied by most of them is a post- tax WACC. In the case of analyst views, the post-tax WACC assumes that imputation credits are not valued by investors. In the case of trading multiples, the treatment of the value of tax credits is unknown; however, if analysts' recommendations are considered as influential on investors then these effectively do not include any value for tax credits. Between the treatment of tax credits and the difficulties of taking a post- tax WACC and converting it into a vanilla WACC further broken down in to costs of equity and costs of debt with their respective weights, it is difficult to see how the requirements of the Rules could be met (especially the cost of debt provisions or Rule 87) – at least in practical sense – using such an approach.

*28.* Are there alternative approaches to estimating the cost of equity, other than the Sharpe-Lintner CAPM, which would better meet the new NGR RoR objective and requirements?

1.76. DBP's proposal is simply that there is no single model that would better meet the ARORO than another and that the regulator must consider all relevant estimation methods, financial models, market data and other evidence.

1.77. In the case of estimating the cost of equity, DBP refers the ERA to the Brattle Equity Report which addressed the strengths and weaknesses of a number of models at Section III (provided as schedule 2 of the APIA submission included as attachment 1).

1.78. The Brattle Group outlines factors that would influence the weight the regulator may put on particular models in particular circumstances at Section IV of the report.

1.79. In terms of the rules or framework that will apply to weighting, DBP believes clear boundaries can be established within which the ERA can apply its judgment consistently. These boundaries should include qualitative weighting as noted in the Brattle report[18] should be:

(a) Economic factors such as market volatility and risk free rates. The Brattle Group demonstrates how these factors inform relative weighting on each model in the following table taken from page 62 of the Brattle report.

| | | Prevailing Risk-free Rate in Economy | | |
|---|---|---|---|---|
| Market Volatility | | **High** | **Average** | **Low** |
| | **High** | Consumption CAPM | | |
| | **Average** | Consumption CAPM / DDM | CAPM / ECAPM | Consumption CAPM / DDM |
| | **Low** | Consumption CAPM / DDM | | |

(b) Industry factors such as market beta of the relevant industry, the stability of growth forecasts, whether the industry is exposed to financial distress and/or significant merger and acquisition activity and the prevalence of share buy backs. The Brattle Group demonstrates how two of these factors inform relative weighting on each model in the following table taken from page 66 the Brattle report.

[18] Brattle report, page 59

| | | Industry Exposure to Financial Distress and/or M&A | |
|---|---|---|---|
| | | High | Low |
| Prevalence of Share Buybacks | High | Other Models: Risk Premium, comparable earnings, maybe use other industries | CAPM, ECAPM, DDM that includes all cash that accrues to shareholders |
| | Low | | CAPM, ECAPM, DDM |

(c) Company factors as noted at page 67 of the Brattle report.

***Market Risk Premium***

*29.* What criteria should be used to select a model/approach for estimating the Market Risk Premium?

1.80. DBP has not considered the questions associated with the market risk premium for the purpose of responding to the ERA's guidelines consultation paper.

*30.* What is the best method to be used in estimating the MRP?

*31.* Are there any other methods that could be adopted for estimating the MRP, which the ERA has not presented in the previous section?

*32.* When using historical data, what is the relevant sampling period given that: (i) there are significant increases in the quality of data on equity returns becoming available in more recent periods; and (ii) recent periods may be more relevant to the current financial environment in Australia?

*33.* Are there any theoretical grounds for an inverse relationship between the risk-free rate of return and the MRP?

*34.* When the risk-free rate of return is low/high, should the MRP be revised upwards/downwards? If yes, what is an unbiased mechanism for doing so? What is the threshold of the risk-free rate in which the prevailing risk-free rate can be considered low?

*35.* Is there a method to calculate the MRP, other than using an average of historical data, which would better meet the new NGR RoR objective and requirements?

1.81. DBP has not considered the questions associated with the market risk premium for the purpose of responding to the ERA's guidelines consultation paper.

***Equity beta***

*36.* What criteria could be used to help select a model/approach for estimating the equity beta?

1.82. DBP has not considered the questions associated with the equity risk premium for the purpose of responding to the ERA's guidelines consultation paper.

*37.* Should the estimate of equity beta be based on a sample of businesses that only includes regulated utility businesses?

*38.* Results from the econometric evaluation of historic market returns as a means to estimate the equity beta are quite sensitive to input data. What is the best way to determine the point estimate of the equity beta from the resulting wide range of estimates (i.e. median, average, any relevant quartiles)?

*39.* Are there any viable alternative methods to the econometric evaluation of historic market returns, such that the equity beta for regulated businesses might be estimated in a more robust manner? If so, would the alternative method better meet the new NGR RoR objective and requirements?

***The Return on Debt – Credit rating***

*40.* What criteria might be used to help select an approach for determining the credit rating?

1.83. The ERA appears to be proceeding on the assumption that the starting point under the new Rule 87 for estimating the cost of debt is to identify the benchmark credit rating that should apply to an efficient service provider and then to determine a single model to estimating the cost of debt based on relevant data available for entities with that benchmark credit rating.

1.84. DBP submits that this misconstrues the role required of the ERA under Rule 87 in three fundamental respects.

1.85. Firstly, the starting point under the new rule is to ensure that the process it calls for identifies the rate of return on debt that achieves the ARORO. Therefore the regulator must focus on a rate of return on debt that is commensurate with the efficient financing costs of a benchmark efficient entity with a similar degree of risk as that which applies to the service provider in respect of the provision of reference services.

1.86. The starting point, as outlined in section 3 of DBP's main submission, is therefore to assess the degree of risk of the service provider in the provision of reference services on the covered pipeline. These risks are not generic risks of the type to which pipeline service providers might generally be exposed. So it may only be appropriate to look at the credit ratings of companies with similar operations if these companies have similar risks to the service provider.

1.87. Secondly, it is not appropriate to rely on a single indicator of risk – credit rating – for the purposes of assuming that any company with a similar credit rating has "a similar degree of risk as that which applies to the service provider in respect of the provision of reference services." As outlined in DBP's main submission (in section 3), credit ratings are imperfect indicators of risk.

1.88. As outlined in page 11 of the Brattle Debt Report, to then use the yield on a generic index selected by credit rating as the basis for estimating the cost of is insufficient, because entities differ within a given rating differ with respect to their coverage rations, capital structures, cash flow variability, level of capital expenditures, and fundamental demand / supply conditions. All of these factors affect the cost of debt that the entity will face.

1.89. Thirdly, the ERA's question presumes that a single model will best meet the ARORO and requirements of rule 87. In DBP's view (a view supported by advice from the Brattle Group in the Brattle Debt Report), the ARORO will be best achieved by a methodology that:

(a) Uses a wide range of relevant rate of return informative material

(b) Weights each piece evidence according to its merits at the time of determination; and

(c) Uses the weighted evidence to provide a transparent and clear decision on the allowed rate of return.

1.90. Section 6 of DBP's submission outlines a practical guide to the estimation of a rate of return on equity and on debt which is consistent with the ARORO.

*41.* What are the key characteristics or the selection criteria for companies to be included in the benchmark sample to determine the credit rating for a regulated business in gas transmission and distribution?

1.91. In the scheme of the Consultation Paper, a credit rating is required for estimating the rate of return on debt from a single model (rate of return on debt model):

RATE OF RETURN ON DEBT = RISK FREE RATE OF RETURN + DEBT RISK PREMIUM

1.92. If the estimate of the rate of return on debt is to contribute to achievement of the allowed rate of return objective, it should (as required by rule 87(8)) be the rate of return estimated for a benchmark efficient entity with a similar degree of risk as that which applies to the service provider in respect of provision of the reference services. That degree of risk must first be established, and this requires:

(a) assessing the degree of risk of the service provider; and

(b) identifying entities with similar degrees of risk, for which data are independently available, and which can be used to establish the benchmark.

1.93. As noted in response to question 40, a credit rating may be one of the measures used. However, a credit rating alone will be insufficient because credit ratings are imperfect indicators of risk. Entities within a given rating class differ with respect to their coverage ratios, capital structures, cash flow variability, level of capital expenditures, fundamental demand/supply conditions and other risk factors.

1.94. As noted in section 3 of DBP's main submission, the issue of ensuring similarity between the degree of risk of the service provider, and the degrees of risk of comparables entities for which data are independently available, and which might be used in rate of return determination, is an issue which has been addressed by regulators in other jurisdictions. The approaches taken in the United States, by the Federal Energy Regulatory Commission, and in Canada, by the National Energy Board, are noted in the Brattle Group report.[19]

1.95. Once the benchmark efficient entity with a similar degree of risk as that which applies to the service provider in respect of the provision of reference services has been established, it can be used to guide the evaluation and setting of the rate of return on equity, the rate of return on debt, the gearing, and the allowed rate of return.

*42.* Is the S&P list of Australian utilities a good starting point for forming a benchmark sample?

1.96. The S & P list of Australian utilities might be a convenient starting point for forming a benchmark sample.

1.97. The number of Australian entities with degree of risk similar to that which applies to the service provider in the provision of reference services, and for which information is independently available, is likely to be quite small. Electricity and gas distribution entities, and electricity transmission entities, are unlikely to be comparables for a gas transmission entity. In consequence, there may not be sufficient data available to make statistically significant estimates of a CAPM beta or a debt margin, or to determine the gearing. In these circumstances, rate of return determination will have to proceed either:

(a) without statistical estimation of beta, and without a statistically significant estimate of the debt risk premium, but using data from the appropriate comparables; or

(b) with an explicit scheme which allows:

(i) conversion of a statistically significant beta estimate calculated using price and dividend data for a group of entities with degrees of risk not all similar to the degree of risk which applies to the service provider in the provision of reference services into a beta for a benchmark efficient entity with a similar degree of risk as that which applies to the service provider in the provision of reference services; and

[19] Brattle report, pages 67-73.

(ii) conversion of a statistically significant debt margin calculated using bond yields for a group of issuers with degrees of risk not all similar to the degree of risk which applies to the service provider in the provision of reference services into a debt margin for a benchmark efficient entity with a similar degree of risk as that which applies to the service provider in the provision of reference services.

1.98. There are difficulties with either way of proceeding. Establishing the benchmark efficient entity may well require extending the set of potential comparable entities to include similar entities from other (international) jurisdictions.

*43.* Among the different types of credit rating for the same company, for example, entity credit rating (i.e. the credit rating for the entire entity) versus instruments credit rating (i.e. the credit rating for a particular debt instrument), which type is more appropriate for determining the RoR?

*44.* How recent should the credit ratings for the company and debt instruments be in order to be considered valid as an input to determining credit ratings? How many years credit ratings assigned in the past can be used?

*45.* Is the median of credit rating of a benchmark sample the best indicator for the credit rating of a regulated business in gas industry? If not, then which is the best method to determine the credit rating from the benchmark sample?

*46.* What methods are suitable as a cross-check of the robustness of a determination of a credit rating for a regulated business?

1.99. Underlying questions 43 to 46 are the assumptions that a single model, the rate of return on debt model, and a single method of estimating the key parameter (the bond yield approach), are capable of producing an estimate of the rate of return on debt which can contribute to the allowed rate of return objective.

1.100. This sole reliance on a single model, and estimation of the debt risk premium, does not accord with the requirements of rule 87, or with the AEMC's intentions in amending the rule in November 2012.

1.101. Rule 87 now admits all relevant financial models, estimation methods, market data and other evidence. There is no presumption that the rate of return on debt model is a relevant model and, if it is, that it produces, in conjunction with the bond-yield approach, an estimate of the rate of return on debt which contributes to achievement of the allowed rate of return objective. There is no presumption that when an estimate of the rate of return on debt made using the rate of return on debt model and the bond-yield approach is used to calculate a nominal vanilla WACC, that that WACC is the allowed rate of return of rule 87.

1.102. Advice from the Brattle Group in the Brattle Debt Report confirms that all relevant financial models, estimation methods, market data and other evidence should be considered and where appropriate, used.

1.103. Whether the rate of return on debt model is a relevant model, whether it produces in conjunction with the bond-yield approach an estimate of the rate of return on debt which contributes to achievement of the allowed rate of return objective, and whether a nominal vanilla WACC calculated using that estimate of the rate of return on debt achieves the allowed rate of return objective, are all questions which must now be asked explicitly, and to which reasoned answers must be given, when determining the allowed rate of return. In addition, explicit consideration must be given to how use of the debt model, in conjunction with the bond-yield approach, accords with the design criteria of rule 87(10), and to how, when using the model and the approach, regard is to be had to the factors of rule 87(11). Beyond restating those rules, the Consultation Paper makes no reference to the specific – and new – requirements of rules 87(10) and 87(11).

1.104. Rule 87 now requires the use of relevant financial models, estimation methods, market data and other evidence. It does not restrict the process of estimating the rate of return on debt to use of a single financial model. In its examination of a large number of essentially technical questions about a specific financial model and a specific estimation method, the Consultation Paper fails to address, in the context of estimation of the rate of return on debt, the critical issues of the requirements of rule 87, and how the ERA intends to weigh the evidence from models, methods and data so as arrive at a rate of return which achieves the allowed rate of return objective of rule 87(3).

***Return on Debt – Debt Risk Premium***

> *47.* Are there alternatives to the ERA's current method for estimating the credit rating that would better meet the new NGR RoR objective and requirements?

1.105. DBP submits that the service providers actual credit rating should be taken into consideration as it should be a better indicator for the "benchmark efficient entity with a similar degree of risk as that which applies to the service provider in respect of the provision of reference services" than selecting a credit rating of BBB+ just because it is generally adopted by regulators for regulated businesses.

1.106. However, as noted above in response to question 40 and 41, the reliance on data from companies with a particular credit rating is not an appropriate proxy for the task required of the regulator under the law – to identify the benchmark efficient entity with a similar degree of risks as that which applies to the service provider in respect of the provision of reference services.

> *48.* What criteria could be used to select an approach/a model for deriving the debt risk premium?

1.107. See Response to question 49.

> *49.* Are there any issues associated with the bond-yield approach that have not been considered by the ERA?

1.108. The implications here are that the rate of return on debt is to be estimated using a single model in which the rate of return on debt is the sum of a risk free rate of return and a debt risk premium (rate of return on debt model), and a specific implementation of that model – the bond-yield approach.

1.109. The Consultation Paper does not address the general issue of the use of relevant financial models, estimation methods, market data and other evidence in the context of estimation of the rate of return on debt. Instead, it appears to advocate use of a single model for estimation of the rate of return on debt, and a single approach to estimation of that model.

1.110. Sole reliance on the rate of return on debt model, and estimation of the debt risk premium using the bond-yield approach, would not, in DBP's view, accord with the requirements of rule 87, or with the AEMC's intentions in amending the rule in November 2012.

1.111. Rule 87 now admits all relevant financial models, estimation methods, market data and other evidence. There is no presumption that the rate of return on debt model is a relevant model and, if it is, that it produces, in conjunction with the bond-yield approach, an estimate of the rate of return on debt which contributes to achievement of the allowed rate of return objective. There is no presumption that when an estimate of the rate of return on debt made using the rate if return on debt model and the bond-yield approach is used to calculate a nominal vanilla WACC, that that WACC is the allowed rate of return of rule 87.

1.112. Whether the rate if return on debt model is a relevant model, whether it produces in conjunction with the bond-yield approach an estimate of the rate of return on debt which contributes to achievement of the allowed rate of return objective, and whether a nominal vanilla WACC calculated using that estimate of the rate of return on debt achieves the allowed rate of return objective, are all questions which must now be asked explicitly, and to which reasoned answers must be given, when determining the allowed rate of return. In addition, explicit consideration must be given to how use of the debt model, in conjunction with the bond-yield approach, accords with the design criteria of rule 87(10), and to how, when using the model and the approach, regard is to be had to the factors of rule 87(11). Beyond restating those rules, the Consultation Paper makes no reference to the specific – and new – requirements of rules 87(10) and 87(11).

1.113. Rule 87 now requires the use of relevant financial models, estimation methods, market data and other evidence. It does not restrict the process of estimating the rate of return on debt to use of a single financial model. Through its focus on essentially technical questions about a specific financial model and a specific estimation method, the Consultation Paper fails to address, in the context of estimation of the rate of return on debt, the critical issues of the requirements of rule 87, and how the ERA intends to weigh the evidence from models, methods and data so as arrive at a rate of return which achieves the allowed rate of return objective of rule 87(3).

*50.* Should Moody's credit ratings of Australian corporate bonds be included in the selection criteria for the benchmark sample?

1.114. See DBP's response to questions 40 and 41.

*51.* If the bond-yield approach was to be adopted, should the current joint-weighting approach be retained, or else an alternate weighting approach be considered? Are there any other issues the ERA should consider with regard to the average of the debt risk premium?

1.115. DBP is concerned that no strong prior reasoning has been advanced for the joint weighting of term to maturity and amount on issue in determining bond premiums using the bond-yield approach. The ERA itself advised, in its October 2012 revised access arrangement decision for the Dampier to Bunbury Natural Gas Pipeline:

*Given that both these characteristics might be regarded as important in the market, the Authority considers that there is merit to assigning greater weight to bonds with large issuance in comparison with other bonds in the benchmark sample. However, the Authority is of the view that more work needs to be undertaken to better reflect both characteristics in a joint weighting system to determining the debt risk premium, as recommended by the Tribunal.*

1.116. The bond-yield approach is the creation of the ERA. It is, in DBP's view, incumbent upon the regulator to carry out any additional work required correct deficiencies in, and validate, the bond yield approach before it proposes the adoption of that approach in guidelines for rate of return determination.

***Debt Raising Costs***

*52.* Would a method other the ERA's bond yield approach better meet the new NGR RoR objective and requirements?

1.117. DBP submits that an approach that is most likely to meet the ARORO will employ all relevant estimation methods, financial model, market data and other evidence. This approach is also supported by the Brattle Group:

"*Given the complexity of estimating the cost of debt, each estimate is likely to result in a range of cost of debt estimates from which the decision maker will determine the cost of debt for the access period. In doing so, all relevant information should be considered and because the risks the target entity may be unique, the decision maker will need to consider both systematic and idiosyncratic risks*"[20].

1.118. DBP refers the ERA to the Brattle Debt Report for further detail on characteristics of each approach that are likely to determine the qualitative weight that maybe place on each piece of evidence.

[20] The Grattle Group, Esitmating the Cost of Debt, page 3

*53.* What criteria could be used to select an approach/a model for estimating debt raising cost?

1.119. DBP's response to questions 40 and 41 are equally applicable to its response to this question – i.e. there should be no additional criteria developed.

1.120. The ERA's question presumes that a single model will best meet the ARORO and requirements of rule 87 where in DBP's view the ARORO will be best achieved by a methodology that:

(a) Uses a wide range of relevant evidence, data and models

(b) Weight each piece evidence according to its merits at the time of determination; and

(c) Uses the weighted evidence to provide a transparent and clear decision on the allowed rate of return.

1.121. DBP notes that this position is supported by the conclusions of Professor Stewart Myers[21]:

"*Use more than one model when you can. Because estimating the opportunity cost of capital is difficult, only a fool throws away useful information. That means that you should not use any one model or measure mechanically and exclusively*".

*54.* What data source is best to gather evidence of debt raising costs incurred by businesses when they use debt financing to finance their capital programs?

1.122. Recognising that actual debt raising costs, particularly in the case for bank debt, are not readily available in the public domain DBP submits that the regulator should seek the opinion of an expert debt market advisor on the current level of debt raising costs for the benchmark efficient entity with similar risks to the service provider.

[21] Estimating the cost of equity: Introduction and overview, page13

*55.* Are there alternatives to the ACG method for estimating the debt raising costs that would better meet the new NGR RoR objectives and requirements?

1.123. DBP doubts whether approaching the estimation of debt raising costs through a model is feasible, and is not aware of suitable models which might be used to estimate those costs. A more pragmatic approach, like that adopted by the Allen Consulting Group (ACG) for the estimates it made of debt raising costs for the Australian Competition and Consumer Commission in December 2004, is required. However, the specific estimates of debt raising costs in the ACG report are now obsolete.

1.124. The costs of raising debt have increased substantially since the Global Financial Crisis and therefore the opinion of an expert debt market advisor would be particularly informative.

***Gamma***

*56.* What criteria should be used to select an approach/ model for estimating gamma?

1.125. DBP has specifically engaged SFG Consulting to provide a detailed update on the best estimate of imputation credits (gamma) and response to each of the ERA's questions 56 to 59. DBP notes that rule 87 now does not require a gamma estimate for the purposes of determining the allowable rate of return. It is however an issue for the guidelines as per rule 87(14)(b).

1.126. DBP therefore refers the ERA to the SFG Report (provided as attachment 5) page 45 which includes a response to question 56.

*57.* What are the best methods and/or studies for estimating the value of gamma?

1.127. DBP refers the ERA to the SFG Report (provided as attachment 5) page 45 which includes a response to question 57.

*58.* What are the main rationales for estimating gamma via the estimates of the payout ratio and theta? Is it possible to estimate gamma directly from available market data?

1.128. DBP refers the ERA to the SFG Report (provided as attachment 5) page 46 which includes a response to question 58.

*59.* Are there methods – other than for dividend drop off studies – which could estimate the value imputation credits and better meet the new NGR RoR objective and requirements?

1.129. DBP refers the ERA to the SFG Report (provided as attachment 5) page 46 which includes a response to question 58.

The Brattle Group

# Estimating the Cost of Debt

Date : 4 March 2013

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**Prepared for**

Dampier Bunbury Pipeline

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## EXECUTIVE SUMMARY

This report discusses the models available for estimating the cost of debt for the purpose of the National Gas Rules in Australia. The new Rule 87 requires "[t]he return on debt for a regulatory year is to be estimated such that it contributes to the achievement of the *allowed rate of return objective*" and that the estimated return on debt must have regard to several characteristics such as (a) the desire to minimize the difference between the return on debt and the return on debt of an efficient benchmark entity referred to in the *allowed rate of return objective*, (b) the relationship between the return on equity and the return on debt, (c) the incentives that the return on debt may provide regarding capital expenditures, and (d) any impact that a change in methodology from one access arrangement period to the next could have on a benchmark efficient entity referred to in the *allowed rate of return objective*.

It is therefore important to consider whether any method, model, market data or other information leads to an overall rate of return that is commensurate with the efficient financing cost of an entity with similar risks to that of the target entity in the provision of reference services. For the purposes of debt estimation both systematic and idiosyncratic risks have to be considered.

All models have relative strengths and weaknesses, and data weaknesses may be more pronounced in a jurisdiction with fewer regulated entities and / or a less active capital market. The focus of the report is on the key characteristics of the various cost of debt estimation methods, models and data available for a decision maker and circumstances under which each methodology may be more or less suitable. It is imperative that the choice of models and their implementation take into account the prevailing economic conditions, industry specifics as well as characteristics of the firm for which the cost of debt is being determined, because, according to the circumstances, each model can show bias. Because the cost of debt interacts with the cost of equity and could impact capital expenditures, a decision maker must take into account specifics about the company, industry and economy. For example, we expect a company with a higher leverage to have a higher cost of debt (and equity) than a company with lower leverage, but the weights assigned to the cost of debt and equity differ, so that the overall cost of capital (absent taxes) is the same. Further, because capital attraction is crucial for entities undertaking capital expenditures, the decision maker must

consider whether the cost of debt estimate allows the entity to raise sufficient funds, so that it can undertake necessary projects.

We review three broad categories of methodologies that can be used to determine the cost of debt. First, the cost of debt can be estimated from market cost of debt using comparable companies. This can be done directly using the cost of debt on an index of companies or through a combination of the risk-free rate and a debt premium. Second, the cost of debt can be based on the embedded cost of debt for one or more companies (also referred to as a portfolio approach or trailing average). Third, the debt cost of recent issuers or investment banks' professional views on the cost of debt for specific companies could be used to determine the cost of debt.

By using embedded cost of debt, the rate regulated entity relies on the historical cost of debt and therefore does not face current financing conditions for the majority of its debt capital. Opponents of embedded cost of debt find that it does not provide the entity the same incentive as market cost to refinance when market conditions indicate that it would be efficient. By using market cost of debt, the regulated firm faces conditions that more closely match conditions in which non-regulated firms operate. Proponents of market cost argue that it gives the entity an incentive to refinance when market conditions dictate that it is efficient.

Regardless of whether market or embedded cost of debt is used, the lack of data can be a serious problem in environments such as Australia, where there are limited numbers of rate regulated entities and few, if any, entities with the same risk characteristics as the target. Therefore, looking to other sources overseas, recent debt issuances or investment banks' forecasts of financing costs becomes important.

Finally, because of the complexity of estimating the cost of debt, the estimate derived from applying each method is likely to result in a range of cost of debt estimates from which the decision maker will determine the cost of debt for the access period. In doing so, all relevant information should be considered and because the risks of the target entity may be unique, the decision maker will need to consider both systematic and idiosyncratic risks.

# I. INTRODUCTION AND CONTEXT

## A. INTRODUCTION

The Australian Energy Market Commission (AEMC) recently modified the rules that guide the regulation of pipelines in Australia. DBP has therefore asked *The Brattle Group* (*Brattle*) to review the methods that are currently used or could be used to estimate the cost of debt for the purposes of the National Gas Rules (NGR) in Australia. As part of this exercise, DBP has asked us to review various models that are used or could be used to determine the cost of debt. We therefore discuss examples of regulatory approaches in the U.S., Canada, the U.K., and the Netherlands, where regulators have considered a number of methods for determining the cost of debt. In assessing the various methods, we note that Rule 87 requires that "[t]he return on debt for a regulatory year is to be estimated such that it contributes to the achievement of the *allowed rate of return objective*" and that the estimated return on debt must have regard to (a) the desire to minimize the difference between the return on debt and the return on debt of an benchmark efficient entity referred to in the *allowed rate of return objective*, (b) the relationship between the return on equity and the return on debt, (c) the incentives that the return on debt may provide regarding capital expenditures, and (d) any impact that a change in methodology from one access arrangement period to the next could have on a benchmark efficient entity referred to in the *allowed rate of return objective*.[1]

We note that the *allowed rate of return objective* in order to be achieved, requires that "regard must be had to relevant estimation methods, financial models, market data and other evidence"[2] in determining the overall rate of return. We therefore focus on introducing a broad set of methods for cost of debt estimation, the characteristics of these methods and how they interact with economy-wide, industry, and company specific factors. Given the complexity of estimating the cost of debt, the estimate derived from applying each method is likely to result in a range of cost of debt estimates. The decision maker will determine the cost of debt for the access period from the range. In doing so, all relevant information should be considered and because the risks of the target entity may be unique, the decision maker will need to consider both systematic and idiosyncratic risks.

[1] Rule 87, (8) – (11).

[2] Rule 87, (5), part a.

The remainder of this report is organized as follows. *Section I.B* introduces the Australian regulatory system and the reasons for considering the estimation of cost of debt in Australia at this point in time. *Section II* then discusses estimation methods used to determine the return on debt, including methods that rely on current or historical market data, methods that use embedded cost of debt, and other methods. *Section III* provides a discussion of the characteristics of each method. *Section IV* surveys the methods relied upon by regulators in Canada, the U.S., the Netherlands and the U.K. Finally *Section V* provides a discussion of lessons learned, focusing on experiences that have worked well and those that have failed.

### B. THE COST OF DEBT

The cost of debt capital is a key parameter in regulatory settings, because it contributes to determining the return to the company's investors. The (required) cost of debt is the rate at which the entity can obtain debt financing. If the allowed cost of debt differs from the return on debt that debt investors require then the difference will be reflected in the return to equity investors. There are two fundamentally different ways to approach the determination of the cost of debt for a rate-regulated entity. First, if the rate-regulated entity itself can be considered to be the benchmark efficient entity referred to in the *allowed rate of return objective*, then the entity's embedded cost of debt could be used as the cost of debt. Second, the cost of debt could be estimated for a benchmark efficient entity of similar risk. The second approach requires the use of estimation methods, models, market data, and other evidence that can then be combined to obtain a reasonable estimate. Under the second approach all relevant information should be used to insure the *Allowed Rate of Return Objective* is achieved.

Up front it is important to recognize that while the cost of equity only varies with systematic risks, the cost of debt varies with both systematic and idiosyncratic risks. It is common to observe non-zero bond betas, which indicate the presence of systematic risks.[3] At the same time, the cost of debt also depends on company-specific characteristics such as the company's capital structure, cash flow variability, the level of capital expenditures, regulatory, environmental and possibly other factors that may not impact systematic risks.

[3] For example, E.J. Elton, M.J. Gruber, D. Agrawal and C. Mann's "Explaining the Rate Spread on Corporate Bonds," in *The Journal of Finance* 56 (2001) reports bond betas ranging from 0.12 to 0.76 depending on the bond type.

Thus, a broader set of factors affect the cost of debt than affect the cost of equity. We discuss these factors further in *Sections III* and *V* below.

### 1. Australian Gas Law and Gas Rules

Australia's National Gas Law (NGL) specifies that the *National Gas Objective* is

> to promote efficient investment in, and efficient operation and use of, natural gas services for the long term interests of consumers of natural gas with respect to price, quality, safety, reliability and security of supply of natural gas.[4]

Thus, an overarching goal of determining the rate of return should be to ensure the goal is met. Further, Section 24 (2) of the NGL states that

> A service provider should be provided with a reasonable opportunity to recover at least the efficient costs the service provider incurs in –
> (a) providing reference services; and
> (b) complying with a regulatory obligation or requirement or making a regulatory payment.[5]

The NGL is supplemented by the National Gas Rules (NGR), which are made under the NGL and govern access to natural gas pipelines. The NGR set the framework for how the Australian Energy Regulator (AER) and the Economic Regulation Authority of Western Australia (ERA) determine access arrangements for covered gas pipelines, including the rate of return on capital which is a component of the charges paid by pipeline customers. We understand that the regulators are currently developing guidelines as to how the rate of return provisions of the NGR may be applied in future determinations.

Of relevance to the determination of the cost of debt, the NGR state that

> … the rate of return for a service provider is to be commensurate with the efficient financing costs of a benchmark efficient entity with a similar degree of risk as that which applies to the service provider in respect of the provision of reference services[6]

and

> [I]n determining the allowed rate of return, regard must be had to: (a) relevant estimation methods, financial models, market data and other evidence…[7]

[4] National Gas (South Australia) Act 2008 (version 1.2.2013), Section 23.

[5] NGL, Section 24 (2).

[6] Rule 87, (2).

[7] Rule 87, (5), part a.

Rule 87 further requires that "[t]he return on debt for a regulatory year is to be estimated such that it contributes to the achievement of the *allowed rate of return objective*" and that "the return on debt may be estimated using a methodology which results in either: (a) the return on debt for each regulatory year in the *access arrangement period* being the same; or (b) the return on debt (and consequently the *allowed rate of return*) being, or potentially being, different for different regulatory years in the *access arrangement period*." Rule 87 at (10) further states that

> the methodology adopted to estimate the return on debt may, without limitation, be designed to result in the return on debt reflecting:
>
> (a) the return that would be required by debt investors in a benchmark efficient entity if it raised debt at the time or shortly before the time when the AER's *decision* on the access arrangement for that *access arrangement period* is made;
>
> (b) the average return that would have been required by debt investors in a benchmark efficient entity if it raised debt over an historical period prior to the commencement of a regulatory year in the *access arrangement period*; or
>
> (c) some combination of the returns referred to in subrules (a) and (b).

Finally, Rule 87 at (11) requires that the estimation of the return on debt have regards to

> (a) the desirability of minimizing any difference between the return on debt and the return on debt of a benchmark efficient entity referred in the allowed rate of return objective;
>
> (b) the interrelationship between the return on equity and the return on debt;
>
> (c) the incentives that the return on debt may provide in relation to capital expenditure over the access arrangement period, including as to the timing of any capital expenditure; and
>
> (d) any impacts (including in relation to the costs of servicing debt across access arrangement periods) on a benchmark efficient entity referred to in the allowed rate of return objective that could arise as a result of changing the methodology that is used to estimate the return on debt from one access arrangement period to the next.

The NGR also state (but does not require) that the cost of debt can be estimated using a methodology that sets the cost of debt at the cost of debt that would have been incurred by a "benchmark efficient entity" referred to in the *allowed rate of return objective* (a) had it raised debt just prior to the regulator's decision *or* (b) had it raised debt over a historical period of time.[8] In the latter case, the NGR require that the cost of debt be formula-based

[8] Rule 87, (10).

and updated each year through the upcoming access period.[9] A combination of (a) and (b) is also possible.

In the past, both the AER and the ERA have relied on market information to determine the cost of debt for regulated entities. For example, the AER determined the cost of debt based on an average of the recently observed yields on corporate bonds of a comparable rating,[10] and the ERA recently took a similar approach.[11]

Note that under the new Rule 87, two options are specified (though the AER and ERA are free to accept a different approach, neither option is required). We note that the first of these methods resembles a market-based cost of debt for a benchmark efficient entity with similar risks, while the second resembles the embedded cost of debt for a benchmark efficient entity with similar risks.

Rule 87(10)(b) states that cost of debt should be "the average return that would have been required by debt investors in a benchmark efficient entity if it raised debt over an historical period **prior to the commencement of a regulatory year** in the access arrangement period," where the bolded portion indicates that the cost of debt is expected to change during the price control period.

## 2. What Should We Expect from Models or Methods

It is useful to explicitly recognize at the outset that models or methods are imperfect. All are simplifications of reality, and this is especially true of financial models. Simplification, however, is also what makes them useful. By filtering out various complexities, a model can illuminate the underlying relationships and structures that are otherwise obscured. After all, while a perfect scale model representation of the city might be highly accurate, it would make a poor road map. It is therefore imperative that regulators and other users of the models use sound judgment when implementing and using the models — there is no one

[9] Rule 87, (12).

[10] Australian Energy Regulator, "Final Decision, Jemena Gas Networks: Access Arrangement Proposal for the NSW Gas Networks," June 2010 (AER Jemena Decision) and "Final Decision, Envestra Ltd., Access Arrangement Proposal for the Qld Gas Network," June 2011 (AER Envestra Decision).

[11] Economic Regulation Authority, Western Australia, "Final Decision on Proposed Revisions to the Access Arrangement for the Dampier to Bunbury Natural Gas Pipeline," October 2011 as Amended December 2011 (ERA DBNGP Decision).

model or set of models that are perfect. The gap between financial models and reality can sometimes be quite significant (as was painfully demonstrated by the recent financial crisis). Therefore, if an estimation approach is used to determine the forecasted cost of debt for a rate-regulated entity, there is no single, best pricing model available for the estimation of the expected cost of debt. Instead, analysts have a variety of potential models at their disposal, and it must be acknowledged that cost of debt estimation requires the exercise of judgment.

While no model is perfect, there are certain features that make models more useful from a regulatory perspective. For example, it is desirable to have models and methods that i) are consistent with the goal being pursued, ii) are transparent, iii) produce consistent results, iv) are robust to small deviations or sampling error, v) are as simple as possible (while maintaining reliability), and vi) can be replicated by others (*e.g.,* data is widely available). However, in the scheme of regulation under the NGL and NGR the most important feature of any method, model, market data or other evidence is that it contributes to the achievement of the allowed rate of return objective.[12]

For example, the average yield on a well-specified group of comparable companies is a transparent measure, is simple, and can be replicated by others, but it may not be consistent with the regulatory goal being pursued, e.g., the National Gas Objective or the notion that a ~~"s~~service provider should be provided with a reasonable opportunity to recover at least the efficient costs the service provider incurs" in providing services.[13]

All cost of debt estimation models have strengths and weaknesses that may be more or less pronounced for specific economic circumstances, industries, or companies. For example, the spread between the yield on corporate and government bonds is currently unusually high, so that methods that rely on adding historical spread to the current risk-free rate may be biased. Similarly, certain industries are more prone to cash flow volatility or large capital expenditures than others, thus making a direct comparison across industries biased. Many of the industry specific characteristics also pertain to companies within an industry because the demand or supply situation, the need for infrastructure investments, or other factors may differ.

[12] Rule 87, (8).

[13] NGL Sections 23 and 24.

Regardless of which estimation methods or models are used to determine an expected cost of debt, the estimate is subject to some uncertainty. Therefore, it is more accurate to say that the methods or models give rise to a range of possible cost of debt estimates from which the decision maker can select. In doing so, the decision maker needs to keep the overarching goal in mind, i.e., the National Gas Objective to ~~–~~promote efficient investment in, and efficient operation and use of, natural gas services …"[14] and the *allowed rate of return objective*.[15]

### 3. Stability and Robustness

For an estimation model used to determine the cost of debt, stability and robustness over time are desirable unless economic conditions have truly changed. Stability means that cost of debt estimates produced in similar economic environments should be similar, not only period-to-period but also company-to-company within a comparable sample. Robustness is meant here as the ability of a model to estimate the cost of debt across different economic conditions.

In general, all of the models discussed here have characteristics that make them more or less suited to one economic environment versus another. As such, all individual models can be, and often are, subject to some instability over time.

## II. COST OF DEBT ESTIMATION METHODS, MODELS, MARKET DATA AND OTHER EVIDENCE

Before discussing the cost of debt estimation methods used in various settings, we note that most methods are based on empirical data, that these methods are **not** mutually exclusive, and that estimation and data error (in a statistical sense) may give rise to a range of plausible cost of debt estimates rather than a single number. It is therefore important to look to the specific risks of the entities for which data is used as well as for the benchmark efficient entity referred in the allowed rate of return objective entity before placing the cost of debt in the range.

[14] NGL Section 23.

[15] Rule 87, (2).

### A. METHODS AND MODELS THAT USE MARKET DATA

The market cost of debt is determined using market data, but the exact implementation of this notion differs. Some regulators rely on a forecasted cost of debt while others rely on observed market data. To further complicate matters, some regulators take a simple average of historically observed cost of debt (or yield) figures, some add a debt premium to the risk-free rate, and some combine a forecasted risk-free rate with a historically observed premium on bonds issued by regulated entities. This section describes the various methods that have been used to estimate the market cost of debt in regulatory settings. *Section III* below discusses the characteristics of each approach as well as biases that might be introduced by considering an inaccurate benchmark efficient entity.

*Average of Observed Yields*

In theory the simplest way to determine the current cost of debt for a company is to use the current market cost of debt for similarly situated companies. This is **not** a straightforward exercise because the NGR calls for the use of a rate of return that is ~~"~~commensurate with the efficient financing costs of a benchmark efficient entity with a similar degree of risk..."[16] Determining what constitutes a benchmark efficient entity of similar risks or finding a sample of entities with a similar risk profile is not trivial. In particular, the use of the yield on a generic index selected by credit rating is not sufficient, because entities within a given rating differ with respect to their coverage ratios, capital structures, cash flow variability, level of capital expenditures, and fundamental demand / supply conditions. All of these factors affect the cost of debt that the entity will face.

The only truly comparable companies are those that have similar business and financial risks as the benchmark efficient entity for which the cost of debt is being determined. Only rarely will there be a sufficiently large group of such comparable companies from which one can feasibly determine the market cost of debt, so in practice the methodology is often implemented by using the yield on an industry index (e.g., a utility, corporate, or generic index), the yield on bonds issued by a sample of companies, or the yield obtained on recently issued bonds. It may then be necessary to adjust this estimate for industry and / or entity specific facts. This is because the NGR requires the cost of debt is estimated for a benchmark efficient entity of similar risk and that the cost of debt contributes to the

[16] Rule 87, (3).

achievement of the allowed rate of return objective.[17] Specifically, the methodology requires an analyst to (1) determine exactly what the benchmark efficient entity of similar risk should be, (2) determine the time horizon over which the cost of debt should be estimated, and (3) assess what adjustment, if any, to make to the raw estimate.

First, because the NGR reference an efficient benchmark entity with a similar degree of risk as that which applies to the service provider in respect of the provision of reference services, it is important to consider its exact definition. For example, while it might be tempting to consider only A-rated entities as efficient, this would be incorrect. In particular, one entity may operate with a relatively low gearing and be A-rated, while another entity may operate with a higher gearing and be BBB-rated, but both entities may be efficient benchmarks. Because the cost of debt, in part, depends on the company's gearing, the BBB-rated entity will have a higher cost of debt, but because the cost of equity has a lower weight for the BBB-rated entity, the weighted average cost of capital (WACC) could be exactly the same as that of the A-rated entity. Not only is it important to distinguish credit ratings and notches of credit ratings, but the evaluation cannot stop there as risk characteristics differ across industries and among entities within an industry. For example, two otherwise benchmark efficient entities within an industry may have different capital expenditure needs and therefore face differences in idiosyncratic risk.

Second, because debt is thinly traded and only few bonds of any specific maturity have yield information on any given day, a very short estimation window could result in biased estimates. If a very long period (e.g., several years) is used, the cost of debt truly measures the historical cost of debt rather than the current cost of debt. For example, in the UK Ofgem has recently used a 10-year trailing average from an index of industrial bonds issued in BGP,[18] an approach explicitly designed to allow for changes in interest rates during the price control period (because the cost of debt is reset annually). This approach is consistent with the average maturity of the debt in the industry being analyzed. Updating the cost of debt annually is more important in the UK context because the price control is longer (8 years) than in other jurisdictions.

[17] Rule 87.

[18] Ofgem, "RIIO-T1: Final Proposals for National Grid Electricity Transmission and National Grid Gas," 17 December 2012, p. 25.

Third, it is possible that there are instances where an adjustment to the raw estimate is needed. For example, if there is insufficient data in Australia on the cost of debt for types of industries, it may be possible to use foreign data on the cost of debt and adjust the estimate for generally higher interest rates in Australia than in, for example, the U.S. Similarly, if the only estimates that are available are for entities with either substantially more or less leverage than the target entity, then it may be necessary to increase or decrease the cost of debt for the target entity.

*Using the Risk-Free Rate Plus a Debt Premium to Estimate the Cost of Debt*

Assuming that the cost of debt for an efficient entity adjusts in response to changes in the risk-free rate, an approach to determining the cost of debt is to add a debt premium to the risk-free rate. This method implicitly assumes that the relationship between the risk-free rate and the cost of debt is constant over time and differs only by a limited number of basis points. Technically, the cost of debt is then calculated as:

$$\text{Cost of Debt} = \text{Risk-free Rate} + \text{Debt Premium} \qquad (1)$$

If the decision maker simply looks at the current risk-free rate, e.g., the current yield on the 10-year government bonds and adds a debt premium, the decision maker implicitly assumes not only that the relationship between the cost of debt for a benchmark efficient entity with similar risks and the risk-free rate is constant but also that this is an appropriate measure of the required return by debt investors on funds (i) raised shortly before the ERA's decision for an access period or (ii) raised over a historical period prior to the commencement of the access period. The method described in Equation (1) can determine the debt premium as the average spread of utility bond yields over government bond yields using a historic period. However, such a simple implementation would not necessarily contribute to the achievement of the allowed rate of return objective as assumes that the utility bond yields relied upon are consistent with the cost of debt of a benchmark efficient entity of similar risk. Because there are many ways in which risk can differ, the risk characteristics of the entity as well as those included in the debt premium need to be considered. To be consistent with the notion that the cost of debt is for a benchmark efficient entity of similar risk, the raw estimate from

Equation (1) will, for most entities, need to be adjusted for risk differences or alternative methods need to be considered in conjunction with this method.

One interpretation of the method is that the current risk-free rate proxies for the expected risk-free rate over the access period and that the debt premium remains constant, so that the sum of these two figures proxies for the forecasted cost of debt. In a sense, the use of the risk-free rate normalizes the cost of debt estimate.

This approach is currently problematic as the long-term historical average spread is lower than the current spread in countries such as Canada. For example, the historical average spread over the period for which data is available is approximately 100 basis points while the year-end 2012 spread was approximately 150 basis points. At the same time, the current yield on government bonds is historically low, so that an estimation technique as the one in Equation (1) would result in very low cost of debt estimates. For example, the year-end 2012 10-year government bond yield in Canada was about 1.8%, so adding 100 basis points would result in a cost of debt of 2.8%. At the same time the yield on highly creditworthy (A-rated) utility bonds in Canada was approximately 3.2%.[19] Thus, the estimated cost of debt does not reflect the cost at which regulated entities can obtain debt financing.[20] We use U.S. and Canadian data in the discussion due to the limits on available data on rate-regulated debt in Australia. Because the yield on Australian government and corporate debt is substantially higher than the yield on similar debt in Europe or North America, the absolute figures have no bearing on the cost of debt for a benchmark efficient entity of similar risk in Australia.[21]

To illustrate this point Figure 1 below shows the yield on 10-year government bonds plus 100 basis points and the yield on A-rated utility bonds using Canadian data. As shown in the chart, the government bond yield and the yield on highly rated utility bonds follow the trend, but at any given point in time, the discrepancy can be quite large and given the drop in yields, any historic debt was financed at rates much higher than what is common right now. In

[19] Data as of December 2012; 10-year government bond and Moody's Utility A bond yield from Bloomberg.

[20] At a time of very high inflation as was experienced in the eighties, the opposite would be true.

[21] For example, while the yield on 10-year government bonds in Australia was 3.3% at the end of December 2012, the yield on 10-year government bonds in the U.S., Canada, and Bloomberg's Euro Generic bond were 1.8%, 1.8%, and 1.3%, respectively. Thus, the Australian government bond carries a substantial spread to North America and Europe.

Figure 1 the period of the financial crisis of 2008-09 lead to a substantial divergence of the government and utility bond yields.

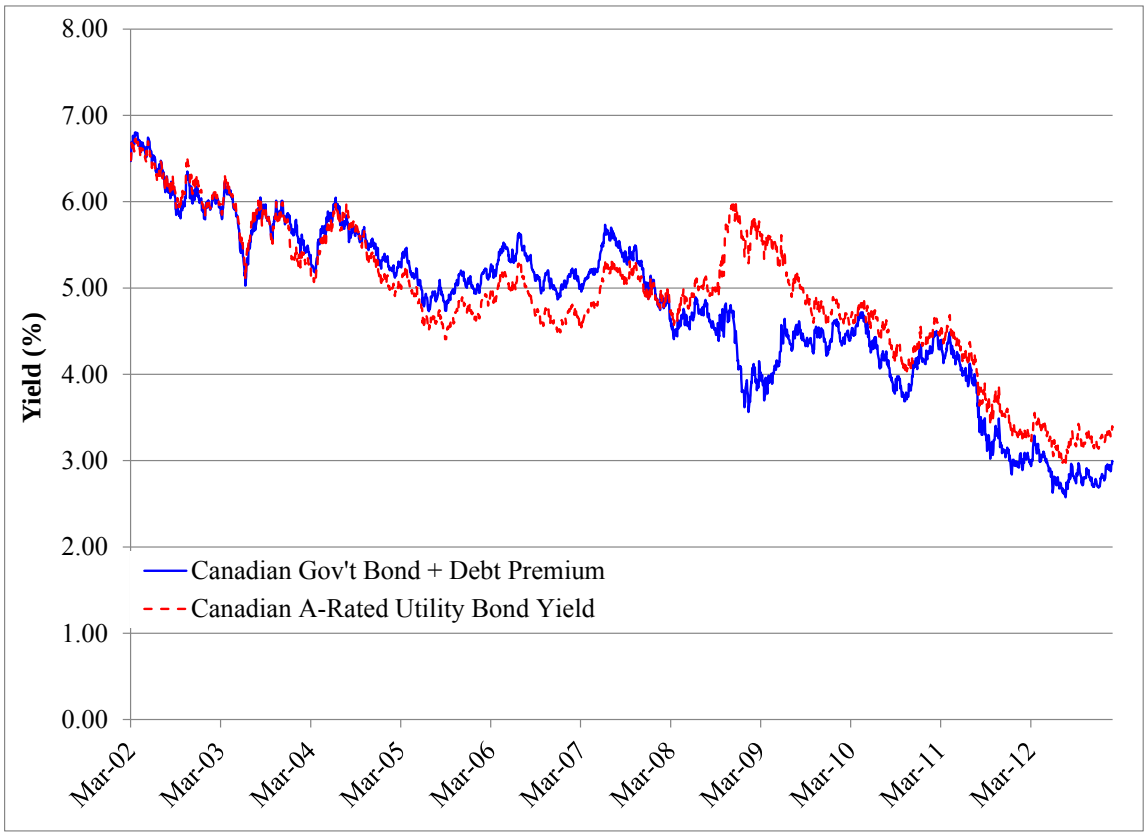


**Figure 1: Utility Bond Yield v. Government Bond Yield Plus Historic Debt Premium**

*Using the Forecasted Risk-Free Rates to Estimate the Cost of Debt*

An alternative to using the current risk-free rate plus a risk premium is to use a forecasted risk-free rate and, if the estimate is based on government bonds, add a risk premium to that estimate. The reason that some regulators use a forecast of the risk-free rate and not a forecast of the cost of debt is that few if any forecasts of the cost of debt for rate-regulated entities or corporations are available. In contrast, many governments as well as commercial vendors provide forecasts for countries' risk-free rates. For example, the National Australia Bank provides forecasts for the yield on the Australian 10-year so-called benchmark bond, but not on corporate or rate-regulated entities' bonds.[22] This approach has been taken by, for example, the Ontario Energy Board in Canada. Specifically, they rely on the forecasted yield

[22] The forecast from the National Australia Bank is available at: http://financial.markets.nab.com.au/News%20and%20Research/Public/Pages/Interest-Rate-Forecast.aspx

on 10-year government bonds plus debt and maturity premia as Canadian utilities commonly issues bonds of longer maturity than 10 years.[23]

This approach has the same flaw as the reliance on the current yield in that the debt premium is not constant and typically changes with the cost of debt. Another problem with this approach is that with the possible exception of the U.S., there are few forecasts available for the cost of debt out for more than one year.

### B. METHODS OR MODELS THAT USE EMBEDDED COST OF DEBT

The embedded cost of debt is simply the actual interest expenses of the regulated entity. It is common in North America to include the amortization of any issuance premia or discount, so that the total interest expense is recovered. Regulators in North America commonly use the embedded cost of debt as the cost of debt for regulated entities subject to prudence.[24] In instances where the regulated entity is 100% equity financed, the FERC has in some past decisions used a hypothetical capital structure for the entity and relied on a market based cost of debt for the entity in question. A similar approach is generally followed by other regulators in the U.S. and Canada.[25]

Because the NGR require that the cost of debt be such that the rate of return is commensurate with the financing cost of a benchmark efficient entity with a similar degree of risk to the service provider in the provision of reference services, the relevant embedded cost of debt is that of a benchmark efficient entity with such risks. Thus, it may be feasible to determine the embedded cost of debt for a number of comparable entities of similar risk as that of the target entity and evaluate whether any adjustments need to be made due to the efficiency requirement.

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[23] Ontario Energy Board, *EB-2009-084: Report of the Board on the Cost of Capital for Ontario's Regulated Utilities*, issued December 11, 2009 (EB-2009-0084)

[24] This is the methodology used by, for example, the Federal Energy Regulatory Commission (FERC), which regulates U.S. pipelines.

[25] The one exception is a relatively recent decision by the National Energy Board of Canada, which in its RH-1-2008 decision allowed the recovery of the then market cost of debt rather than the embedded cost of debt.

The embedded cost of debt has the advantage of potentially allowing the regulated entity to recover its actual debt costs. If the benchmark entity obtains debt financing efficiently, reliance on the embedded cost of debt satisfies the NGL Section 24's requirement that a ~~"s~~service provider should be provided with a reasonable opportunity to recover at least the efficient costs the service provider incurs …"[26] Using the embedded cost of debt, which is a historically trailing average of debt costs decreases the interest rate uncertainty that regulated entities face and in a stable regulatory environment the regulated entity can finance its operations with debt of maturities that best match the entity's needs without considering the potential for gains or losses due to interest rate movements. As regulatory economists, this is how we envision the NGR embedded cost of debt framework will apply.

It is noteworthy that a recent publication by Fitch Ratings indicates that the par-weighted average coupon of U.S. industrial bonds as of year-end 2012 was 4.72% for A-rated bonds and 5.45% for BBB-rated bonds of all maturities. This was down by about 50 basis points for both A-rated and BBB-rated bonds from 2011.[27] As A-rated utility bonds currently have a yield a little above 4%, the gap between the two measures of the cost of debt is approximately 70 basis points.[28] There is generally little difference in the investment grade yield on rate-regulated and other companies in the U.S. although there may be a difference in the maturity profile. Thus, the figures indicate that the difference between a historical trailing average and the current cost of debt is substantial.

To illustrate the difference between the embedded cost of debt and the yield on bonds of a comparable rating, we looked at pipeline and natural gas companies in Australia, Europe, and North America to calculate the embedded cost on bonds whose coupon, principal and term to maturity were disclosed in their annual reports or through Thompson Financial. We then compared the entity's embedded cost of debt to the current yield on comparably rated utility bonds in the entity's home country. Unfortunately, not all companies disclose this information, so Table 1 does not have complete information for companies outside North America. We note that the calculation in Table 1 is approximate because we assumed all

[26] NGL Section 24 (2).

[27] Fitch Ratings, ―U.S. Corporate Bond Market: 2012 Rating and Issuance Activity," February 12, 2013.

[28] Source: Bloomberg.

debt issuances sold at par, while in practice some sell at a discount or a premium. The exact calculation of the embedded cost of debt for such entities is illustrated in the appendix.

| | Embedded Cost of Debt [1] | Utility Bond Yield [2] | Bond Rating [3] |
|---|---|---|---|
| ***Australian Regulated Utilities*** | | | |
| APA Group | n/a | n/a | BBB |
| Envestra Ltd | 6.81% | n/a | BBB- |
| SP AusNet‡ | n/a | n/a | A- |
| ***European Regulated Utilities*** | | | |
| Enagas SA | 2.12% | n/a | BBB |
| National Grid PLC | 5.09% | 2.79% | A- |
| Snam SpA | 2.68% | 2.79% | A- |
| European Regulated Utilities Average | 3.30% | 2.79% | |
| ***North American Pipelines*** | | | |
| Boardwalk Pipeline Partners LP | 5.42% | 3.58% | BBB |
| ONEOK Partners LP | 6.18% | 3.58% | BBB |
| Spectra Energy Corp | 6.28% | 3.00% | BBB+ |
| Spectra Energy Partners LP | 4.22% | 3.58% | BBB |
| TC Pipelines LP | 4.61% | 3.58% | BBB |
| Williams Partners LP | 5.64% | 3.58% | BBB |
| Enbridge Inc.‡ | 4.85% | 3.65% | A- |
| TransCanada Corp‡ | 6.21% | 3.65% | A- |
| North American Pipelines Average | 5.43% | 3.52% | |

Sources and Notes:
‡ Bond yield calculated as (1/3) * BBB yield plus (2/3) * A yield to account for notching.
[1]: Obtained from Thomson Financial as of 1/24/2013 for the Australian and European Regulated Utilities and from companies' latest annual reports for National Grid and the North American Pipelines.
[2]: Bloomberg LP as of 2/7/2013.
[3]: Bloomberg LP as of 2/7/2013. Bond rating for APA Group obtained from Standard & Poor's as of 2/19/2013.

**Table 1: Embedded Cost of Debt and Corresponding Utility Bond Index Yield**

It is evident from Table 1 above that the embedded cost of debt can be quite different from the current market cost of debt. Based on the sample's most recent annual reports, the embedded cost of debt is higher for most companies due to the decline in interest rates over the last several years. If market-based interest rates increase, it is likely that the embedded cost of debt will be lower than the market-based costs.

Table 1 also makes it abundantly clear that the reliance on the embedded cost of debt for comparable companies requires a careful consideration of whether the entities considered are efficiently financed and of comparable risk to the target entity. The variability in the embedded cost of debt across entities even within an industry and country or region is substantial.

### C. OTHER EVIDENCE

Among the other evidence that can be used to determine the cost of debt is a review of recent debt issuances or the polling of one or more investment bankers about the likely cost of debt. As an example of the latter, we consider how the New Brunswick Energy and Utilities Board (NBEUB) determined the cost of debt for Enbridge Gas, New Brunswick, which is a gas distribution subsidiary of Enbridge Inc. In setting the allowed cost of debt for Enbridge Gas, New Brunswick, the NBEUB determined, based on evidence submitted by the company, that the company could not plausibly issue debt at the same rate as its parent, Enbridge Inc. Therefore, NBEUB asked investment banks to give a professional opinion on the likely debt financing costs for Enbridge Gas, New Brunswick relative to the company's embedded cost of debt. Based on the information obtained from the two investment banks, the NBEUB added 100 basis points (1%) to the embedded cost of debt of the parent company, Enbridge Inc.[29]

It may also be possible to obtain information on bonds recently issued by comparable companies. Specifically, if the debt issuance market for rate regulated entities is sufficiently active, it is possible to collect information about the cost of debt from these issuances. In doing so, we caution that outside North America, the debt issuance market is often thin, and it may be difficult to find debt issuances from entities that are sufficiently comparable to a benchmark efficient entity with similar risks to that of the target entity in the provision of reference services. Thus, to use the approach in Australia, it will most likely require looking at not just Australian debt issuances but also at debt issuances in other countries where Australian rate regulated entities raise capital. Further, it is important to consider the maturity

[29] New Brunswick Board of Commissioners of Public Utilities (now NBEUB), ~~"D~~ecision in the Matter of an Application by Enbridge Gas New Brunswick Inc. for Approval of its Rates and Tariffs," June 23, 2000, pp. 23-25.

of the bonds, whether the bonds are secured or unsecured, senior or junior, and generally what the total risk profile of the issuing entity is. Finally, the market for debt issuances can change quickly with especially more leveraged entities being vulnerable to market conditions. This was particularly true in the fall of 2008 and spring of 2009, where very few debt offerings materialized.

## III. CHARACTERISTICS OF COST OF DEBT ESTIMATION METHODS, MODELS, MARKET DATA AND OTHER EVIDENCE

### A. FACTORS TO CONSIDER

Before we discuss the characteristics of each method, model, market data or other evidence, we emphasize that the cost of debt cannot be determined in isolation. There are, as acknowledged in Rule 87 (11) (b), important interactions between the cost of debt and the cost of equity through leverage. The overall cost of capital (WACC) of a company is the weighted average of the cost of debt and the cost of equity. As the leverage increases, larger weight is placed on the cost of debt. Therefore, risk of default increases and the cost of debt (and equity) increases. This change in relative weight generally does not change the overall cost of capital (absent taxes) and says nothing about the efficiency of an entity.[30] Therefore, the cost of debt for a benchmark efficient with similar risks to that of the target entity in the provision of reference services entity increases with leverage.

The cost of debt, unlike the cost of equity, depends on the totality of the risk (systematic and idiosyncratic) for the entity. Therefore, it is imperative to evaluate the risk characteristics of the entity and if needed adjust for differences in risks.[31] As an example, the New Brunswick decision above illustrates a case in which the regulator recognized that a specific utility faced risks that made its cost of debt different from that of its parent company (and different from other entities in its industry). In addition to leverage, company-specific facts such as the variability of its cash flow, the magnitude of its capital expenditures, and fundamental supply / demand dynamics affect debt costs. Furthermore, the access to and cost of debt may

[30] The WACC may change if the new capital structure is not within the broad middle range of capital structures over which the WACC is a minimum for a particular company.

[31] For a discussion of risk positioning of an individual rate regulated entity, see, *The Brattle Group*, —Estimating the Cost of Equity for Regulated Companies," prepared for the APIA, 17 February 2013, pp. 67-73.

depend on industry factors such as fundamental oil and gas prices and the level of inflation in the country or region where funds are raised. Thus, there is no one simple formula available to determine the expected cost of debt.

Under Rule 87 (11) (c), the approach to determining the cost of debt must consider the ~~"i~~incentives that the return on debt may provide in relation to capital expenditure over the *access arrangement period*, including as to the timing of any capital expenditure." It is clear that if the rate of return differs from the cost at which the rate regulated entity can obtain financing, capital expenditures may be affected. For example, if the allowed cost of debt is set at a lower rate than that at which the entity can obtain debt financing, the entity will have an incentive to postpone capital expenditures until it can either file a new tariff request or until the allowed and the market costs of debt converge. Similarly, if the allowed cost of debt is set higher than the market cost of debt for a period of time, there is an incentive to pull capital expenditures forward in time to "~~c~~atch up" on needed investments. Regardless of the direction of the bias, incentives to undertake capital expenditure are affected by the allowed cost of debt decision. The refinancing of debt is affected in the same manner as is capital expenditures - if the cost of debt is lower than the cost at which debt financing can be obtained, then refinancing may be postponed, done at maturities that are different from those the entity normally would use to balance its debt portfolio or the rate-regulated entity may delay capital expenditures to minimize the need for funds.

One consequence of the discussion above is that the notion of a benchmark efficient entity with similar risks to that of the target entity in the provision of reference services cannot readily be associated with a specific credit rating as entities necessarily will have different levels of gearing, cash flow variability, capital expenditures, and demand / supply fundamentals. Within any given rating and even within notched ratings, the range of companies can be quite broad, so simply relying on the yield on an index cannot be expected to measure the cost of debt for a benchmark efficient entity with similar risks.

Lastly, a key issue in choosing which method, model, data or other evidence to rely on is availability of needed information. For example, yield data on utility bonds of a variety of ratings is readily available in the U.S., but data for anything but A-rated entities is scarce in Canada and Europe. In Australia, we know of no source for yields specific to rate-regulated

entities, so the reliance on the yield of a group of companies becomes less transparent and likely requires adjustments for not only entity-specific risk but also for industry and country risks.

### B. SUMMARY CHARACTERISTICS OF EACH METHOD

Regardless of the approach used to determine the cost of debt, there are advantages and disadvantages. The following summarizes some of the key characteristics of the available estimation methods, models, data and other evidence.

#### 1. Market-Based Cost of Debt

*Average of Observed Yields*

- The market cost of debt reflects the debt financing cost in capital markets and thus is more aligned with the cost of debt that could be achieved by a company more exposed to competition.
- For a well-specified market index or group of comparable companies, it is easy to determine and audit the market cost of debt if such a group is available.
- Proponents argue that the reliance on market cost of debt gives the regulated entity an incentive to obtain the cheapest possible financing.
- The maturity of the available market cost of debt may not match the rate-regulated entity's maturity horizon.
- Currently observed yields may not be reflective of the cost of debt over the access period.
- It may not be feasible to find a group of comparable risk benchmark efficient entities from which to estimate the market cost of debt, i.e., the average yield does not take into account company-specific risks.
- If the market cost of debt differs from the cost at which the entity can obtain debt financing, the rate regulated entity faces incentives to move capital expenditures forward or backward in time or to have frequent tariff filings.

- Regulated entities could have an incentive to match the debt financing to the regulatory period rather than to what is optimal for an entity with very long-lived assets.[32]

*Risk-Free Rate Plus a Debt Premium*

- Assumes the cost of rate-regulated debt and government debt moves in sync.
- If a forecasted risk-free rate is used, the cost of debt estimate is forward looking.
- At any point in time the debt premium may be upward or downward biased relative to the market cost of debt.
- Estimating and auditing the cost of debt estimate is simple.
- In many countries a forecasted risk-free rate is only available few years out making the estimate less forward –looking.

In addition to the above characteristics, we urge caution in relying strictly on bond ratings to assess the efficient cost of debt because (i) the costs of debt and equity interact through leverage, (ii) the cost of debt depends on total risk, which varies by industry (including across different types of utilities) and across companies, and (iii) a specific rating covers a broad range of companies. We also note that using the government bond rate plus a debt premium is likely to cause additional difficulties if, for example, the country whose government debt is being used faces unique circumstances. As an example, Greek government debt has a higher yield than the debt of many Greek companies. At the same time, if a historical risk premium is added to the government debt yield, a higher cost of debt would be estimated.

### 2. Embedded Cost of Debt

- The cost of debt can readily be calculated from rate-regulated entities' records although obtaining a sufficient group of benchmark efficient companies of similar risk may prove challenging.
- The cost of debt estimate is more stable over time.

[32] We observe debt maturities that are relatively long in North America, where the use of embedded cost of debt is common. Shorter debt maturities are common in Australia and Europe, where market cost of debt is more frequently used.

- The rate-regulated entity's capital expenditure decisions are unaffected by the cost of debt allowance.
- The cost of debt does not necessarily reflect market cost (which is what non-regulated entities face).
- The rate-regulated entity has less incentive to refinance than when the cost of debt equals market cost of debt.
- The cost of debt estimate is less readily available as it relies on non-public records in Australia.[33]
- Because of the limited number of similar risk benchmark efficient entities available, the cost of debt estimate will likely need to be adjusted to take into account the risk-characteristics of the entity. One way to do this is to use data obtained from investment banks.

In addition to the pros and cons above, we note that many of the advantages or disadvantages of using market-based cost of debt depends on the exact measurement of the market cost of debt. For example, the reliance on the risk-free rate plus a debt premium is associated with more problems than is the reliance on the yield of a well-defined index that is based on a reasonably large amount of bonds and companies in the relevant industry. Similarly, the embedded cost of debt is easier to track and audit if all debt is issued by one specific entity (the regulated entity or the parent) than if it is issued by a number of different parties. Finally, we note that some debt is subject to private placement and therefore the market cost of debt is not readily available.

### 3. Market Data and Other Evidence

The characteristics of other evidence inherently depend on the nature of such evidence. The two most promising candidates in this category are the cost of recently issued debt by comparable companies and estimates on the likely cost of debt financing obtained from investment banks.

[33] In North America, annual filings provide sufficient public data to easily determine that the embedded cost of debt.

- If data is available on recently issued debt of comparable companies, it provides a true estimate of the current cost of debt financing. Such data may be difficult to obtain - especially in a smaller market.
- Data obtained from recent debt issuances is readily auditable.
- Data obtained from recently issued debt is likely to vary substantially over time, so that the cost of debt varies substantially from one access period to the next.
- Estimates from investment banks can be obtained even when there are no current debt issuances, so data should readily be available.
- The data from investment banks is likely not readily auditable.
- Like the data from recent bond issuances, the data will depend substantially on current market conditions and is likely to vary substantially over time.

There is no unanimously correct cost of debt methodology. All methods, models, market data and other evidence have unique characteristics that make the methodology more or less useful in specific circumstances. However, to avoid any bias, it is important to maintain consistency across access periods. Most notably, if moving from an embedded cost of debt methodology to a market-based methodology, current debt should be grandfathered. If moving from a market-cost of debt methodology to embedded cost of debt or other methods, the impact is likely to be less severe, because the cost of debt estimate is already based on data that changes substantially over time.

## IV. REGULATORY SURVEY

### A. AUSTRALIA

***Jemena decision***

In the 2010 Jemena Gas Networks (JGN) decision,[34] the AER determined the cost of debt as the 20-day average yield on what the AER viewed as comparable 10-year corporate debt. The main points of substance in the case were that disputes that arose between JGN and the regulator were associated with the choice and derivation of the corporate bonds used. The key difficulty is that there are relatively few publicly-traded corporate bonds in the Australian capital market. The AER used fixed-rate BBB+ rated corporate bonds with remaining terms of more than two years that were issued in Australia by an Australian

[34] AER Jemena Decision.

company and conjointly priced by Bloomberg, CBASpectrum, and UBS. There were six such bonds. The AER eliminated one bond from the sample because it showed large swings in price. The AER then tested which of the "fair value curves" for BBB rated debt published by Bloomberg and CBASpectrum more closely matched the observed yields on the remaining five bonds. Since the CBASpectrum curve was a slightly better match, the AER selected that curve, and read the 10-year yield from that curve. Figure 2 below (taken from the AER decision)[35] illustrates this process.

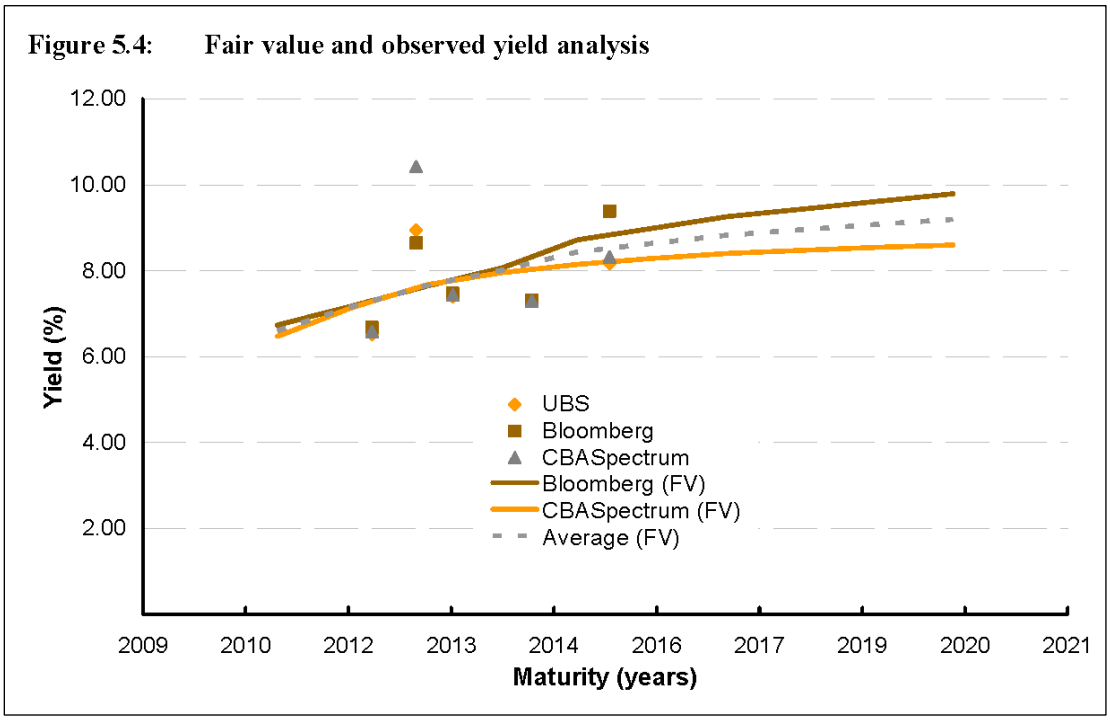



**Figure 2: Replication of Fair Value and Observed Yield Analysis from AER Decision**

The AER determined a cost of debt of 8.78% by this process. It is apparent from Figure 2 above that the fair-value curves from which the AER determined the cost of debt did not match the yields on the bonds relied upon by AER particularly well, that the curves extrapolate well beyond the point at which there is any relevant market data, and that the resulting cost of debt is very sensitive to the methodology used to derive the fair value curve (the Bloomberg curve, which is ostensibly reporting the same thing as the CBASpectrum curve on which the AER relied, would have yielded a cost of debt closer to 10%).

[35] AER Jemena Decision, p. 198.

In addition to dispute over which fair-value curve should be used, the choice of credit rating was also at issue in the case. JGN argued that gas networks are riskier than electricity networks, and that therefore it would be appropriate to use a benchmark entity with a lower credit rating than BBB+. The AER rejected this argument because there was little evidence on credit ratings of actual gas and electricity utilities in Australia, and because statistically there was no evidence to support the thesis that gas utilities have riskier revenues. The AER also pointed out that, in its WACC review (which was the origin of the decision to use a BBB+ rated bonds), the bond AER used was chosen conservatively, being towards the bottom of the range identified (BBB+ to A-).

The EUAA[36] submitted evidence which suggested that one Australian utility had been able to raise debt "offshore" at a cost significantly (280 bps) below the cost determined by the AER in setting rates for that utility. The AER dismissed this concern on the grounds that the Rules required the AER to set the cost of debt by reference to a benchmark utility, not the actual cost of debt of any one utility.[37]

The AER also included an allowance for debt-raising costs. On the basis of modeling the fees that would be incurred to raise debt equivalent to the debt-funded proportion of the asset base, the AER determined an allowance of approximately 9 bps.[38]

***Envestra***

In the Envestra decision, the AER similarly considered evidence from what was considered comparable bonds and fair value curves. The AER ultimately determined that the cost of debt should reflect evidence from both the Bloomberg BBB fair value curve (extrapolated) and a recently-issued bond from APA Group (a gas utility), equally weighted. This evidence is shown in the Figure 3 below (note that in this figure yields are expressed relative to the risk-free rate, so the Y-axis is the debt risk premium).[39]

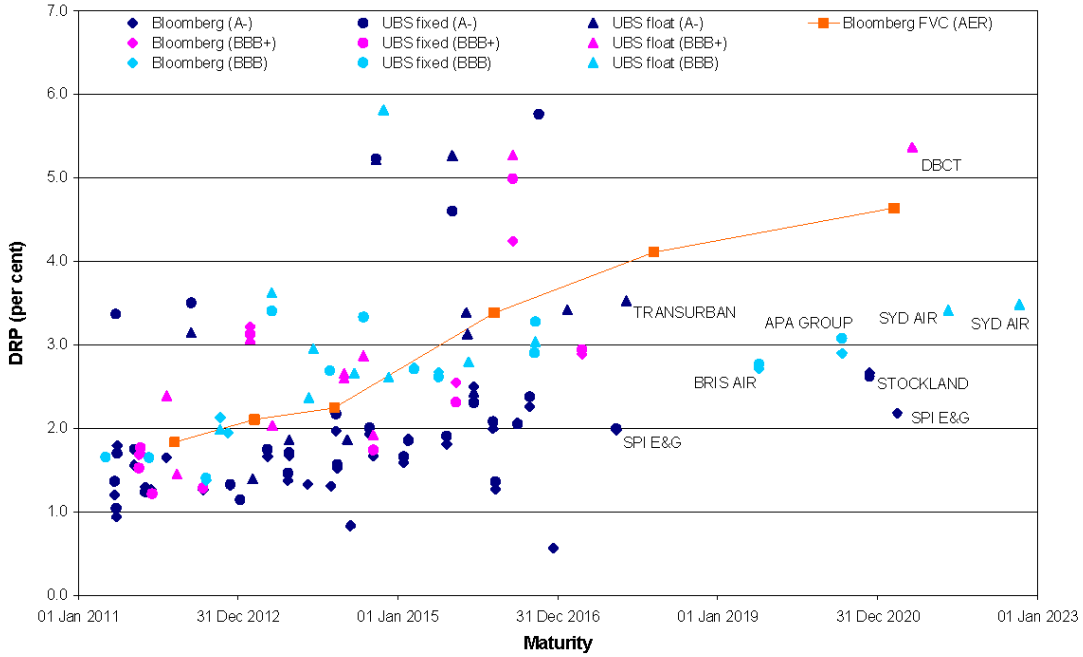
[36] The Energy Users Association of Australia, a national association of large electricity and gas users.

[37] AER Jemena Decision, p. 184.

[38] AER Jemena Decision, p. 278.

[39] Reproduced from the AER Envestra Decision, p. 49.

**Figure 5.1 Australian corporate bonds with credit ratings ranging from BBB to A–**




Source: Bloomberg, UBS, AER analysis.
Note: Yields are annualised, and floating bonds have been converted to fixed rate equivalents. No other adjustments have been made.
Observed yields for the Brisbane Airport and SP AusNet bonds only became available from 28 and 30 March 2011 respectively. As such, references throughout this chapter to the observed yields of the Brisbane Airport and SP AusNet bonds reflect average yields over the period from 1 April 2011 to 31 May 2011. Although these dates are not in Envestra's averaging period, the AER considers these bonds provide relevant information in setting the benchmark DRP.

**Figure 3: Replication of Australian Corporate Bonds with Credit Ratings Ranging from BBB to A- from AER Envestra Decision**

The AER placed weight on the yield of the APA Group bond because it had a similar (BBB vs. BBB+) credit rating to what was viewed as the benchmark utility, and because it was a 10-year bond. The AER also included an allowance for debt-raising costs, equivalent to approximately 11 bps.[40]

***DBNGP***

The ERA determined the cost of debt by a debt risk premium approach. The premium over government bonds was estimated from a sample of 15 corporate bonds with ratings in the BBB- to BBB+ range, and terms of 2.4 to 8.8 years. Four subsets of this group were considered, and four methods were used for calculating an average debt risk premium (in all cases, the debt risk premium was equal to the observed yield less the calculated yield on

[40] AER Envestra Decision, p. 77.

a government bond of equivalent term). The results of this process are shown in Figure 4 below.[41]

**Table 37 Debt Risk Premiums under Various Scenarios and Weighted Average Approach, (per cent) as at 30 September 2011**

| Weighted Average Method | Scenario 1 (15 bonds) | Scenario 2 (12 bonds) | Scenario 3 (5 bonds) | Scenario 4 (3 bonds) | Simple Average of all 4 scenarios |
|---|---|---|---|---|---|
| Simple Average | 3.107 | 3.062 | 3.084 | 2.996 | 3.062 |
| **Term to Maturity Weighted Average** | **3.146** | **3.106** | **3.083** | **2.992** | **3.082** |
| Amount Issued Weighted Average | 3.162 | 3.148 | 3.064 | 2.965 | 3.085 |
| Median | 3.119 | 2.999 | 3.119 | 2.940 | 3.044 |

*Source: Authority's calculations*

**Figure 4: Debt Risk Premiums under Various Scenarios from ERA Decision**

In Figure 4 above, Scenario 1 contained all 15 bonds, Scenario 2 excluded BBB- bonds, Scenario 3 excluded bonds shorter than 5 years, and Scenario 4 excluded both BBB- and shorter bonds. The ERA determined that the appropriate debt risk premium should be 3.082%, the simple average of the four scenarios with the term-to-maturity-weighted-average (the bold row in the table above). Subsequently, following an appeal, the ERA revised its decision to 3.143%, which was based on a joint-weighted version of Scenario 2 (where the weights on each of the 12 bonds were proportional to the product of the amount issued and the term to maturity).[42]

The ERA also allowed debt-raising costs of 12.5 bps.

The ERA rejected evidence put forward by the DBP which suggested that Australian utilities would be likely to raise at least some debt outside Australia, *e.g.* in the U.S. DBP

[41] Reproduced from the ERA DBNGP Decision, p. 149.

[42] Pages 8–10 of *Revised access arrangement decision pursuant to rule 64(4) of the National Gas Rules giving effect to the Economic Regulation Authority's proposed revisions to the Access Arrangement for the Dampier to Bunbury Natural Gas Pipeline Revised by reason of and pursuant to orders of the Australian Competition Tribunal made on 26 July 2012* (ERA, October 2012).

presented evidence on the cost of doing so, swapped back into an Australian-dollar-equivalent basis. The ERA rejected this evidence, in part because the methodology seemed to generate different weightings (on the different sources of debt finance) over time.[43]

Because of the smaller market for longer term debt in Australia, it is reasonable to expect that Australian companies benefit from raising some debt internationally. Further, because rate-regulated entities necessarily obtain funds for payment of interest and repayment of debt in AUD, the cost of swapping these funds back into AUD needs to be considered as long as it is efficient to raise funds internationally. In considering whether international debt funding is efficient, it is necessary to consider not only the yield on such debt, but also the maturities available, because companies benefit from financing their debt with a portfolio of debt instruments that span a range in terms of the maturities, exposure to country risk, etc.

### B. NORTH AMERICA: CANADA AND THE U.S.

***Standard Cost of Debt Determination***

Regulators in Canada and the U.S. usually allow the embedded cost of debt to include the amortization of any issuance premia or discount to be recovered in rates provided the debt was prudently incurred. The only substantial difference across U.S. regulators is whether they allow the embedded cost of debt to be determined solely from debt and debt costs that existed prior to the rate case or if they allow the debt and debt costs to be updated with information about upcoming debt offerings. In the latter case, the regulator commonly requires specific information about the amount of debt and its terms from the underwriter of the debt. Canadian regulators usually allow the amount and cost of debt to be updated for planned debt issuances.

North American pipelines generally issue significant amounts of debt with long maturities. As shown in Table 2 below, more than 80% of the debt held by a group of North American pipelines has more than 5 years to maturity, and many of these debt issuances have maturities in excess of 10 years.[44]

[43] See ERA DPNGP Decision, p. 146

[44] The North American companies listed in Table 2 are pipelines characterized by having substantial pipeline assets (oil, natural gas, or liquids), an investment grade bond rating, and no recent mergers

| Company | Currency | Current Portion of Long Term Debt [1] | Notes Payable [2] | Less Than 1 Year [3] | 1 to 5 Years [4] | More Than 5 Years [5] | Total [6] |
|---|---|---|---|---|---|---|---|
| ***Australian Regulated Utilities*** | | | | | | | |
| Envestra Ltd | AUD | - | 91 | 91 | - | 633 | 725 |
| Australian Regulated Utilities Total | | - | 91 | 91 | - | 633 | 725 |
| Australian Regulated Utilities Total (%) | | 0% | 13% | 13% | 0% | 87% | 100% |
| ***European Regulated Utilities*** | | | | | | | |
| Enagas SA | USD | - | 2,082 | 2,082 | 666 | - | 2,748 |
| Fluxys Belgium | USD | 153 | 40 | 193 | 133 | 466 | 639 |
| National Grid PLC | USD | - | - | - | 4,169 | 4,958 | 9,127 |
| REN - Redes Energeticas Nacionais | USD | - | 69 | 69 | - | - | 69 |
| Snam SpA | USD | 2,089 | 3,612 | 5,701 | 2,330 | 5,659 | 11,602 |
| European Regulated Utilities Total | | 2,242 | 5,804 | 8,046 | 7,298 | 11,083 | 24,185 |
| European Regulated Utilities Total (%) | | 9% | 24% | 33% | 30% | 46% | 100% |
| ***North American Pipelines*** | | | | | | | |
| Boardwalk Pipeline Partners LP | USD | - | - | - | 1,350 | 1,075 | 2,425 |
| ONEOK Partners LP | USD | 361 | - | 361 | 1,100 | 2,436 | 3,536 |
| Spectra Energy Corp | USD | 525 | 1,052 | 1,577 | - | 10,607 | 11,659 |
| Spectra Energy Partners LP | USD | 150 | 58 | 208 | 250 | 250 | 558 |
| TC Pipelines LP | USD | 3 | - | 3 | 27 | 349 | 376 |
| Williams Partners LP | USD | 324 | - | 324 | 2,010 | 5,018 | 7,028 |
| Enbridge Inc. | CAD | 252 | 548 | 800 | 2,568 | 8,948 | 12,064 |
| TransCanada Corp | CAD | 935 | 1,880 | 2,815 | 397 | 17,661 | 19,938 |
| North American Pipelines Total | | 2,550 | 3,538 | 6,088 | 7,702 | 46,344 | 57,584 |
| North American Pipelines Total (%) | | 4% | 6% | 11% | 13% | 80% | 100% |
| MLP Total | | 838 | 58 | 896 | 4,737 | 9,128 | 13,923 |
| MLP Total (%) | | 6% | 0% | 6% | 34% | 66% | 34,663 |

Sources and Notes:
[1] - [2]: Bloomberg LP as of 1/25/2013.
[3] = [1] + [2].
[4] - [5]: Obtained from Thomson financial for Australian and European companies and companies' latest annual reports for National Grid and the North American Pipelines.
[6] = [2] + [4] + [5].
Spectra Energy Corp and TransCanada Corp list a range of maturity dates for various bonds in their annual reports.
When this occurred, the longest maturity was used.
Total percentages may not add up to 100%.

**Table 2: Summary of Australian, European and North American Debt Maturities**

or acquisitions. We note that the majority of the companies are so-called Master Limited Partnerships (MLP), which are pass-through entities for U.S. tax purposes. Therefore, the corporate entities have no tax benefits of debt although their owners do. The Australian entities are the Australian pipelines for which we have recent decisions and the European rate-regulated entities are those recently reviewed by the Dutch regulator for the purpose of determining the generic WACC.

***Instances Where Cost of Debt Differed from the Embedded Cost of Debt***

*National Energy Board*

The National Energy Board (NEB) is an independent federal agency in Canada that regulates international and interprovincial aspects of the oil, gas and electric utility industries. The NEB determines rates, including the cost of capital and capital structure, for interprovincial and international pipelines. The NEB has traditionally allowed regulated pipelines to recover their embedded cost of debt, but in its RH-1-2008 decision,[45] the NEB allowed Trans Québec & Maritimes Pipelines Inc. to earn a WACC based on a market cost of debt. The cost of debt was set at the market cost of debt relying on the yield of an index of utility bonds. Specifically, the NEB noted

> the market cost of debt was assumed to be equal to the current yield on an index of utility bonds corresponding to each sample company's debt rating.[46]

Using this principle, the NEB used a 15-day average yield on an index of bonds that have the same rating as the companies used to determine the cost of equity.

*Ontario Energy Board*

The Ontario Energy Board (OEB) regulates Ontario's electric and gas markets and utilities including some provincial pipelines.[47] While the OEB generally uses the utility's embedded cost of debt for rate making purposes, a formulaic approach is used to determine the deemed cost of long-term and short-term debt for entities that have no debt outstanding. This estimate is also used as a cap on inter-company borrowing costs that can be recovered in rates.[48] The deemed long-term cost of debt is determined as the Long Canada Bond Forecast from *Consensus Forecast*[49] plus a maturity premium plus the average spread of a long-term A-rated utility bond yield over the long Canada bond yield. Specifically,[50]

$$LTDR_t = LCBF_t + Average_{3\ months}\ (UtilBonds_t - CB_t) \qquad (2)$$

[45] National Energy Board, *Reason for Decision, RH-1-2008*, issued March 2009 (RH-1-2008).

[46] RH-1-2008, p. 27.

[47] The OEB bases rates on a forecast test year and the forecasted cost of service.

[48] Ontario Energy Board, *EB-2009-084: Report of the Board on the Cost of Capital for Ontario's Regulated Utilities*, issued December 11, 2009 (EB-2009-0084), p. 59.

[49] Consensus Forecast is a subscription service from Consensus Economics. The service provides consensus estimates on the 10-year Canadian government bond yield.

[50] EB-2009-0084, Appendix C.

Where LTDR is the Long-Term Deemed Debt Rate, LCBF is the Long Canada Bond Forecast for the year, UtilBonds is the realized yield on 30-year A-rated utility bonds, CB is the realized yield on 30-year Canada Bonds and the average is taken over three months prior to the date the rates are implemented.[51]

Similarly, the OEB determined a deemed short-term debt rate (STDR), which is the average 3-month bankers' acceptance rate plus a forecasted average spread of short-term debt issuances over the 3-month bankers' acceptance rate using R1-low Canadian utilities.[52] Specifically,[53]

$$STDR_t = \text{Average}\ (BA_t) + AnnualSpread_t \qquad (3)$$

Where STDR is the Short-Term Deemed Debt Rate, BA is the 3-month Bankers' Acceptance rate, which is averaged over a month, and AnnualSpread is the average annual spread between debt issuances of an R1-low utility and 3-month Bankers' Acceptance rate. The AnnualSpread is obtained by OEB staff by contacting major banks whereas the 3-month Bankers' Acceptance rate is available from Cansim (Series V39071).

Table 3 below shows the OEB's estimate for the long-term cost of debt and the realized (market) cost of debt during the year the estimate was made.

| | A-Rated Utility Bond Yield | Deemed LT Debt Rate |
|---|---|---|
| 2012 | 4.77% | 5.01% |
| 2011 | 5.21% | 5.32% |
| 2010 | 5.92% | 5.87% |

**Table 3:[54] OEB Cost of Debt and Comparable Bond Yield**

[51] OEB obtains the UtilBond yield from Bloomberg (Series C29530Y) and the yield on long Canada Bonds (CB) from Cansim (Series V39056).

[52] R1-low is a rating designation used by Dominion Bond Rating Services.

[53] EB-2009-0084, Appendix D.

[54] EB-2009-0084 –Cost of Capital Parameters Updates for 2010 Cost of Service Applications," 2/24/2010; —Cost of Capital Parameters for 2011 Cost of Service Applications for Rates Effective May 1, 2011," 3/3/2011; —Cost of Capital Parameters Updates for 2012 Cost of Service Applications," 11/10/2011; and

Table 3 above shows that the OEB's cost of debt estimates vary around the realized utility bond yield in the year of the estimate. We note that the OEB estimates the cost of debt (and equity) for the entities it regulates in the late fall of the year prior.

***New Brunswick Energy and Utilities Board***

The interesting deviation from using the embedded cost of debt in New Brunswick relates to the cost of debt allowed for Enbridge Gas, New Brunswick. Enbridge Gas, New Brunswick is a subsidiary of Enbridge Inc. In setting the allowed cost of debt for Enbridge Gas, New Brunswick, the New Brunswick Energy and Utilities Board added 100 basis points (1%) to the embedded cost of debt of the parent company, Enbridge Inc. In making this determination, the regulator asked two investment banks to give a professional opinion on the likely debt financing cost of Enbridge Gas, New Brunswick relative to the embedded cost of debt of the parent company.

## C. EUROPE

Most European regulators use market information to determine the cost of debt that regulated entities are allowed to recover in rates. While we found no systematic disclosure of debt maturities, coupon rates, discounts or premia among European utilities, we notice that the information available on the maturity of debt outstanding by, for example, Flyxys in Belgium, NationalGrid in the U.K., Snam in Italy or Redes Energeticas Nacionais SGPS in Portugal indicates that debt maturities are much shorter that the maturities we see among North American pipelines. This is important because the maturity of a regulated entity's debt affects not only the cost of debt but also refinancing risks and the variability of interest expenses. Under a regime where embedded cost of debt is recovered, the maturity of the outstanding debt also affects the stability of rates.

***The U.K.: Ofgem***

In the U.K., the Office of Gas and Electricity Markets (Ofgem) is the entity that determines the allowed return for regulated electric and gas companies. In considering Ofgem's

st of Capital Parameters Updates for 2012 Cost of Service Applications for Rates Effective May 1, 2012," 3/2/2012.

approach, it is important to know that Ofgem relies on a real (rather than nominal) WACC and currently uses an 8-year regulatory cycle with some annual formula-based updates.

In determining the cost of debt that is included in rates, Ofgem uses a trailing average of historically observed yields on a broad index of bonds. In its most recent decision,[55] Ofgem specified the cost of debt as the simple 10-year trailing average of two so-called iBoxx indices of Sterling denominated corporate bonds.[56] Ofgem uses a real rather than a nominal cost of debt, so an inflation adjustment is made to the nominal value for a final real cost of debt of 2.92% for 2013-2014 (estimated in October 2012). The cost of debt is updated annually (*i.e.*, rates will be adjusted each year to take account of changes in the 10-year trailing average adjusted yield).[57]

Ofgem does not make any allowance for issuance costs. The iBoxx indices are composed of a broad set of bonds and in Ofgem's view the characteristics of network companies and the regulatory regime within which they operate allow them to raise debt more cheaply than other companies of similar credit rating. Therefore Ofgem finds that the margin provided by the index will allow network companies to recover any costs that are not directly in the index.[58]

***The Netherlands: NMa and OPTA***

In the Netherlands, NMa regulates energy companies (including pipelines), while OPTA regulates communications markets in the Netherlands. The two agencies merged at the start of 2013.

To estimate a cost of debt for the regulated firms, the Dutch regulator considers the yield on debt issued by other A-rated European companies. The methodology specifies that the allowed cost of debt is the risk-free rate plus the average spread of the regulated firms' debt over the risk-free rate over the last three years. The risk-free rate is also calculated over a 3-

[55] Ofgem, "RIIO-T1: Final Proposals for National Grid Electricity Transmission and National Grid Gas," December 17, 2012 (Ofgem Decision), pp. 25-26.

[56] The iBoxx indices are fixed income indices published by MarkIt, a data and financial services provider with offices in many countries. The bond-based indices are available in several currencies including U.K. sterling.

[57] Ofgem Decision Table 3.1.

[58] Ofgem Decision p. 26.

year period. As the Dutch regulator relies on the German risk-free rate, the spread is over the German 10-year bond.

A-rated debt has remained reasonably stable over the three year reference period, moving in a band between 1.0-1.5%, while BBB+ debt has been more volatile. The spread is indicated in Figure 5 below, which shows that the most recent 3-year period misses the volatility seen at the end of 2008 and beginning of 2009.

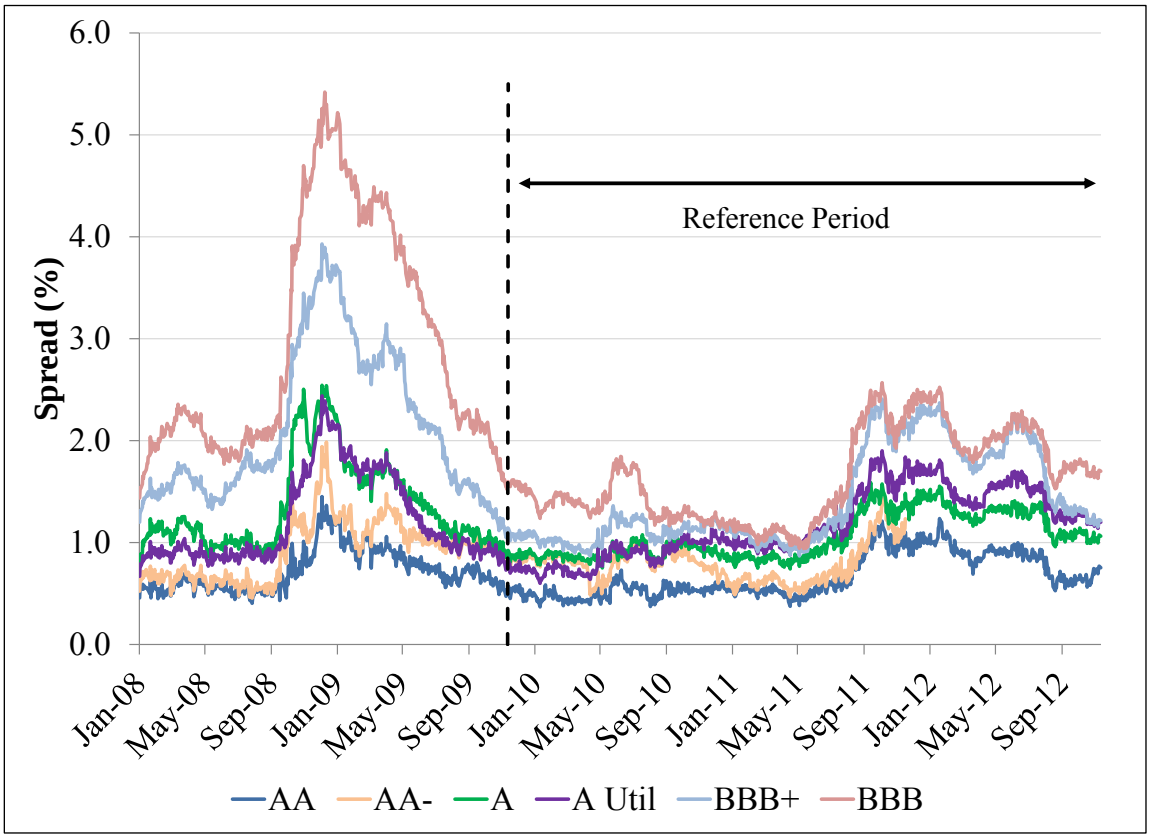



**Figure 5: Credit Spread on European Rated Debt**

Calculating the spread for each type of bond over a 3-year period and averaging the results, the NMa / OPTA obtain the spread added to the risk-free rate. The regulator takes the risk-free rate to be the average of the German risk-free rate over the most recent three years. The average spread is calculated as above and the regulator then adds another premium to cover issuance and other non-interest costs. Thus, the cost of debt is determined as the risk-free rate plus the average spread plus an allowance for issuance costs.

Looking to the methods used by various regulators, we can summarize the methods relied upon as shown in Table 4 below.

| Regulator | Primary Method | Specifics |
|---|---|---|
| AER | Current Market Cost of Debt | Average of corporate bond yields over a relatively short time period |
| ERAWA | Risk-Free Rate plus Premium | Current risk-free rate plus the average premium estimated from 15 corporate bonds and an allowance for issuance costs |
| U.S. | Embedded Cost of Debt | Actual costs including any premia or discount |
| Canada | Embedded Cost of Debt | Actual cost including any premia or discount |
| OEB | Secondary method: forecasted cost of debt | Forecasted 10-year government bond yield plus historic utility debt premium |
| Ofgem | Historical Market Cost of Debt | 10-year historic average of all Sterling denominated bonds |
| Netherlands | Risk-Free Rate plus Premium | 3-year period and benchmark is other European A-rated utilities |

**Table 4: Summary of Regulatory Approaches to Setting the Cost of Debt**

From Table 4, it is evident that there currently are a number of different approaches to determining the cost of debt.

## V. USING THE METHODS AND LESSONS LEARNED

### A. CHARACTERISTICS AND PRACTICES

In addition to the standard methodologies reviewed in Table 4 above, at least one Canadian regulator (New Brunswick Energy and Utilities Board) relies on information from investment bankers to determine a reasonable cost of debt allowance. Specifically, the regulator recognized that at its standard cost of debt allowance, the regulated entity would not be able to raise debt capital needed for infrastructure development. Additionally, in light of the financial crisis, the Portuguese regulator[59] recently changed its approach to estimating the cost of debt. Specifically, instead of using the Portuguese 10-year bond, where the yield spiked, the regulator started using either German or a combination of all AAA-rated Eurozone government bonds to determine the risk-free rate. Since the Portuguese regulator relies on the risk-free rate plus a debt premium to set the cost of debt, the method used to determine the cost of debt has changed. These examples illustrate that regulators have

[59] Portugal Entidade Reguladora dos Serviços Energéticos (ERSE).

recognized the need to be flexible and take country or company-specific circumstances into account.

Before discussing the methods, models, market data and other evidence in detail, we briefly summarize the characteristics of the methodologies discussed in Table 5 below.

| | Evaluation Criteria | | | |
|---|---|---|---|---|
| Cost of Debt Estimation Method | Underpinning | Bias | Impact of Market Conditions | Forward or Backward-Looking |
| Observed Yields | Uses historical data | Aggregates diverse entities' yield, which may be biased for the risk characteristics of the target | Sensitive to economic conditions and inflation | Backward |
| Risk-Free Rate Plus Premium | Assumes the the risk-free rate and cost of debt maintains a constant spread | Biased if risk-free rate impacted by monetary policy or flight to quality and if the (historical) risk premium does not reflect current market conditions | Very sensitive to monetary policy, flight to quality, and inflation | Backward |
| Forecasted Risk-Free Rate Plus Premium | Assumes the the risk-free rate and cost of debt maintains a constant spread | Same as above, but risk-free rate is less prone to bias | Same as above but less sensitive | Forward |
| Embedded Cost | Can be viewed as either:<br>- assuming the access period cost of debt will be similar to the embedded cost of debt<br>- treating debt cost as an operating expense. | Historical financial conditions affect the current cost of debt | N/A | Backward |
| Investment Banks' Forecasts | Bank specific | Subject to individual investment banks' perception of market conditions and company factors | Sensitive to monetary policy, inflation, and industry policy | Forward |

**Table 5: Summary Characteristics of Cost of Debt Estimation Methodologies**

Looking at Table 1 in *Section II.B*, it is clear that there can be a substantial difference between the embedded cost of debt and the yield on a comparable utility bond index. This difference can easily increase if there is no index of utility bonds available to determine the market cost of debt or the debt premium needed. In this case it becomes imperative that the regulator looks to the reasonableness of the estimates obtained and ideally compares the

results to either (i) the embedded cost of debt or (ii) the cost at which the regulated entity currently can raise debt (for example, using information from investment bankers).

We raise this issue because there is relatively little information available in the public domain about Australian bonds' maturities or yields. While we were able to approximate the embedded cost of debt for a number of pipelines in North America and have readily available utility bond indices by bond rating, we found only two publicly listed bonds for Envestra (using Bloomberg and Thompson Financial) and none for other Australian pipelines. Thus, there is very limited information available to determine the current or historical yield on utility bonds. As a result we recommend that regulatory entities in Australia (i) rely on embedded cost of debt, which is readily available and / or (ii) use a combination of the methods discussed above to assess the cost of debt.

### B. Impact of Economic, Industry and Company Factors

*Economy-wide Factors*

In times of sharply declining or increasing debt cost, the reliance on market cost of debt necessarily leads to the regulated utility either issuing shorter maturities or a divergence between the actual incurred cost of debt and the allowed cost of debt. This may bias capital expenditure decisions. Further, in a market where data on market cost of debt is not readily available and where many entities issue debt overseas, it becomes necessary to derive an estimate relying on the market cost of data from overseas to capture the debt capital market. At the same time, Australian issuers are but a small portion of overseas market and therefore adjustment for country, industry, and company factors are likely needed. There may also be a need for efficiency adjustments although plausibly most entities that remain in operation are efficient.

As the spread between rate-regulated entities and the government bond yields changes or the risk characteristics of the risks of bonds change, the reliability of the various methods discussed in Section II above is affected. The effects are illustrated in Table 6 below. We note that by change in risk, we are referencing the change in the premia debt investors require and that Table 6 considers only the relative reliability, i.e., the methods discussed are not mutually exclusive.

| | Spread: Utility and Government Bond Yield | | | |
|---|---|---|---|---|
| Change in Risk | | High | Average | Low |
| | High | Other | Forecast Risk-Free + Premium | Other |
| | Average | Forecast Risk-Free + Premium | Risk-Free + Premium, Embedded Cost | Forecast Risk-Free + Premium |
| | Low | Embedded, Other | Risk-Free + Premium, Embedded | Other |

**Table 6: Reliability of the Cost of Debt Estimation Methods as Spreads or Risk Changes**

In a smaller debt market such as Australia, it may make sense to solicit input from investment banks or recent debt issuances to determine the cost of debt. This methodology is referenced as "Other" in Table 6.

This will become especially useful if there are few comparable companies or if the target entity faces unique circumstances that may cause the cost of debt to be either higher or lower than that of available comparable companies.

*Industry Factors*

In addition to the economy-wide factors considered above, industry factors affect the cost of debt and the methodology chosen to best estimate a forward looking cost of debt. Industry-specific factors that affect the cost of debt and the estimation thereof include regulatory initiatives, supply and demand conditions for the industry, and gas prices. If, for example, regulatory initiatives are such that cash flow variability increases, then the cost of debt increases although the cost of debt in other industries would be unaffected. Similarly, the supply / demand conditions may be such that the industry needs to engage in large capital expenditures and thus is adding CapEx leverage, which increases the cost of debt. In those circumstances, the reliance on a generic model such as the risk-free rate plus a debt premium will not reflect the industry specific risks. Similarly, because it is unlikely that a sufficiently large sample of comparable companies can be found (especially in a smaller debt market), the average of the observed yield will also be biased. In these circumstances, the entity's own embedded cost of debt or other methods such as the yield on recently issued debt or investment banks' forecasts may prove useful.

*Company-Specific Factors*

We stress that there is an interaction of the cost of debt with the cost of equity through gearing as recognized in Rule 87. Similarly, each entity will have unique risk characteristics in the form of, for example, cash flow variability, demand / supply conditions, the need for capital expenditures, exposure to commodity markets, etc. Therefore, a forward-looking cost of debt estimate cannot be estimated without an assessment of the risks inherent in the rate-regulated entity's operations. The higher the risk of an entity, the higher the entity's cost of debt is.

In summary, the cost of debt can be viewed either as an operating expense-like item and the embedded cost of debt of the entity itself becomes an obvious candidate for the cost of debt. This obviously would need to be subject to a prudence review. Alternatively, the cost of debt can be viewed as a component of the cost of capital, which is an opportunity cost. In the latter case, the question becomes how best to estimate the expected cost of debt assuming efficient financing. There is no one way to do so, and we therefore have described the pros and cons of some methods that have been used in the past. Each of these methods, models, market data and other evidence has strengths and weaknesses, so for the *allowed rate of return objective* ~~to~~ be achieved regard must be had to relevant estimation methods, financial models, market data and other evidence."[60]

[60] Rule 87, (5) part a.

## APPENDIX: SPECIFICS ABOUT THE NUMERICAL ANALYSES

### A. DETERMINING DEBT MATURITIES

In order to determine the distribution of embedded debt maturities, we examined the long-term debt issued by a sample of publicly traded regulated utilities across Australia, Europe, and North America.

For Australia, we created our company universe from three sources: the members of the Australian Pipeline Industry Association (APIA), utilities currently undergoing regulatory filings with the AER, and utilities used by the AER and the ERA.[61] We then restricted the sample of companies to only publicly-traded electricity and natural gas generation, distribution, and transmission companies.

For North America, we included all regulated pipelines that satisfy a series of criteria. To be included, an entity must be a publicly traded entity owning substantial pipeline assets that are subject to regulation. We included only companies with an investment grade bond rating (BBB- or higher from Standard & Poor's) and 2011 revenues in excess of $300 million. Companies with large merger or acquisition activity or dividend cuts were eliminated.

Europe, like Australia, has a limited number of publicly traded pipelines, so we included regulated entities that were included in a recent filing for the NMa. Schedule 1 below list the companies we considered.

[61] See, for example, Economic Regulation Authority, *Final Decision on Proposed Revisions to the Access Arrangement for the Dampier to Bunbury Natural Gas Pipeline*, dated October 31, 2011, p. 128 and Deloitte Touche Tohmatsu Limited, *Attachment B – Refinancing, Debt Markets and Liquidity*, prepared for the AER on November 12, 2008, p. 27.

| Company Name | Region | Business Segments |
|---|---|---|
| APA Group | Australia | Natural Gas Pipeline |
| Envestra Ltd | Australia | Natural Gas Distribution and Transmission |
| ERM Power Ltd | Australia | Electric Generation |
| SP AusNet | Australia | Electric Distribution and Transmission, Natural Gas Distribution |
| Boardwalk Pipeline Partners LP | North America | Natural Gas Pipeline |
| ONEOK Partners LP | North America | Natural Gas Pipeline |
| Spectra Energy Corp | North America | Natural Gas Pipeline |
| Spectra Energy Partners LP | North America | Natural Gas Pipeline |
| TC Pipelines LP | North America | Natural Gas Pipeline |
| Williams Partners LP | North America | Natural Gas Pipeline |
| Enbridge Inc. | North America | Natural Gas Pipeline |
| TransCanada Corp | North America | Natural Gas Pipeline |
| Enagas SA | Europe | Natural Gas Distribution, Storage, and Transmission |
| Fluxys Belgium | Europe | Natural Gas Pipeline |
| National Grid PLC | Europe | Electric and Natural Gas Distribution and Transmission |
| REN - Redes Energeticas Nacionais | Europe | Electric Generation, Electric and Natural Gas Distribution and Transmission |
| Snam SpA | Europe | Natural Gas Distribution, Storage, and Transmission |

**Schedule 1: Regulated Utilities in Australia, Europe, and North America**

We collected information on long-term debt held by the sample companies from their most recent annual reports and determined the debt maturities using information for all long-term debt mentioned in the annual reports.

### B. Determining the Embedded Cost of Debt

The embedded cost of debt of a company is calculated as follows. For each debt issuance, we obtain information about the coupon, the principal, the maturity, and any discount or premium obtained at issuance. The embedded cost of debt is then calculated as the weighted

average interest expense adjusted for the amortization of discounts or premia. The following example illustrates the calculation.

*Example: Calculating the Embedded Cost of Debt*

Assume a regulated entity has issued three bond series with the characteristics listed in Schedule 2 below.

| Series | Date of Issue | Maturity | Coupon | Principal | Price |
|---|---|---|---|---|---|
| A | 1/1/2005 | 12/31/2014 | 6.00% | $1,000,000 | 102% |
| B | 1/1/2010 | 12/31/2024 | 5.00% | $800,000 | 98% |
| C | 7/1/2012 | 6/30/2031 | 4.50% | $1,200,000 | 100% |

**Schedule 2: Assumptions Used in Example**

To determine the embedded cost of debt, it is necessary to calculate (i) the premium (Series A) or discount (Series B) obtained, (ii) the annual amortization of the premium or discount, and the annual interest expense. Having determined these figures the embedded cost of debt is the total annual debt cost (coupon payment plus amortization) divided by the dollar amount obtained from the issuance. Finally, the embedded cost of debt is the weighted average cost of debt. This is calculated in Schedule 3 below.

| Series | Premium (Discount) | Annual Amortization | Annual Coupon Payment | Annual Cost of Debt | Embedded Cost of Debt |
|---|---|---|---|---|---|
| A | $20,000 | $5.48 | $60,005 | $60,011 | 5.88% |
| B | ($16,000) | ($2.92) | $39,997 | $39,994 | 5.10% |
| C | $0 | $0.00 | $54,000 | $54,000 | 4.50% |
| Weighted Average Cost of Debt | | | | | **5.12%** |

**Schedule 3: Calculating the Embedded Cost of Debt**

# Estimating gamma

## *Report for DBP*

4 March 2012

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## Contents

# 1. Executive summary

## Background and context

1. SFG Consulting (**SFG**) has been engaged by DBNGP (WA) Transmission Pty Ltd (**DBP**) to provide an opinion in relation to the value of gamma that should be used in the context of the regulation of DBP's regulated pipeline assets. We have been asked to have regard to the Consultation Paper issued by the Economic Regulation Authority of Western Australia (**ERA**) and to address the questions posed in that paper insofar as they relate to gamma.

## Summary of conclusions

2. Our primary conclusions are:

   a) Gamma is estimated by regulators as the product of two components, $\gamma = F \times \theta$, where $F$ is the distribution rate (the proportion of created imputation credits that are distributed to shareholders) and $\theta$ is the value that the relevant shareholder places on a dollar of distributed credits. The Australian Competition Tribunal (the **Tribunal**) has recently held that the best available estimates are $\gamma = F \times \theta = 0.7 \times 0.35 = 0.25$;

   b) The distribution rate, $F$, can be estimated with reference to observed market data or set according to a theoretical assumption that is inconsistent with the observed market data. We agree with the Tribunal that the empirical estimate should be used and that the appropriate estimate is 70%;

   c) In relation to the estimation of theta:

      i) We agree with the Tribunal that redemption rate tax statistics do not provide an estimate of theta and should not be used for that purpose;

      ii) We agree with the Tribunal that the best available dividend drop-off estimate of theta is 0.35 – from the state-of-the-art SFG study. This estimate of theta is conditional on cash dividends being valued at 85 cents in the dollar; and

      iii) The best available estimate of theta using the simultaneous security price method is the estimate of zero from Cannavan, Finn and Gray (2004). This estimate of theta is conditional on cash dividends being valued at full face value.

      These results produce a range of estimates for theta of $0 - 0.25$, and a corresponding range for the value of cash dividends of 100% − 80% of face value.

   d) The use of the best available estimates of $F$ and theta based on relevant observable market data (rather than theoretically assumed values or dated and methodologically inferior estimates) is consistent with the National Gas Objective (**NGO**) and the Revenue and Pricing Principles (**RPP**). The NGO is to "promote efficient investment in, and efficient operation and use of, natural gas services for the long term interests of consumers" [1] and the RPP provide that "A service provider should be provided with a reasonable opportunity to recover at least the efficient costs the service provider incurs" and "A reference tariff should

[1] National Gas Law s. 23.

allow for a return commensurate with the regulatory and commercial risks involved."[2] In our view, the NGO and RPP are best met by using the best available estimates of *F* and theta that are based on relevant observable market data. In our view, inferior estimates (or theoretical assumptions) cannot possibly better promote efficient investment and operation, better determine efficient costs, or better estimate the return commensurate with the regulatory and commercial risks involved, in which case the best possible market-based estimates should be used;

e) The dominant market practice is to make no adjustment in relation to imputation credits. However, the regulatory approach is to make two adjustments. First, the estimate of market risk premium (**MRP**) is "grossed-up" to incorporate the assumed effect of imputation credits. Then the with-imputation estimate of the required return on equity is adjusted downwards to determine the ex-imputation required return on equity. Handley (2010) has advised the Australian Energy Regulator (**AER**) that the first step involves a "gross-up" and then the second step should have "the effect of reversing that gross-up."[3] In our view, a minimum requirement under the Rules if for the regulator to:

   i) Implement the market practice approach, specifying its estimate of the MRP unadjusted for imputation credits; and

   ii) Demonstrate that the two steps of the regulatory approach have the effect of reversing each other in accordance with Handley (2010); and

f) As a general WACC estimation principle, for a given parameter, the same value must be adopted consistently throughout a single WACC estimation process. This principle is a requirement under NGR 87(4)(b).

[2] National Gas Law s. 24(2).
[3] Handley (2010), p. 9.

## 2. The role of gamma in regulatory determinations

### Background and Tribunal request

3. In a recent decision in relation to the gamma parameter, the Australian Competition Tribunal (**the Tribunal**) noted that:

> The Tribunal has found some deficiencies in its understanding of the foundations of the task facing it, and the AER, in determining the appropriate value of gamma[4]

and that:

> The Tribunal would be assisted in its consideration of the issues before it if the AER were to provide relevant extrinsic material explaining:
>
> (a) the rationale for including the gamma component in the formula for calculating the estimated cost of corporate income tax; and
>
> (b) how it relates to the rest of the building blocks, especially the rate of return.[5]

4. Since it is not clear that the Tribunal has yet been provided with a satisfactory explanation of the precise role of gamma in regulatory determinations, we set out such an explanation in the remainder of this section.

### The effect of dividend imputation tax credits and the role of gamma

5. In a dividend imputation tax system, such as has operated in Australia since 1987, dividends paid by Australian companies out of profits that have been taxed in Australia have tax credits attached to them. For example, a company that earns a profit of $100 and pays $30 of Australian corporate tax and then distributes the remaining $70 as a dividend to shareholders can attach $30 of dividend imputation tax credits to the $70 dividend. Those tax credits can be used by resident investors to reduce their personal tax obligations by $30. These tax credits are of no value to non-resident investors under the Australian dividend imputation legislation.

6. In the Australian regulatory environment, the regulator provides an estimate of a parameter known as "gamma" or "$\gamma$." This parameter is an estimate of the equilibrium value of a dollar of corporate tax paid by the company. To see the role of the gamma parameter, first consider the following example that involves a single period. Suppose that over the period the company is expected to earn a profit of $100, pay $30 corporate tax and then pay out a $70 dividend to shareholders. Also suppose that the equilibrium required return on equity (on the standard after-company-tax basis) over the single period is 10%. In the absence of dividend imputation the equilibrium value of equity would simply be the present value of the $70 dividend that is expected to be received at the end of the period[6]:

$$E = \frac{70}{1.10} = 63.64. \quad (1)$$

[4] Gamma Case, ACompT 9 [2010], Paragraph 149.
[5] Gamma Case, ACompT 9 [2010], Paragraph 150.
[6] The present value of an expected cash flow to be received at the end of the period is given by PV=Cash Flow/(1+$r$) where $r$ is the required return per period.

7. However, if the equilibrium value of the gamma parameter is 0.25, for example, the equilibrium value of equity would be the present value of the dividend plus the value of the imputation credit, both of which are to be received at the end of the period:

$$E = \frac{70 + 0.25 \times 30}{1.10} = 70.45. \quad (2)$$

8. That is, gamma represents the proportion of corporate tax paid that flows through into the equilibrium stock price and the equilibrium value of the firm's equity.

9. The above example can be easily extended to the multi-period case where the company is expected to earn a $100 profit, pay $30 corporate tax, and distribute a $70 dividend every year in perpetuity. In that case, the equilibrium value of equity in the absence of imputation would be[7]:

$$E = \frac{70}{0.10} = 700 \quad (3)$$

and the equilibrium value of equity with imputation would be:

$$E = \frac{70 + 0.25 \times 30}{0.10} = 775. \quad (4)$$

10. That is, in these examples with gamma set to 0.25 the value of equity (and the stock price) is 10.7% higher due to imputation.

11. Also note that every year, the shareholder receives a total payment of 70 + 0.25×30 = 77.5. Of this, the company itself provides the dividend which represents 90.3% (70/77.5) of the total and government provides the imputation tax credit which represents 9.7% (7.5/77.5) of the total.

12. Algebraically, for every dollar of pre-tax profit, the firm can distribute a dividend of (1-$T$) where $T$ is the corporate tax rate and the government provides imputation tax credits that have a value of $\gamma T$. In the example above, for every dollar of pre-tax profit, the firm distributes a dividend of (1-0.3) = 0.70 and the imputation credits have a value to the relevant shareholder of 0.25 × 0.3 = 0.075. Thus, the proportion of the total value provided by the firm is:

$$\left[\frac{1-T}{1-T(1-\gamma)}\right] \quad (5)$$

which in this case is:

$$\left[\frac{1-0.3}{1-0.3(1-0.25)}\right] = 90.3\%, \quad (6)$$

[7] The present value of an expected cash flow to be received at the end of every period in perpetuity is given by PV=Cash Flow/$r$.

as noted above. Also note that this ties in with the stock price and value of equity being 10.7% higher under imputation (for a gamma of 0.25) because 1/0.903 = 1+0.107.

13. Note that the equilibrium value of equity can also be derived by discounting just the cash dividend at a discount rate that removes the effect of imputation credits. The required return, net of the effect of imputation credits, is:

$$r_e^* = r_e\left[\frac{1-T}{1-T(1-\gamma)}\right] \tag{7}$$

where $r_e^*$ is the imputation adjusted required return on equity.

14. In this case, we have:

$$r_e^* = r_e\left[\frac{1-T}{1-T(1-\gamma)}\right] = 10\%\left[\frac{1-0.3}{1-0.3(1-0.25)}\right] = 9.03\%. \tag{8}$$

15. Note that this gives the same equilibrium value of equity as in Equation (4) above:

$$E = \frac{70}{0.903} = 775. \tag{9}$$

16. In summary, to the extent that imputation credits are valued by the relevant shareholder, the share price and value of equity will be higher to reflect the value (to the relevant shareholder) of those imputation credits. There are two equivalent ways of determining value – the estimated effect of imputation credits can be incorporated by either:

    a) Increasing the cash flows to reflect the assumed effect of imputation credits, and applying a discount rate that includes the return from imputation credits, as in Equation (4), in which case for every $\$X$ of pre-tax earnings available to the equity holders we have:

$$E = X_e\frac{(1-T)+\gamma T}{r_e} = 100\frac{0.7+0.25\times 0.3}{0.10} = 775\text{; or} \tag{10}$$

    b) Omitting the assumed effect of imputation credits from the cash flows, and applying a discount rate that removes the return from imputation credits, as in Equation (9), in which case for every $\$X$ of pre-tax earnings available to the equity holders we have:

$$E = X_e\frac{(1-T)}{r_e^*} = 100\frac{0.7}{0.903} = 775. \tag{11}$$

## How dividend imputation affects allowed revenues

### The regulatory framework

17. In the regulatory setting, the regulator begins with an estimate of the present value of equity – as an assumed proportion (such as 40%) of the regulatory asset base (**RAB**). The regulator then estimates the required return net of the effect of imputation credits, $r_e^*$, to produce an estimate of the after-tax return that is required for shareholders. This after-tax required return is then "grossed up" for corporate tax by dividing by (1-*T*). That is:[8]

$$X_e = \frac{E \times r_e^*}{(1-T)}. \tag{12}$$

18. For example, suppose the RAB is \$1,937.50 and 40% is assumed to be financed by equity. This implies that the equity capital base is \$775 (40% of \$1,937.50). The regulator then estimates $r_e^*$ as explained below. Suppose this estimate is 9.03%, as in the example above. In this case, we would have:

$$X_e = \frac{E \times r_e^*}{(1-T)} = \frac{775 \times 9.03\%}{(1-0.3)} = 100,$$

exactly consistent with Equation (11) above.

19. In this case, the regulator would allow the firm to charge prices such that pre-tax revenues (in relation to equity) are \$100. The firm then pays \$30 corporate tax allowing it to pay a \$70 dividend to shareholders. The shareholders also receive \$30 of imputation credits which the relevant shareholder values at 0.25×30=\$7.75. Thus, the relevant shareholder receives the cash dividend plus imputation credit, worth a total of \$77.5. This is precisely enough to provide them with the total return of 10% that they require on their \$775 of equity capital.

20. In summary, to compute the pre-tax revenue that is required to provide an appropriate return to equity holders, the regulator requires an estimate of $r_e^*$.

### Regulatory estimation of $r_e^*$

21. Handley (2010, pp. 3-10) explains that the first step in the regulatory approach to estimating $r_e^*$ is to estimate the required return on equity, including the assumed effect of imputation credits. Current regulatory practice is to do this using the Sharpe-Lintner CAPM:

$$r_e = r_f + \beta_e \times MRP$$

where the estimate of $MRP$ includes the impact of imputation.

22. That is:

[8] Note that Equation (12) is identical to Equation (11), just rearranged to solve for the required pre-tax revenue rather than the equilibrium value of equity.

$$r_e = r_f + \beta_e \times \left(MRP_{dc} + Imputation\ Adjustment\right)$$

where $MRP_{dc}$ is an estimate of MRP that includes returns from dividends and capital gains, but excludes any returns from imputation credits. Historical stock return data, which is the primary means of estimating MRP, produces a direct estimate of $MRP_{dc}$. Under the regulatory approach, that estimate is increased by adding an Imputation Adjustment to reflect the assumed return from imputation credits.

23. In summary, the first step of the regulatory approach is:

    a) Estimate $MRP_{dc}$ primarily using historical stock return data;

    b) Apply an Imputation Adjustment to that estimate;

    c) Insert the adjusted estimate of MRP into the CAPM formula to obtain an estimate of $r_e$, which is the required return *including* the effect of imputation credits.

24. Of course, what is ultimately required is an estimate of $r_e^*$ – the required return on equity in the absence of imputation credits – for the purpose of determining the required pre-tax revenue as in Equation (12) above. Hence, the regulatory approach involves a second step to remove the effect of imputation credits. This is done by applying the adjustment factor to the estimate of $r_e$ from Step 1, as in Equation (7) above:

$$r_e^* = r_e\left[\frac{1-T}{1-T(1-\gamma)}\right]$$

where $T$ is the relevant corporate tax rate and $\gamma$ is the regulatory estimate of the "gamma" parameter.

25. Handley (2010) notes that:

> Intuitively, $r_e$ represents the cost of equity grossed-up to include the value of imputation credits, but multiplying by $\left[\frac{1-T}{1-T(1-\gamma)}\right]$ then has the effect of reversing that gross-up.[9]

### Summary

26. In summary, the regulator:

    a) Compiles an estimate of the gamma parameter; then

[9] Handley (2010), p. 9.

b) Compiles an estimate of $r_e^*$ based on that estimate of gamma, as set out above in Equation (7); then

c) Computes the revenue that is required to provide a fair return to equity holders based on that estimate of $r_e^*$ as set above in Equation (12).

27. A higher estimate of gamma implies that a greater proportion of the required return on equity is provided in the form of imputation credits, which reduces the portion of the return to equity that must be paid by the firm (e.g., dividends). Consequently a higher gamma means a lower revenue requirement, other things equal.

### Regulatory estimation of gamma

28. Gamma is estimated by regulators as the product of two components:

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

where $F$ is the distribution rate (the proportion of created imputation credits that are distributed to shareholders) and $\theta$ is the value that the relevant shareholder places on a dollar of distributed credits. Imputation credits are created whenever a firm pays a dollar of Australian corporate tax. But to distribute all of the imputation credits it creates, a firm would have to distribute 100% of its (Australian) profits as dividends. The average firm does not do this, because it retains some profits to finance capital expenditure.

29. If, for example, firms distribute 70% of the imputation credits they create and if those credits are each valued at 35% of face value, then gamma would be:

$$\gamma = F \times \theta = 0.7 \times 0.35 = 0.25.$$

30. This would mean that 25% of the corporate tax that the firm pays is assumed to flow back to the relevant shareholder, so the grossing up for corporate tax would be reduced accordingly.

31. The techniques that can be used to estimate each of the two components of the gamma parameter are set out in the subsequent sections of this report.

## 3. Estimating the distribution rate, *F*

### Definition of the distribution rate

32. The distribution rate (or franking credit payout ratio) is the ratio of:

    a) the total amount of franking credits that are distributed (or paid out) to shareholders during a particular period, to

    b) the amount of franking credits that are created during that same period.

33. For example, if the average firm created $100 of franking credits in a year and distributed $70 of those to shareholders in that year, the distribution rate for that year would be 70%.

### Approaches for estimating the distribution rate

34. Two approaches have been proposed for determining the distribution rate:

    a) **Empirical distribution rate** – the observed empirical estimate of the actual distribution rate of real firms across the Australian economy; and

    b) **Assumed distribution rate** – an assumed value that is based on the proposition that the observed empirical evidence is irrelevant.

#### Empirical distribution rate is 70%

35. It appears to be common ground that the observed empirical distribution rate is approximately 70%. This figure is based on estimates from two studies, Hathaway and Officer (2004) who report an estimate of 0.71 and Hathaway (2010) who reports an estimate of 0.69. Both of these studies use data provided by the Australian Taxation Office to measure the ratio of:

    a) the total amount of franking credits that are distributed (or paid out) to shareholders during a particular period, to

    b) the amount of franking credits that are created during that same period.

36. That is, these studies measure the actual distribution rate (exactly as defined) each year and report an average value of close to 0.7. This average distribution rate has been quite stable over the period since imputation was introduced into Australia. For example, the average figure over the most recent ten-year period reported by Hathaway (2010) is immaterially different from the earlier figure reported by Hathaway and Officer (2004).

37. Consequently, it is generally accepted that the actual practice of Australian firms is to distribute to shareholders approximately 70% of the franking credits that are created each year.

38. Of course, the reason why the actual distribution rate is materially less than 100% is that companies do not routinely distribute 100% of their after-tax profits as dividends. For example, a company that generates a pre-tax profit of $100 and then pays $30 of Australian corporate tax creates $30 of imputation credits. To distribute the entire $30 of credits, the company would have to pay a dividend of its full after-tax profit of $70. If the company retains some of that $70 for reinvestment it will be

unable to distribute the entire \$30 of credits that were created. For example, if the company retains \$20 and pays a dividend of \$50, it will distribute \$21.4 (=5/7 × 30) and retain \$8.6 (=2/7 × 30) of the credits. In this case the 5/7 of the credits are distributed in which case the distribution rate is 71%.

39. The \$8.6 of credits that are not distributed are then retained in the company's Franking Account Balance (**FAB**). These stored credits can then be distributed in subsequent years, but only if the dividend is greater than 100% of after-tax profits. Suppose, for example, that in the following year the company again earned a \$100 pre-tax profit and paid \$30 of corporate tax. Even if it paid the entire \$70 of after-tax profit out as a dividend, that would only be enough to distribute the \$30 of credits created that year. The \$8.6 of credits from the previous year would remain stored in the FAB. Those stored credits could only be distributed if the company paid a dividend of more than 100% of the after-tax profit.

40. Of course, the more likely scenario is that the company again distributes \$50 and reinvests \$20 of its after-tax profit. This would cause the FAB to grow by a further \$8.6. So long as the company distributes less than 100% of its after-tax profits, the FAB will continue to grow and the credits stored in it cannot be distributed.

### Basis for assumed distribution rate of 100%

41. Over 2008-2009, the Australian Energy Regulator (**AER**) undertook a *Review of WACC Parameter Estimates*, culminating in a *Statement of Regulatory Intent* (**SoRI**) in May 2009. In its SoRI, the AER recognised that the empirical distribution rate was approximately 70%, but adopted an assumed distribution rate of 100% based on the recommendation of its consultant, Associate Professor Handley. That is, the AER recognised that, on average, the actual distribution rate of franking credits is approximately 70% but then estimated gamma *as though* the distribution rate were 100%:

> …the adoption of a payout ratio of 1.0 does not imply an expectation that all credits will be paid out in each period. Rather as Handley advised, the full distribution of free cash flows is the standard assumption for valuation purposes, therefore for consistency, a 100 per cent payout of imputation credits is appropriate.[10]

42. In the regulatory setting, the 100% distribution rate is acknowledged to be an "assumption"[11] and that the value of 100% is "an assumed distribution rate."[12] Moreover, the AER notes that any value above 0.7 would have to be based on "theoretical grounds"[13] whereas "the empirical evidence currently before the AER supports a value of the payout ratio of 70%."[14]

43. The basis for the assumed 100% distribution rate is a report from the AER's consultant, Handley (2010). In particular, Handley concludes that retained credits should be assumed to be just as valuable to investors as those that have been distributed.[15] The basis for this conclusion is that those credits that have been retained in one year will be distributed to investors soon after. In this case, the

[10] AER (2009), SoRI, p. 410.
[11] DBP Draft Decision, Paragraph 664.
[12] DBP Draft Decision, Paragraph 664.
[13] Envestra SA Draft Decision, p.109.
[14] Envestra SA Draft Decision, p.109.
[15] Handley (2010, pp. 37-38) recognises that retained franking credits do exist in reality and that they are likely to be valued less than distributed credits, but then concludes that we should ignore this valuation differential when estimating gamma. That is, he concludes that gamma should be estimated either by assuming away the existence of retained credits or by recognizing that they exist and then assuming that they are just as valuable as distributed credits.

time value loss would be negligible and retained credits would be approximately as valuable to investors as those that have already been distributed.

44. Handley (2010, p. 37) suggests that "investment bankers and or potential corporate raiders" will come up with some means to unlock the value of these retained credits. The AER (SA Final Decision, p. 151) has conjectured that this could be done via three means:

    a) Off-market buy-backs;

    b) Dividend reinvestment plans; and

    c) Special dividends.

45. But there are several problems with this view:

    a) All three of these mechanisms are *already* included in the 70% empirical estimate of the observed distribution rate. The 70% figure is the ratio of (i) the total amount of franking credits distributed via any means including those set out above, to (ii) the total amount of franking credits created;

    b) In any event, the mechanisms set out above are small in the overall scheme of things. For example, in an average year less than ten companies throughout the entire Australian market conduct an off-market buy-back;

    c) The amount of "special" distributions for the average firm would have to be enormous to keep the FAB close to zero. For the average Australian firm distributing $70 out of every $100 of franking credits created in a given year, an *additional* $60 in special distributions would have to be made every second year just to keep the franking account balance from building up. This is an extraordinarily large amount of special distributions and there is no evidence that *any* firm has ever distributed anything like this amount of special dividends, much less that the *average* firm does (or ever could do) this; and

    d) The only available evidence on this issue suggests that firms are *not* able to routinely distribute all of their franking credits, but rather that franking account balances are growing to huge amounts over time as more and more credits are retained within the firm. Handley (2010, p. 36) notes that at the end of 2007, no less than $150 billion of unused retained franking credits were locked inside firms and McKenzie and Partington (2010, p. 27) note that "the tendency has been for the total of franking account balances to rise through time."

46. For even a dollar of retained credits to be distributed, 100% of the franking credits created in a given year would have to be distributed in that year. And this would then have to happen for the *average* firm *every* year. The fact that this has clearly *not* happened is evidence that retained franking credits are not routinely distributed *at all*.

47. It appears to be logically impossible for retained franking credits to be routinely distributed soon after their retention. In our view, there is no basis for the conclusion that retained credits are just as valuable as those that have already been distributed.

### Empirical distribution rate should be used

48. An estimate of the distribution rate of franking credits is available, it appears to be uncontroversial, and it should be used. If we know that the distribution rate is 70%, we should use a distribution rate of 70%. We should not assume that the distribution rate is, or should be, something different from what we can observe it to be. This is particularly the case given that the 70% estimate is the best estimate that is available and it has been arrived at on a reasonable basis.

## Regulatory developments

### Tribunal decision

49. Recall that the distribution rate ($F$) is the ratio of (a) the total amount of franking credits distributed to shareholders in a given year, to (b) the total amount of franking credits created in a given year. In a recent merits review before the Australian Competition Tribunal (**the Tribunal**), the AER abandoned its contention that $F$ should be set to 100% even before the hearing. In its submissions to the Tribunal prior to the hearing, the AER acknowledged that an estimate above 0.7 was unsupportable and therefore that the distribution rate should be set to 0.7. In summarising the AER's position on this issue, the Tribunal stated that:

> The AER accepts that on the material presently before the Tribunal, there is no empirical data that is capable of supporting an estimated distribution ratio higher than 0.7. The AER therefore accepts that it is open to the Tribunal to adopt a substitute distribution ratio of 0.7.[16]

50. The Tribunal then concluded and ordered that:

> In light of these submissions and the material before the Tribunal, the Tribunal concludes that the distribution ratio is 0.7 for the calculation of gamma.[17]

### AER determinations

51. In all of its determinations since the tribunal decision, the AER has adopted a distribution rate of 70%.

### ERA determinations

52. In its DBP Final Decision on 31 October 2011, the ERA concluded that:

> The Authority considers that an estimate of the payout ratio of 70 per cent is appropriate based on the empirical evidence currently available. This estimate is consistent with the Tribunal's decision with regard to the value of the payout ratio. The Authority is of the view that existing evidence still supports the use of a range of 70 per cent and 100 per cent for payout ratio. However, for regulatory certainty, the Authority considers that there is no new evidence at this time that would cause the Authority to depart from the findings of the Tribunal in respect of gamma.[18]

[16] Australian Competition Tribunal [2010] ACompT 9, Paragraph 2.
[17] Australian Competition Tribunal [2010] ACompT 9, Paragraph 4.
[18] DBP Final Decision, October 2011, Paragraph 533.

53. For the reasons set out above, our view is that assuming that the average firm could possibly consistently and immediately distribute 100% of the imputation credits that it creates is illogical and demonstrably inconsistent with all known evidence. It is also inconsistent with the fact that the AER has submitted that there is no basis for adopting a value above 70%. For these reasons, our view is that the ERA has no basis for concluding that "existing evidence still supports the use of a range of 70 per cent and 100 per cent for payout ratio." However, this is currently a moot point as the ERA has followed the Tribunal and the AER in adopting a point estimate of 70%.

## Miscellaneous issues

### Consequential effect of adopting a distribution rate above the empirical estimate of 70%

54. McKenzie and Partington (2010) are quite clear to the extent that retained credits are assumed to have value (i.e., to the extent that a number above 70% is used) the regulator must use "a higher cost base [RAB], or a higher cost of capital, for investments financed from retained earnings."[19]

55. That is, if retained credits do have material value, capital expenditure financed from retained earnings prevents (or at least delays) the distribution of those credits and consequently retained earnings becomes a more expensive source of finance than new equity. McKenzie and Partington suggest that regulators should account for this (to the extent that they decide that retained credits do have value) by adjusting the RAB or using two different costs of equity.

56. Consequently, it would be wrong for a regulator to rely on any indication from McKenzie and Partington that retained credits might have some positive value, but then to not make any compensating adjustment to the RAB, or to apply two different costs of equity.

### Studies on the value of retained earnings

57. McKenzie and Partington (2010) state that:

> There is empirical evidence to support the view that retained credits have a positive value. Harris, Hubbard and Kemsley (2001) find that in Australia retained earnings are valued at more than their face value, consistent with additional value arising from undistributed franking credits.[20]

58. Harris, Hubbard and Kemsley (2001) is one of a group of papers written by these co-authors using a technique that they have developed to estimate whether markets value retained earnings more or less than new equity. This empirical methodology is based on a modification to the Residual Income model of Ohlson (1995) that is developed in a series of papers beginning with Harris and Kemsley (1999) and including Collins and Kemsley (2000) and Harris, Hubbard and Kemsley (2001).

59. This empirical methodology has subsequently been discredited (correctly in our view) in a series of papers, including Hanlon, Myers, and Shevlin (2003) and Dhaliwal, Erickson, Frank and Banyi (2003), both of which are published in the top-ranked *Journal of Accounting and Economics*.

60. Hanlon et. al. conclude that "the model, tests, and results in Harris and Kemsley are non-diagnostic regarding dividend tax capitalization." This means that the results say nothing at all about the extent to which dividend taxes or tax credits might be capitalised into stock prices. Specifically, whether or

[19] McKenzie and Partington (2010), p. 27.
[20] McKenzie and Partington (2010), p. 25.

not dividend taxes or tax credits are capitalised into stock prices, and whether or not retained tax credits are materially valued by investors, the results obtained by the authors would be the same.

61. They explain the reason for this as follows:

> …the HK empirical specification examines the relative weights on book value and net income as a function of the ratio of retained earnings to book value (REBV). We analytically examine the use of REBV in the Ohlson (1995) model and find it has no role in the determination of firm value, even in a world where shareholder-level taxes are fully capitalized.[21]

62. That is, even if shareholder level dividend taxes were fully capitalized into prices, the key variable that is the centre of the proposed methodology is irrelevant to firm value – the same results will be found whether or not tax credits are materially valued by investors. This means that the results that are cited in McKenzie and Partington are meaningless.

63. Hanlon et. al. also note that Dhaliwal et. al. (2003) reach similar conclusions – that the Harris et. al. test is "non-diagnostic with respect to dividend tax capitalization" and that the results reported in the Harris et. al. studies "are not robust to reasonable alternative design choices."[22]

[21] Hanlon, Myers, and Shevlin (2003, p. 121).
[22] Dhaliwahl et. al. (2003), p. 121.

## 4. Estimating the value of distributed tax credits, theta

### Approaches for estimating the value of distributed credits

64. The value of a distributed imputation tax credit, theta, is the value to the representative investor of a one dollar imputation tax credit that is distributed to them. Three methods have been proposed to estimate theta:

    a) Aggregate tax statistics redemption rates;

    b) Dividend drop-off analysis; and

    c) Simultaneous price studies.

### Redemption rates

#### Method

65. The redemption rate approach is to estimate the ratio of (a) the total amount of franking credits (across the entire economy) redeemed in a given year, to (b) the total amount of franking credits (across the entire economy) that were created in that year. That is, it is a measure of the extent to which franking credits are redeemed – in aggregate, across the entire economy.

66. The AER estimates the aggregate redemption rate to be 0.74, based on a paper by Handley and Maheswaran (2008). The AER obtains this estimate as the simple average of two estimates reported by Handley and Maheswaran:

    a) An estimate of 0.67 for the period 1990-2000; and

    b) An estimate of 0.81 for the period 2001-2004.[23]

67. The AER's interpretation and use of the results reported by Handley and Maheswaran (2008) is curious in a number of respects:

    a) The AER has specifically ruled out the use of pre-2000 data for all other methods of theta, yet relies on pre-2000 data for this estimation method only;

    b) Handley and Maheswaran (2008, Table 4) report an average redemption rate of 71% for their entire sample period of 1990-2004. If the AER has concluded that the entire HM sample period is relevant, then the HM estimate for the entire sample period should have been adopted. However, the AER, for some unspecified reason, has re-weighted the HM sub-period results to obtain its own re-weighted estimate of the redemption rate for the entire period; and

    c) In the post-2000 period, Handley and Maheswaran (2008) do not *measure* the actual amount of franking credits that are redeemed, but rather *assume* that all franking credits distributed to residents will be redeemed.[24] Consequently, the value for the post-2000 period is an assumption rather than an estimate.

[23] See Handley and Maheswaran (2008), Table 4, p. 90.
[24] See Handley and Maheswaran (2008), Table 4, p. 86.

68. The ERA has applied a different interpretation to the results reported by Handley and Maheswaran (2008). The ERA has considered only the results for the post-2000 sub-period and has concluded that the relevant empirical estimate of the aggregate redemption rate is 81%. Consequently, the ERA has been consistent in considering only estimates of theta that are based on post-2000 data. However, as stated above, Handley and Maheswaran (2008) make an assumption about the redemption of franking credits in the post-2000 period rather than constructing an empirical estimate.

### Upper bound or point estimate?

69. In his advice to the AER, Handley (2010) suggests that redemption rates provide an *upper bound* for theta. He does not suggest that this approach provides an *estimate* of theta. He specifically notes that the tax statistics estimate:

> may be interpreted as a reasonable upper bound estimate of the value of gamma[25]

where:

> "upper bound" is used here as a (theoretical) maximum value.[26]

70. Associate Professor Handley has been clear on this point in his advice to the AER throughout the entire regulatory process. In the AER's WACC Parameter Roundtable Handley noted that the tax statistic estimate is:

> Not our estimate of gamma, therefore we haven't said that's our estimate of gamma. In some ways, what you could do is you could certainly say that is perhaps an upper bound for what gamma is.[27]

71. Moreover, Handley and Maheswaran (2008) do not claim anywhere in their paper that the redemption rate approach provides an estimate of gamma (or theta) and the title of their paper (and the abstract) make it clear that the paper is about the efficacy of the imputation system (that is, the extent to which franking credits are *used*) and not about how franking credits might be *valued* or about the impact that imputation might have on the corporate cost of capital.

72. Suppose we take the AER/Handley estimate of 0.74. This implies that, on average, 74% of the franking credits that are distributed to shareholders end up being redeemed. But this tells us nothing about the *value* of those franking credits as reflected in the market price of the shares.

73. Suppose, for example, that 74% of all shareholders were residents who valued franking credits at 10 cents per dollar. What proportion of franking credits would we expect to see being redeemed? 74% of course – the resident investors may as well redeem their franking credits, as 10 cents is better than nothing. That is, observing how many franking credits get redeemed tells us nothing about their value to investors and certainly nothing about their effect on the corporate cost of capital.

74. Handley and Maheswaran (2008) and Handley's advice to the AER state that redemption rates do not provide "an estimate of gamma," but rather an "upper bound for gamma." The reason for this is

[25] Handley (2010), p. 15.
[26] Handley (2010), p. 15.
[27] AER Roundtable Transcript, p. 18.

that the redemption rates establish that 26% of shareholders do not value franking credits at all as they allow them to lapse without being redeemed.[28] The remaining 74% of shareholders presumably do value franking credits, but the tax statistics provide no indication of what this value might be. It could be 100 cents or 1 cent per dollar of face value. This has led Handley to conclude that the aggregate redemption rate sets an upper bound for gamma – which he says would apply if the 74% of investors who redeemed franking credits valued them fully.

75. In our view, the aggregate redemption rate cannot even be used as an upper bound. Even if we knew for certain that 74% of investors fully valued credits at their face value and the other 26% of investors did not value them at all, this would not lead to the conclusion that theta equals 0.74. In such a case, 0.74 would be the average value placed on a dollar of distributed credits. However, in the Sharpe-Lintner CAPM (and a broad range of CAPM-like asset pricing models), equilibrium outcomes are driven by a representative investor. Indeed this class of models are often referred to as representative investor models. The representative investor is not the average investor and cannot be computed by taking a simple average across investors. Rather, the representative investor is a complex amalgam of all investors with weights that depend on the relative wealth and the relative risk preferences of all investors. In none of the CAPM class of models is the simple average investor of any relevance to any value or any equilibrium outcome of any kind.

76. That is, even if we knew that for certain that 74% of investors fully valued credits at their face value and the other 26% of investors did not value them at all, this would not lead to the conclusion that theta equals 0.74. Consequently, aggregate redemption rates cannot even be interpreted as an upper bound for theta.

77. Whether or not the aggregate redemption rate can be used as an upper bound for theta is a moot point. This is because the aggregate redemption rate is materially higher than every empirical point estimate of theta. Consequently, even if the redemption rate is used as an upper bound, it would not have any effect because its only use would be to rule out empirical point estimates that are above it, but none are.

78. In summary, the aggregate redemption rate clearly cannot be used as a point estimate of theta. In our view, it should not even be used as an upper bound because to do so would be inconsistent with the use of any sort of representative investor model such as the CAPM. But even if it is used as an upper bound, it would have no effect because redemption rates are materially above all empirical estimates of theta. Consequently, aggregate redemption rates should have no impact on the estimation of theta.

### AER's use of redemption rates as a point estimate

79. In the SoRI and a number of subsequent decisions, the AER was clear about having rejected Handley's assessment of redemption rates providing an upper bound for theta, and that redemption rates should be treated as a *point estimate* of theta. However, treating aggregate redemption rates as a point estimate of theta rests on two strong assumptions, both of which should be rejected:

    a) The first assumption is that franking credits distributed to residents are valued at 100% of their face value. There are two problems with this assumption:

        i) There is no basis for it (and it is inconsistent with the advice of its consultant); and

[28] This point is about the proper *interpretation* of the Handley and Maheswaran (2008) estimates, so we take their reported estimates (as adopted by the AER) at face value here.

ii) It is unreasonable in light of the fact that the AER values cash dividends at 80 cents per dollar (as set out below). It is simply not possible that any investor would value a dollar of franking credits more than a dollar of cash.

b) The second assumption is that equilibrium stock prices are set with reference to a simple average across investors. However, under the CAPM (and all representative investor asset pricing models) equilibrium stock prices are set by a representative investor – a complex amalgam of all investors weighted by wealth and risk aversion. That is, the assumption that the equilibrium value of theta is determined by a simple average across investors is inconsistent with the CAPM, under which shares prices are *not* determined by a simple average across investors.

80. Moreover, using aggregate redemption rates to estimate theta is inconsistent with the way other WACC parameters are estimated. Other WACC parameters are estimated with reference to market data. For no other WACC parameter do we divide potential investors into classes, assume a value for each class, and then take an average of those assumed values. For theta, market-based empirical estimates are available and they should be used.

81. It is apparent in the SA Electricity Distribution Final Decision (AER, 2010) that the AER misunderstood the point that is being made about tax credits providing an estimate of the upper bound for theta. The AER says that (p. 161):

> the AER also noted that the 0.74 estimate of theta by Handley and Maheswaran (2008) was not an upper bound on the reasonable range of estimates for theta, based on tax statistics. As noted in the draft decision, and consistent with the WACC review, the AER considers that a reasonable range of estimates for theta based on tax statistics is 0.67 to 0.81 and a point estimate of 0.74 is a reasonable point estimate for theta based on tax statistics.

82. That is, the AER examined the estimates from two different sub-periods in the Handley and Maheswaran (2008) study:

a) The first sub-period provides an upper bound estimate of 0.67 – thus the possible range for theta is narrowed to between 0 and 0.67;

b) The second sub-period provides an upper bound estimate of 0.81 – thus the possible range for theta is narrowed to between 0 and 0.81.

83. The AER then took an average of the two upper bounds and interpreted the result as a point estimate, which is clearly illogical.

### Tribunal decision

84. The Tribunal has recently ruled that the only use that can be made of redemption rates is as an upper bound of the estimate of theta, and that the AER had made "an error of logic"[29] in using them to produce a point estimate. The Tribunal noted that during the hearing:

[29] Australian Competition Tribunal, [2010] ACompT 7, Paragraph 93.

> The AER accepted that utilisation rates derived from tax statistics provide an upper bound on possible values of theta,[30]

and that consequently:

> its relevance could only be related to the fact that it was an upper bound. No estimate that exceeded a genuine upper bound could be correct. Thus the appropriate way to use the tax statistics figure was as a check.
>
> In fact the figure that the AER derived from Handley and Maheswaran (2008), 0.74, far exceeded any estimate for theta from empirical studies and, in particular, the estimate from Beggs and Skeels (2006) ,0.57, on which the AER relied. Thus the tax statistics figure did no more than confirm that the Beggs and Skeels (2006) figure was not to be ruled out as being too high, ie higher than the correct figure could possibly be.[31]

85. The Tribunal went on to explain the source of the AER's error. The Tribunal first noted that the Handley and Maheswaran (2008) estimate for the post-2000 period is 0.81, and then reasoned that:

> The AER, recognising that this was an upper bound on the value of theta for the relevant period, decided to be "conservative" by adjusting the figure downwards. As explained, it did so by averaging 0.81 with the lower figure of 0.67 that Handley and Maheswaran (2008) estimated for the period 1988-2000.
>
> But this simple averaging adjustment has no logic to it and fails to accord each Handley and Maheswaran (2008) estimate its correct interpretation as an upper bound applying to a period. The fact that the AER chose a simple average rather than using the Handley and Maheswaran (2008) estimate for the combined period 1988-2004 is immaterial to the AER's error, since any downward adjustment to a properly derived upper bound would be inappropriate as a means of deriving an estimate of theta.[32]

86. In summary, the Tribunal concluded that:

    a) It is illogical to take estimates of an upper bound from two different periods, to take the simple average of those two upper bounds, and to interpret the result as a point estimate; and

    b) An upper bound can only be used as an upper bound – as a check to ensure that no point estimate exceeds it.

### ERA's use of redemption rates

87. The ERA has never sought to combine two estimates of an upper bound, but it has sought to interpret the redemption rate upper bound as a point estimate of theta. For example, in its DBP Draft Decision, the ERA considered two point estimates of theta – a dividend drop-off estimate and an estimate from aggregate redemption rates. The ERA's redemption rate estimate was based entirely on post-2000 data, so there was no averaging over different sub-periods. However, the ERA did interpret the redemption rate value as a point estimate.

[30] Application by Energex Limited (No 2) [2010] ACompT 7, Paragraph 91.
[31] Application by Energex Limited (No 2) [2010] ACompT 7, Paragraphs 91-92.
[32] Application by Energex Limited (No 2) [2010] ACompT 7, Paragraphs 94-95.

88. In its DBP Final Decision, the ERA followed the Tribunal in not using redemption rates for anything other than as a cross check, but noted that:

> The Tribunal considered that redemption rate studies should only be used as a check on the reasonableness of the market value of imputation credits as estimated from dividend drop-off studies. On this basis, the Authority may consider further evidence on the estimate of theta using redemption rate studies in the future when this sort of study has been refined on economically justifiable grounds (such as a consideration of any time value loss between when imputation credits are distributed and when they are redeemed, which is currently missing in redemption rate studies).[33]

89. That is, the ERA leaves open the possibility that in the future a redemption rate upper bound estimate could somehow be converted into a point estimate of theta by applying a series of adjustments. The purpose of these adjustments would presumably be to determine how much value resident investors place on a dollar of distributed imputation credits. But this assumes that all resident investors place the same value on distributed imputation credits, which is clearly not the case. For the same reason that different investors place a different value on a dollar of cash dividends, different investors will place a different value on a dollar of imputation credits. What drives a particular investor's valuation of a dollar of dividends or a dollar of imputation credits includes that investor's wealth, their risk preferences, their personal tax position and myriad other factors.

90. Moreover, even if it was possible to determine how much each investor valued imputation credits (which it is not), there is no simple calculation that can be performed to convert that information into an estimate of the equilibrium value of theta. As noted above, under a representative agent model such as the CAPM it would be necessary to take a complex weighted average that depended (at least) on the relative wealth, risk preferences, and tax position of every investor.

91. Finally, even if it was possible to manually perform the complex representative agent calculation (which it is not), that method of determining theta would be inconsistent with the way other WACC parameters are estimated. Other parameters are estimated with reference to market prices. For example, the risk-free rate is estimated by observing government bond prices and not by making assumptions about how much different investor groups might value a government bond and then taking a simple average according to how many bonds might be owned by each type of investor. The same applies to theta. One approach is to make assumptions about how different investor groups might value distributed imputation credits and assumptions about how the interplay (i.e., trading) between investors might produce stock prices that imply a certain equilibrium value for theta. The alternative is to actually examine stock prices to empirically estimate the equilibrium value of theta that has resulted from the interplay between investors. The former approach would be unique among WACC parameter estimates, whereas the latter is quite standard.

### Conclusions in relation to the use of redemption rates

92. The aggregate redemption rate clearly cannot be used as a point estimate of theta. In our view, it should not even be used as an upper bound because to do so would be inconsistent with the use of any sort of representative investor model such as the CAPM. But even if it is used as an upper bound, it would have no effect because redemption rates are materially above all empirical estimates of theta. Consequently, aggregate redemption rates should have no impact on the estimation of theta.

[33] DBP Final Decision, Paragraph 535.

### Dividend drop-off analysis

#### Method

93. The dividend drop-off method involves examining stock price changes on ex-dividend days.[34] The amount by which stock prices change (on average) is assumed to reflect the value of the dividend and franking credit that has separated from the shares on the ex-dividend day. This is implemented via regression analysis whereby the stock price changes are compared with dividends and franking credits. Such a comparison can be written in the form of a regression equation as follows:

$$\Delta P = aD + \theta FC + \varepsilon$$

where $\Delta P$ represents the change in stock price, $D$ represents the amount of the cash dividend, $FC$ represents the amount of franking credits, and $\varepsilon$ is a residual term that represents the extent to which the stock price might change for reasons other than the payment of the dividend and franking credit.

94. In this analysis, $a$ is the estimated value of a $1 dividend and $\theta$ is the estimated value of a $1 franking credit. At the present 30% corporate tax rate, a $1 fully-franked dividend will have $0.43 of franking credits attached to it. If both are fully valued by investors, on average, $a$ and $\theta$ would both equal one and on average the stock price would fall by $1.43 on the ex-date, where:

$$\begin{aligned}\Delta P &= aD + \theta FC \\ &= 1\times 1 + 1\times 0.43 \\ &= 1.43.\end{aligned}$$

95. Different researchers estimate $a$ and $\theta$ using slight variations of the equation above,[35] but the essence of what is being estimated is well-described by this equation – on average the stock price is expected to change by the market's assessment of the combined value of the dividend and franking credit.

#### AER's use of dividend drop-off analysis

96. In its SoRI, and in several subsequent determinations, the AER considered a number of dividend drop-off analyses, but ultimately relied on one result from a single drop-off study – that of Beggs and Skeels (2006). Beggs and Skeels use the dividend drop-off technique to examine the effects of six changes to the Australian tax laws during the period from 1986 to 2004. They conclude that over their sample period cash dividends are close to fully valued and that the market value of imputation credits is generally insignificantly different from zero for a substantial proportion of the sample period (p.249):

> It was then found that cash drop-off ratios were consistently close to 1, but the franking credit drop-off ratios were significantly less than 1. Moreover, the franking credit drop-off ratios were not significantly different from zero for much of the sample data. This

[34] These are days on which the dividend and associated franking credit separate from the shares. An investor who buys the shares prior to the ex-date is entitled to receive the dividend and franking credit, but an investor who buys the shares on or after the ex-date is not.

[35] For example, some researchers divide both sides of the equation by $D$ to scale by the amount of dividends and others divide both sides by $P$ to scale by the stock price. If this sort of scaling was not done, high-priced stocks would receive disproportionately higher weight relative to low-priced stocks.

> indicates that marginal investors did not value the franking credit, and provides an explanation as to why gross drop-off ratios less than 1 were observed.

97. However, in its SoRI the AER focused on a single estimate of theta from the most recent sub-period that was examined by Beggs and Skeels (2006) on the basis that an estimate that uses the most recent data is likely to better reflect the current value of theta. The estimate of theta from that sub-period was 0.57.[36]

### Regulatory debate

98. Throughout the SoRI process and a number of subsequent determinations, there was substantial debate about the AER's reliance on a single dividend drop-off estimate from a single sub-period in a single paper. It was argued that it was inappropriate for the AER to have relied on this single estimate for a number of reasons:

    a) The single sub-period on which the AER relied contained relatively few observations, which goes to the statistical reliability of the estimate;

    b) The statistical methodology of other papers should be preferred to that adopted by Beggs and Skeels (2006); and

    c) Even if the AER has a legitimate preference for the Beggs and Skeels (2006) variation of the drop-off methodology and for the use of recent data, it should have given at least some weight to a study performed by SFG, which had been commissioned to follow the Beggs and Skeels methodology, but to use an updated and more recent data set.

99. Subsequent to the AER's SoRI, Professor Chris Skeels (one of the authors of Beggs and Skeels, 2006) was engaged to perform a thorough peer review of the SFG study and of the AER's concerns with and criticisms of it. Skeels (2009) notes that:

> Many of the criticisms raised by the AER were little more than allusions to potential problems with the SFG analysis. In some cases I found that these allusions were ill-founded and readily dismissed. In other instances the appropriate response was to rework the model and to actually establish whether the concern was valid or not. This latter class of concerns was incorporated into the questions posed to SFG. I found their responses to be convincing in as much as the potential problems were demonstrated to have little or no material impact upon the results.[37]

100. Professor Skeels (2009) then concluded that:

> I find that the results presented in Appendix I constitute an empirically valid study of the dividend drop-off problem for Australia and that the SFG estimate of theta represents the most accurate estimate currently available.[38]

[36] This estimated value for franking credits is accompanied by an estimate for the value of cash dividends of 0.80. As we discuss in other sections, the implied market value for one dollar of fully franked dividends is approximately one dollar, computed as $0.80 \times 1.00 + 0.57 \times 0.43 = 0.80 + 0.25 = 1.05$.
[37] Skeels (2009), p. 5.
[38] Skeels (2009), p. 5.

101. Nevertheless, in a series of determinations the AER persisted in placing 100% weight on the result from the single sub-period in Beggs and Skeels (2006) and placed no weight at all on the results of the more up-to-date SFG study.

### Tribunal decision

102. The Tribunal has recently held that the AER was wrong to rely on an out-dated and methodologically unsound dividend drop-off study. The Tribunal then directed that SFG should conduct a "state-of-the-art" dividend drop-off study to assist the Tribunal.[39] The Tribunal also directed that the dividend drop-off study to be performed by SFG "should employ the approach that is agreed upon by SFG and the AER as best in the circumstances," and that "[c]consideration should be given to any possible enhancements to the data set."[40]

### The "state-of-the-art" study

103. After a number of meetings and telephone conferences and circulation of several draft versions of proposed Terms of Reference, agreement on two matters could not be reached. This required a further hearing before the Tribunal on those matters that were in dispute. At the completion of this hearing, the Tribunal made an immediate ruling, finding against the AER on those issues.

104. SFG then conducted the state-of-the-art dividend drop-off study under the Terms of Reference that had been settled by the Tribunal and circulated a draft report to all parties. The AER and the regulated businesses provided comments on the draft report and these were taken into account in a revised report that was provided to all parties and to the Tribunal.

105. At the final hearing, the AER submitted that the SFG study had departed from the Terms of Reference, could be criticised on numerous other grounds, and should therefore be afforded little weight. The Tribunal rejected these submissions entirely concluding that:

> It is not necessary to set out the details of the eight issues, since they raise no important or significant questions of principle…Calling them "major compliance issues" is unnecessarily pejorative.
>
> Whether or not the terms of reference have been departed from, what is important is whether the concerns raised by the AER with the construction of the database cast doubt on the value of SFG's analysis, requiring the Tribunal to give it less weight than it otherwise would. In the Tribunal's view, they do not.
>
> 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.[41]

106. The Tribunal then accepted the estimates from the SFG state-of-the-art study:

> 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

[39] Australian Competition Tribunal [2010] ACompT 7, Paragraph 146.
[40] Australian Competition Tribunal [2010] ACompT 7, Paragraph 147.
[41] Australian Competition Tribunal [2011] ACompT 9, Paragraphs 18-19.

> SFG's report has been subjected, and SFG's comprehensive response, gives the Tribunal confidence in those conclusions. [42]

107. 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.[43]

and

> The Tribunal finds itself in a position where it has one estimate of theta before it (the SFG's March 2011 report value of 0.35) in which it has confidence, given the dividend drop-off methodology. No other dividend drop-off study estimate has any claims to be given weight vis-à-vis the SFG report value.[44]

### Final estimate of Gamma

108. Having determined that the appropriate distribution rate is 70% and that the best dividend drop-off estimate of theta is 0.35, the Tribunal had no more work to do other than to multiply these two estimates together to obtain a gamma estimate of 0.25:

> Taking the values of the distribution ratio and of theta that the Tribunal has concluded should be used, viz 0.7 and 0.35, respectively, the Tribunal determines that the value of gamma is 0.25.[45]

### Value of package of dividend and imputation tax credit

109. Whereas dividend drop-off studies have reported a range of estimates of theta (and a corresponding range of estimates of the value of cash dividends), they have uniformly reported that the combined value of the package of a one dollar dividend and the associated 43 cent imputation credit is approximately one dollar. That is, the various studies agree that the combined value of the package is approximately one dollar, and only diverge with respect to the way this one dollar value is allocated between the cash dividend and the associated imputation credit.

110. By way of example, we note that the combined value of a one dollar dividend and the associated 43 cent imputation credit is approximately one dollar for both the Beggs and Skeels (2006) sub-period (on which the AER sought to rely) and for the state-of-the-art SFG study which has recently been adopted by the Tribunal:

    a) For Beggs and Skeels the combined value is $1.0 \times 0.80 + 0.43 \times 0.57 = 1.0$; and

    b) For SFG the combined value is $1.0 \times 0.85 + 0.43 \times 0.35 = 1.0$.

111. Similarly, Hathaway and Officer (2002) perform separate estimates for different kinds of companies, based on size and sector. For all of the subsets of companies that they examine, the estimated

[42] Australian Competition Tribunal [2011] ACompT 9, Paragraph 22.
[43] Australian Competition Tribunal [2011] ACompT 9, Paragraph 29.
[44] Australian Competition Tribunal [2011] ACompT 9, Paragraph 38.
[45] Australian Competition Tribunal [2011] ACompT 9, Paragraph 42.

combined value of cash dividend plus franking credit is close to one. This is summarised in Table 1 below.

**Table 1: Combined Value of Dividend Plus Franking Credit – Hathaway and Officer (2002)**

| Sector | Small Companies | Large Companies | All Companies |
|---|---|---|---|
| **Industrials** | 0.97 | 1.11 | 1.02 |
| **Resources** | 1.00 | 1.00 | 1.00 |
| **All** | 0.97 | 1.08 | 1.02 |

Source: Hathaway and Officer (2002), Table 1, p. 17.
Computed as estimated value of cash dividend × 1.00 + estimated value of franking credit × amount of franking credit.

### Dividend drop-off estimates come in pairs

112. Dividend drop-off regression analysis produces estimates of two parameters – theta and the value of cash dividends. The estimate of theta is conditional on the estimate of the value of cash dividends – a different value for cash dividends would produce a different estimate of theta.

113. For example, the final conclusions of the SFG study are:

> In our view, considering all of the evidence set out above, an appropriate point estimate for theta based on dividend drop-off analysis is 0.35.
>
> Finally, it is important to note that dividend drop-off analysis produces estimates of two parameters: theta and the value of cash dividends. That is, the estimates from drop-off analysis come in pairs. The point estimate of 0.35 for theta is not independent of the estimated value of cash dividends. Rather the estimate of 0.35 for theta corresponds with an estimate in the range of 0.85 to 0.90 for the value of cash dividends.[46]

114. In our view, it is important to be consistent when applying empirical evidence. In the context of dividend drop-off analysis, consistent application requires the recognition that dividend drop-off estimates come in pairs – the estimate of theta also implies an estimate of the value of cash dividends and both should be applied consistently throughout the WACC estimation process. We address this issue of internal consistency in more detail in Section 6 below. There are different methods and approaches for estimating theta and the value of cash dividends. Our only point here is that consistent estimates of these two related parameters must be applied throughout the WACC estimation process.

115. By analogy, it would be inconsistent and wrong to use one approach to estimate the proportion of equity finance to be 50% and to then use another approach to estimate the proportion of debt finance to be 70%. Similarly, it would be wrong to use one approach to estimate theta and a different approach to estimate an inconsistent value of cash dividends. We address this issue of internal consistency in more detail in Section 6 of this report.

[46] SFG (2011), Paragraphs 101-102.

### Simultaneous price studies

#### Individual share futures contracts

116. The best-known example of the simultaneous security price method is Cannavan, Finn and Gray (2004), which was published in the top-ranked *Journal of Financial Economics*. They examine the simultaneous prices of shares (which entitle the holder to receive dividends and franking credits) and futures contracts (which do not). The difference in the respective prices is then used to obtain estimates of the value of cash dividends and the value of franking credits.

117. Cannavan, Finn and Gray (2004) conclude that the combined value of a $1.00 cash dividend and the attached franking credit is approximately $1.00, consistent with the results from dividend drop-off studies. They also conclude that cash dividends are fully valued and that theta is close to zero, after the 1997 tax amendment that effectively prevented non-residents from "selling" franking credits to residents.

118. In our view, this paper provides strong evidence in support of theta (and consequently gamma) taking a value close to zero.[47] It is based on a large sample, involves thousands of observations for each stock that is examined, and has met the criteria for publication in the leading journal. However, this study uses data from prior to the tax amendment that took effect in July 2000 and for that reason has not received any weight in regulatory determinations.

#### Special market for trading cum-dividend shares in the ex-dividend period

119. Walker and Partington (1999) examine a special market available at the ASX that allows investors to simultaneously trade shares with and without a dividend. Volumes traded through these special side markets are extremely small and the market exists only for a very small number of shares.

120. While the authors report that the value of franked dividends exceeds the face value of the dividend itself, on average, there is extremely wide variation in the estimates for different ex-dividend events. This is curious given that the shares trade with and without the dividend simultaneously. Such variation is expected in dividend drop-off studies as there are other reasons (new information) for prices to change between the cum- and ex-dividend dates. In this market, however, there is no reason other than the dividend for the prices of the two securities to differ, yet there is wide variation in the implied values of dividends and franking credits. This seems to suggest that the trades may be structured to produce tax benefits between related parties and may not reflect competitive market forces.

121. We are not aware of this study being afforded material weight in any regulatory determination.

### Studies that seek to document the value of retained credits

122. In its DBP Draft Decision, the ERA stated that:

> based on McKenzie and Partington's advice to the AER, these two authors state that empirical evidence from Hubbard and Kemsley (2001), and Ricketts and Wilkinson (2008), supported the view that retained imputation credits have positive value.[48]

[47] In particular, if theta is zero, then gamma is also zero, regardless of what value is used for the distribution rate.
[48] DBP Draft Decision, Paragraph 641.

123. We first note that the AER no longer supports this view. In a recent judgment, the Tribunal referred to a submission from the AER that concedes that:

> there is no empirical data that is capable of supporting an estimated distribution ratio higher than 0.7.[49]

124. This is consistent with the fact that the studies that formed the basis of the McKenzie and Partington advice have since been discredited, as discussed in Paragraphs 57 to 63 above.

### Approaches that rely on the combined value of dividends and imputation credits

125. In a report for the AER, McKenzie and Partington (2010) submit that the approach of Dempsey and Partington (2008) makes it possible to "undertake valuations which correctly account for franking credits without explicit consideration of their value."[50] This approach estimates the combined value of dividend plus franking credit and seeks to perform valuation exercises without separating the combined value into its component pieces.

126. McKenzie and Partington note, however, that "we doubt that it had extensive use."[51] Indeed, they submit no evidence of it having any use whatsoever. Moreover, under the DP approach, retained earnings are more valuable than new equity to the extent that undistributed franking credits are assumed to have some value. This means that when a regulated investment is financed by retained earnings "the investment base for price regulation should be adjusted accordingly."[52]

127. Dempsey and Partington also note that "in most regulatory hearings, the utilities argue for a zero value for imputation credits … to justify higher prices. Under the proposed system, it is possible that such argument would actually be reversed."[53] They conclude that "quite different valuations can arise using the [proposed] method relative to either the traditional method or the Officer (1994) method."[54]

128. In our view, the Partington approach should not be used (and has not been used) in any commercial or regulatory setting. However we do agree with two conceptual points made by McKenzie and Partington:

a) Every estimate of theta is paired with a corresponding estimate of the value of cash dividends. It would be inconsistent and wrong to use an estimate of theta from one approach together with an inconsistent estimate of the value of cash dividends from another approach; and

b) To the extent that retained credits are assumed to have value, financing investments with retained earnings must be more expensive than new equity and a higher required return would be appropriate – it would be inconsistent and wrong to assume that retained franking credits have material value, but then to assume that the required return on retained earnings is the same as on new equity.

[49] Australian Competition Tribunal [2010] ACompT 9, Paragraph 2.
[50] McKenzie and Partington (2010), p. 28.
[51] McKenzie and Partington (2010), p. 28.
[52] Dempsey and Partington, p. 445.
[53] Dempsey and Partington, p. 445.
[54] Dempsey and Partington, p. 454.

### Conclusions in relation to theta

129. Our main conclusions in relation to the estimation of theta are:

a) We agree with the Tribunal that redemption rate tax statistics do not provide an estimate of theta and should not be used for that purpose;

b) We agree with the Tribunal that the best available dividend drop-off estimate of theta is 0.35 – from the state-of-the-art SFG study. This estimate of theta is conditional on cash dividends being valued at 85 cents in the dollar; and

c) The best available estimate of theta using the simultaneous security price method is the estimate of zero from Cannavan, Finn and Gray (2004). This estimate of theta is conditional on cash dividends being valued at full face value.

130. These results produce a range of estimates for theta of 0 − 0.25, and a corresponding range for the value of cash dividends of 100% − 80% of face value.

## 5. Market practice

### Overview of observed market practice

131. In this section, we consider the evidence about commercial and market practice in relation to imputation tax credits. We begin by noting that the issue is *not* about whether some investors might value or benefit from imputation tax credits. Unquestionably, some investors do value the imputation tax credits they receive and some do not. Rather, the key issue is whether dividend imputation affects the equilibrium cost of capital of Australian companies, and consequently the revenue requirement of the benchmark firm, which is a different question entirely.

132. One (but not the only) consideration that is relevant when estimating gamma is whether market professionals in practice actually adjust their cost of capital estimates for an assumed equilibrium value of imputation tax credits in the way that Australian regulators do. The evidence suggests that they do not. Specifically, the great majority of market professionals make no adjustment at all to either the cash flows or the discount rate to reflect any assumed value of imputation tax credits. In particular:

a) The great majority of independent expert valuation reports make no adjustment at all to either cash flows or discount rates to reflect any assumed value of imputation credits (Lonergan, 2001; KPMG, 2005). KPMG conclude that of the reports that adopt the CAPM for estimating the cost of equity:

> …none made any adjustment for the value of imputation credits.[55]

They further conclude that:

> based on these results, KPMG considers that the standard market practice in relation to estimating the cost of capital in Australia, as evidenced by independent expert reports relating to takeovers, is to assume a zero value for imputation credits.[56]

b) The great majority of CFOs of major Australian companies (who between them account for more than 85% of the equity capital of listed Australian firms) make no adjustment at all to either cash flows or discount rates to reflect any assumed value of imputation credits. For example, Truong, Partington and Peat (2008) conclude that:

> in general the companies surveyed have ignored the impact of imputation tax credits in the capital budgeting process. The majority of respondent companies said they did not adjust for imputation credits when estimating beta, or the market risk premium, or when they carry out project evaluations.[57]

and that:

> With regard to the impact of imputation tax credits, the uniform view of Australian regulators has been that there was a significant market value for imputation credits.

[55] KPMG (2005), p. 16.
[56] KPMG (2005), p. 17.
[57] KPMG (2005), pp. 12 – 13.

> Accordingly, the value of imputation credits and their impact was taken into account when estimating a regulated firm's cost of capital. This is in contrast to the practice of the Australian firms surveyed.[58]

c) Published Queensland Government Treasury valuation principles require government entities to make no adjustment at all to either cash flows or discount rates to reflect any assumed value of imputation credits (OGOC, 2006). The OGOC principles state that:

> When assessing investment proposals, independent commercial advice provided to OGOC is that a value of zero should be used for dividend imputation as dividend imputation is not generally taken into account by the private sector and GOC competitors when determining a WACC. Accordingly, for non-regulated assets and assets not subject to monopoly prices oversight, it is proposed all GOCs adopt a value of zero for gamma in calculating WACC.[59]

d) Credit rating agencies such as Moody's and Standard and Poor's also make no adjustments in relation to imputation credits to any quantitative metric that they compute when developing credit ratings for Australian firms.

133. In summary, the standard market practice is to make no adjustment at all in relation to imputation tax credits when valuing assets or estimating the corporate cost of capital.

### Approaches for estimating required returns

#### Points of agreement

134. There appears to be broad agreement that the general market practice is to make no adjustment (to either the discount rate or the cash flows) in relation to franking credits when estimating WACC or valuing companies or assets. The only disagreement is about *why* practitioners make no adjustment.

135. For example, in advice to the AER Handley (2010) explicitly states:

> …whilst there is no disagreement concerning what experts do, there is disagreement about why they do it.[60]

136. Handley (2010) further explains that regulators and market practitioners are both ultimately seeking an estimate of the required return on equity excluding the effect of imputation credits, which he defines to be $r_e^*$. This can be interpreted as the expected return (not including any return from imputation credits) that investors would require before committing equity capital to the firm. Handley (2010) states that there are two methods for estimating $r_e^*$ – the regulatory approach and the market practice approach (which he refers to as the "conventional" approach[61]).

[58] Truong, Partington and Peat (2008, p.116).
[59] Queensland Treasury (2006, p. 7).
[60] Handley (2010), p. 3.
[61] See, for example, Handley (2010), p. 4.

### The regulatory approach

137. Handley (2010, pp. 3-10) explains that the first step in the regulatory approach is to estimate the required return on equity, including the assumed effect of imputation credits:

$$r_e = r_f + \beta_e \times MRP$$

where the estimate of $MRP$ includes the impact of imputation.

138. That is:

$$r_e = r_f + \beta_e \times \left(MRP_{dc} + Imputation\ Adjustment\right)$$

where $MRP_{dc}$ is an estimate of MRP that includes returns from dividends and capital gains, but excludes any returns from imputation credits. Historical stock return data, which is the primary means of estimating MRP, produces a direct estimate of $MRP_{dc}$. Under the regulatory approach, that estimate is increased by adding an Imputation Adjustment to reflect the assumed return from imputation credits.

139. In summary, the first step of the regulatory approach is:

a) Estimate $MRP_{dc}$ primarily using historical stock return data;

b) Apply an Imputation Adjustment to that estimate;

c) Insert the adjusted estimate of MRP into the CAPM formula to obtain an estimate of $r_e$, which is the required return *including* the effect of imputation credits.

140. However, recall that regulators and market practitioners are both ultimately seeking an estimate of the required return on equity *excluding* the effect of imputation credits. Hence, the regulatory approach involves a second step to remove the effect of imputation credits. This is done by applying an adjustment factor to the estimate of $r_e$ from Step 1:

$$r_e^* = r_e\left[\frac{1-T}{1-T(1-\gamma)}\right]$$

where $T$ is the relevant corporate tax rate and $\gamma$ is the regulatory estimate of the "gamma" parameter.

141. Handley (2010) notes that:

> Intuitively, $r_e$ represents the cost of equity grossed-up to include the value of imputation credits, but multiplying by $\left[\frac{1-T}{1-T(1-\gamma)}\right]$ then has the effect of reversing that gross-up.[62]

#### The conventional or market practice approach

142. Handley (2010) notes that the two steps of the regulatory approach are:

    a) Step 1: Increase the estimate of the required return to include the effect of imputation credits; and

    b) Step 2: Reduce the estimate of the required return to remove the effect of imputation credits.

143. He then notes that the conventional or market practice approach is simpler and more direct. That approach involves a single straightforward implementation of the CAPM:

$$r_e^* = r_f + \beta_e \times MRP_{dc}.$$

144. Under the conventional/market practice approach, $MRP_{dc}$ is estimated in exactly the same way as in the first step of the regulatory approach. That estimate is then inserted directly into the CAPM formula to produce a direct estimate of $r_e^*$, as required. Handley (2010) confirms that:

> To implement this approach, the conventional measure of the cost of equity $r_e^*$ may be estimated using the Sharpe CAPM in the normal way i.e. using returns based on dividends and capital gains only (and so does not require an estimation of gamma).[63]

### The relevance of market evidence

#### Context

145. As set out above, there is broad support for the proposition that:

    a) The dominant market practice is to make no adjustment for imputation credits when determining the WACC or performing valuation exercises;

    b) Regulators and market practitioners are both ultimately seeking an estimate of the required return on equity excluding the effect of imputation credits, which Handley (2010) defines to be $r_e^*$; and

    c) There are two methods for estimating $r_e^*$ – the regulatory approach and the market practice or "conventional" approach.

[62] Handley (2010), p. 9.
[63] Handley (2010), p. 9.

### Regulatory practice

146. In the regulatory context, the question then becomes one of what a regulator should do with this information. To date, the regulatory approach has been to:

a) Note that independent experts, corporate and government treasuries, and credit rating agencies make no adjustment in relation to imputation credits; but then

b) Argue that observations about this market practice are not relevant to the regulatory setting because practitioners may be using a different approach to that adopted by regulators.

147. For example, in its SoRI, the AER concluded that:

> There does appear to be a valid valuation framework (i.e. the classical approach) that would avoid the need to directly estimate gamma. It is quite possible and plausible that market practitioners are consciously choosing to adopt this simpler approach to estimating the cost of equity.
>
> On this basis the AER reiterates its views from the explanatory statement that the adoption of a positive value for imputation credits is not inconsistent with market practice.[64]

148. Similarly, in its DBP Final Decision, the ERA concluded that the observation that market practitioners make no adjustment for imputation credits is not relevant to the regulatory setting because practitioners may be using a different approach to that adopted by regulators:

> In the advice to the AER, Handley states that, under the conventional approach to valuation (i.e. no imputation credits), Australian firms and independent valuation practitioners do not explicitly recognise the value of imputation credits in either the cash flows or in the discount rate. As such, imputation credits are not assumed to have zero value, but rather they are simply not explicitly taken into account in either the cash flows or in the discount rate.[65]

### Regulatory considerations

149. As set out above, regulators and market practitioners are both ultimately seeking an estimate of the required return on equity excluding the effect of imputation credits, which Handley (2010) defines to be $r_e^*$.

150. The revised National Gas Rules require the regulator to estimate $r_e^*$ having regard to the prevailing conditions in the market for equity funds. [66] The new Rules also require that in producing its estimate of $r_e^*$ the regulator must have regard to relevant estimation methods, financial models, market data and other evidence.[67]

[64] AER SoRI, pp. 409-410.
[65] DBP Final Decision, Paragraph 528.
[66] National Gas Rules, Rule 87(7).
[67] National Gas Rules, Rule 87(5).

151. Given that the regulatory approach for estimating $r_e^*$ is unconventional and differs from the approach used in practice, and given that there is a conventional/market practice approach for estimating $r_e^*$, it would seem that the conventional/market practice approach must fall under the definition of "relevant estimation methods, financial models, market data, and other evidence." That is, it would not seem open to a regulator to note that market practitioners make no adjustment for imputation credits, to state that practitioners may be using a approach for estimating $r_e^*$, and to then give no further consideration to the conventional/market practice estimate of $r_e^*$. Rather, in determining whether its own estimate of $r_e^*$ is reasonable and appropriate, the minimum required of a regulator would be compare its own estimate of $r_e^*$ with the estimate of $r_e^*$ that is produced by the conventional/market practice approach.

152. Moreover, it would not seem possible for a regulator to conclude that its estimate of $r_e^*$ was commensurate with the prevailing conditions in the market for equity funds without even considering the estimate of $r_e^*$ that is produced by the conventional/market practice approach.

153. In summary, the Rules would appear to require the regulator to at least compare its estimate of $r_e^*$ with the estimate of $r_e^*$ that is produced by the conventional/market practice approach.

### Implementation of the conventional/market practice approach

154. As set out above, implementation of the conventional/market practice approach is straightforward – one simply estimates MRP without an adjustment for imputation credits and inserts that directly into the CAPM formula:

$$r_e^* = r_f + \beta_e \times MRP_{dc}.$$

155. In a report for the AER, Handley (2012) estimates that the average annual excess return (the return on a broad stock index less the return on government bonds) from 1958 to 2011 (the period of the most reliable data) to be 5.8% p.a.[68] This is a return based on dividends and capital gains only – it has not had any Imputation Adjustment applied to it. This estimate implies that the required return for an average firm (with a beta of 1.0) when the risk-free rate is 5%, is:

$$\begin{aligned} r_e^* &= r_f + \beta_e \times MRP_{dc} \\ &= 5.\% + 1 \times 5.8\% = 10.8\%. \end{aligned}$$

156. Implementation of the conventional/market practitioner approach is straightforward and only requires parameters that are already required for the regulatory approach. That is, no additional parameters need to be estimated by the regulator – existing parameter estimates simply need to be inserted into a simple formula.

### Implementation of the regulatory approach

157. Handley (2012) goes on to calculate an Imputation Adjustment based on the Tribunal's recent estimate of theta of 0.35. Based on this, the AER concluded that the imputation-adjusted MRP was

[68] Handley (2012), p. 5.

6.0%. Thus, Step 1 of the regulatory approach produces an estimate of the required return after increasing to reflect the effect of imputation credits:

$$\begin{aligned} r_e &= r_f + \beta_e \times \left(MRP_{dc} + Imputation\ \ Adjustment\right) \\ &= 5\% + 1 \times \left(6\%\right) = 11\%. \end{aligned}$$

158. Step 2 of the regulatory approach is to apply the downward adjustment to remove the effect of imputation credits. Using the current regulatory estimates of $T = 0.3$ and $\gamma = 0.25$, the resulting estimate is:

$$r_e^* = r_e \left[\frac{1-T}{1-T(1-\gamma)}\right] = 11\% \left[\frac{1-0.3}{1-0.3(1-0.25)}\right] = 9.9\%.$$

### Comparison of conventional approach and regulatory approach

159. In this example, a comparison of the two approaches for estimating $r_e^*$ would reveal that the two approaches produce different estimates. The conventional/market practice approach produces a direct estimate of 10.8%. The regulatory approach applies an uplift of 0.2% to include the effect of imputation credits, followed by a downward adjustment of 1.1% to remove the effect of those same imputation credits. This clearly reveals a problem with the implementation of the regulatory approach – whereas the uplift and downward adjustment steps in the regulatory approach are supposed to cancel each other out, they do not. Recall that Handley (2010) notes that:

> Intuitively, $r_e$ represents the cost of equity grossed-up to include the value of imputation credits, but multiplying by $\left[\frac{1-T}{1-T(1-\gamma)}\right]$ then has the effect of reversing that gross-up.[69]

160. However, in the example above, the second step does not "reverse the effect of that grossing up," but outweighs it more than five-fold.

161. The problem with the implementation of the regulatory approach in the above example is that the two steps are inconsistent.

### Conclusions in relation to market practice

162. In our view, a minimum requirement under the Rules if for the regulator to:

a) Implement the market practice approach, specifying its estimate of the MRP unadjusted for imputation credits; and

b) Demonstrate that the two steps of the regulatory approach have the effect of reversing each other in accordance with Handley (2010).

[69] Handley (2010), p. 9.

## 6. Evidence from recent independent expert reports

### Summary of evidence

163. From the Connect 4 database, we have identified nineteen independent expert reports from calendar year 2012 that specifically addressed the potential valuation effects of dividend imputation. In every one of these reports, the independent expert valuation professional concluded that no adjustment should be made to the cash flows or to the cost of capital in relation to imputation credits. This confirms the evidence presented in the previous section – the dominant market practice is to make no adjustment in any part of the valuation in relation to imputation credits.

164. That is, in the independent expert reports, no adjustment was made in *any part* of the valuation exercise. In particular, equity beta and MRP are estimated without regard to imputation credits. The independent expert estimates for each of these parameters are on an ex-imputation credits basis. For example, the independent expert estimate of MRP is an estimate of the premium that would be required to attract equity capital to the average firm *before* imputation credits, whereas the current regulatory estimates of MRP are *including* the assumed effect of imputation credits. In summary, the independent expert estimate of MRP would need to be grossed-up to include the regulator's assumed effect of imputation credits before that estimate could be compared with the regulatory estimate.

### Independent expert analysis

165. The text of independent expert reports provides some important insights into the reasoning that has led to the conclusion that no adjustment should be made in relation to imputation credits. For example, the ERA has previously expressed the view that setting gamma to zero would be inconsistent with the fact that all Australian energy network companies have some domestic resident shareholders. For example, in its DBP Final Decision, the ERA stated that:

> The Authority is also of the view that setting gamma to zero is clearly inappropriate given the presence of Australian shareholdings in all energy network companies in Australia.[70]

166. The basis of this conclusion is that resident shareholders obtain some benefit from imputation credits so gamma should not be set to zero.[71] However, there is a clear difference between the proposition that:

a) Imputation credits can be used by some investors; and

b) The equilibrium price at which an asset will trade is materially affected by imputation credits.

167. This distinction is made apparent in the independent expert reports. Independent expert reports uniformly:

a) Recognise that imputation credits are valued by some investors; and

b) Conclude that (a) does **not** imply that imputation has any relevance to their valuation.

[70] DBP Final Decision, Paragraph 530.

[71] Whereas the ERA appears to refer to the actual shareholding of network companies, they clearly mean the shareholding structure of the benchmark efficient firm. That is, it would not be open to a government-owned entity to argue that gamma should be set to zero solely on the basis of its government ownership – or similarly for a 100% foreign-owned company.

168. That is, independent expert reports recognise that the fact that imputation credits may have some value to some investors does **not** imply that any adjustment should be made to their valuation.

169. For example, KPMG (2012) note that:

> …on the assumption that the ultimate recipients of the dividend streams will redeem the franking credits, the value of the imputation credits associated with the ownership of an interest in them should be considered in any valuation exercise.[72]

170. KPMG (2012) further recognises that, if imputation credits were assumed to have an effect on firm value, there would be two ways of incorporating that effect into the valuation – either by adjusting the cash flows or the discount rate:

> The value of imputation tax credits can be taken into account in two ways, either:
>
> • within the measure of cash flows, or
>
> • within the discount rate calculation through the application of a gamma factor.[73]

171. However, KPMG concludes that:

> …a number of studies have considered that the evidence is either insufficient to conclude that an adjustment is appropriate, or that no adjustment is necessary…On this basis, we have not made an adjustment for the value of franking credits in our valuation.[74]

172. Similarly, Grant Samuel (2012a) recognise that imputation credits will be of value to some investors:

> Under Australia's dividend imputation system, domestic equity investors now receive a taxation credit (franking credit) for any tax paid by a company. The franking credit attaches to any dividends paid out by a company and the franking credit offsets personal tax. To the extent the investor can utilise the franking credit to offset personal tax, then the corporate tax is not a real impost. It is best considered as a withholding tax for personal taxes. It can therefore be argued that the benefit of dividend imputation should be added into any analysis of value.[75]

but conclude that:

> In Grant Samuel's view, however, the evidence gathered to date as to the value the market attributes to franking credits is insufficient to rely on for valuation purposes. More importantly, Grant Samuel does not believe that such adjustments are widely used by acquirers of assets at present. While acquirers are undoubtedly attracted by franking credits there is no clear evidence that they will actually pay extra for them or build it into values based on long term cash flows…Accordingly, it is Grant Samuel's opinion, that it is not appropriate to make any adjustment.[76]

[72] KPMG (2012), p.100.
[73] KPMG (2012), p.100.
[74] KPMG (2012), p.100.
[75] Grant Samuel (2012a), p. 10.
[76] Grant Samuel (2012a), p. 10.

173. Deloitte (2012) also clearly state that their approach is to make no adjustment to their estimate of the cost of capital or to the projected cash flows in relation to any assumed effect of imputation credits:

> We have not adjusted the cost of capital or the projected cash flows for the impact of dividend imputation due to the diverse views as to the value of imputation credits and the appropriate method that should be employed to calculate this value.[77]

174. Grant Thornton (2012) notes that:

> Arguably, the benefit of dividend imputation has value that should be incorporated into valuations. However, there is contention amongst academics and practitioners as to what adjustment should be made to reflect the value of this benefit, including whether the adjustment, if any, should be made to cash flows and/or to the discount rate.[78]

and concludes that:

> Grant Thornton Corporate Finance does not consider it appropriate to factor the potential benefits into this valuation.[79]

175. BDO Corporate Finance (WA) (2012) also recognise that, if imputation credits were assumed to have an effect on firm value, there are methods of incorporating that effect into the valuation. However, BDO conclude that none of those methods should be used. Rather, the appropriate method is to make no adjustment at all in relation to dividend imputation:

> In calculating WACC there are a number of different formulae which are based on the definition of cash flows (i.e., pre-tax or post-tax), the treatment of the tax benefit arising through the deductibility of interest expenses (included in either the cash flow or discount rate), and the manner and extent to which they adjust for the effects of dividend imputation. The commonly used WACC formula is the post-tax WACC, without adjustment for dividend imputation.[80]

### Current independent expert practice and reasoning

176. Perhaps the best example of the current independent expert reasoning in relation to imputation credits is set out in Grant Samuel (2012b), who first note that imputation credits can be utilised by some investors:

> Under Australia's dividend imputation system, domestic equity investors receive a taxation credit (franking credit) for tax paid by a company. The franking credit attaches to any dividends paid by a company and the franking credit offsets personal tax for Australian investors. To the extent that personal tax has been fully offset the individual will receive a refund of the balance of the franking credit. Franking credits therefore have value to the recipient.[81]

[77] Deloitte (2012), p.44.
[78] Grant Thornton (2012), p. 150.
[79] Grant Thornton (2012), p. 150.
[80] BDO Corporate Finance (WA) (2012), p.60.
[81] Grant Samuel (2012b), p. 59.

177. They then note that there is a clear distinction between the fact that some investors can utilise imputation credits and the proposition that this materially affects the equilibrium value of the firm. Some people may like the small biscuit that is served with a coffee, and that may attract some people to a particular shop, but it can't be used to materially increase the price in the face of competition:

> However, in Grant Samuel's opinion, while acquirers are attracted by franking credits there is no clear evidence that they will actually pay extra for a company with them.[82]

178. Grant Samuel (2012b) explain the reason why the equilibrium value of the company might not be materially affected by the imputation credits that can be utilised by some shareholders:

> Further, franking credits are not an asset of the company in the sense that they can be readily realised for a cash sum that is capable of being received by all shareholders. The value of franking credits can only be realised by shareholders themselves when they receive distributions. Importantly, the value of franking credits is dependent on the tax position of each individual shareholder. To some shareholders (e.g. overseas shareholders) they will have very little or no value. Similarly, if they are attached to a distribution which would otherwise take the form of a capital gain taxed at concessional rates there may be minimal net benefit.[83]

and conclude that:

> Accordingly, while franking credits may have value to some shareholders they do not affect the underlying value of the company itself. No value has therefore been attributed to Spotless' accumulated franking credit position in the context of the value of Spotless as a whole.[84]

[82] Grant Samuel (2012b), p. 59.
[83] Grant Samuel (2012b), p. 59.
[84] Grant Samuel (2012b), p. 59.

## 7. Internal consistency

### Inconsistency with estimate of required return on equity

179. One issue that has been raised in the SoRI process and in subsequent determinations is that there is an apparent inconsistency whereby the AER has proposed to use different estimates for the same parameter in two different parts of the same WACC estimation exercise. In particular, inconsistent estimates of the value of cash dividends are used in two places in the AER's reasoning:

    a) The AER's empirical estimates of theta (and consequently gamma) are based on an estimated value of cash dividends of 80-85 cents per dollar;[85] and

    b) The AER's estimate of the required return on equity using the CAPM is based on cash dividends being valued at 100 cents per dollar.

### Regulatory acceptance that an inconsistency exists

180. It is clear that both Handley (2008) and the AER have accepted that there is such an inconsistency:

> Handley agrees with SFG that the empirical evidence from dividend drop-off studies – that cash dividends are less than fully valued – presents an apparent inconsistency with the standard CAPM.[86]

181. Moreover, Handley (2009, p.29) notes that the AER has:

    a) Relied upon US dividend yield studies to conclude that dividends are valued at 100 cents per dollar in supporting its use of the standard CAPM in one step of the WACC estimation exercise; and

    b) Relied upon drop-off studies to conclude that dividends are less than fully valued (80 cents per dollar) when estimating gamma.

182. Handley (2009, p.29) also notes that this "at first appears to be an inconsistency." He then notes that the AER is "not concerned with" this inconsistency because it is using different estimates of the value of dividends in the two different steps of its WACC estimation exercise (p.29):

> i.e. US dividend yield studies in relation to the CAPM and drop-off studies in relation to gamma.

183. Similarly, the ERA notes that different estimates of the value of cash dividends are used in two places in its WACC estimation exercises – one estimate based on one set of evidence in relation to the CAPM and a different estimate based on a different set of evidence in relation to gamma:

[85] In particular, recall that a consistent result among all dividend drop-off analyses is that the combined value of a one dollar cash dividend and the associated 43 cent imputation tax credit, is one dollar. The sub-period result from Beggs and Skeels (2006), on which the AER sought to rely, set the value of theta at 0.57 and the value of cash dividends at 80 cents per dollar. Thus, the combined value of the package of dividend and imputation credit is $1.0\times0.8+0.43\times0.57=1.0$. This means that the AER's theta estimate of 0.57 is conditional on cash dividends being valued at 80 cents per dollar.

[86] AER (2009), Explanatory Statement, p. 335.

> i.e. US dividend yield studies in relation to the CAPM and drop-off studies in relation to gamma.[87]

### Are different estimates of the same parameter allowed under the Rules?

184. Once it has been established that the estimated WACC is based on different estimates of the same parameter in two or more steps of the WACC estimation process, the question is whether inconsistent estimates of the same parameter are allowed under the Rules. Logically, there are only three possible responses to this question:

    a) Different estimates of the same WACC parameter are not allowed;

    b) Different estimates of the same WACC parameter are always allowed; or

    c) Different estimates of the same WACC parameter are only allowed in certain circumstances.

185. In our view, there are several reasons to support the conclusion that different estimates of the same WACC parameter are not allowed within a single WACC estimation process:

    a) The new Rules specifically refer to "the consistent application of any estimates of financial parameters";

    b) In GasNet, the Tribunal held that different values of the same parameter could not be used.[88] That case concerned the use of different values for the risk-free rate in two places in the CAPM formula; and

    c) The ERA has recently submitted that:

> It is neither permissible nor appropriate to use different values for the same parameter in two places in the same WACC estimation.[89]

186. By contrast, the current regulatory view appears to be that different estimates of the same parameter are permissible in certain circumstances. In particular, the argument appears to be that different estimates can be adopted for the same parameter so long as each estimate can be justified. In relation to the value of cash dividends, regulators have pointed to US dividend yield studies to justify the adoption of a value of 100 cents in relation to the CAPM and to Australian dividend drop-off studies in relation to gamma. For example, in its DBP Draft Decision, the ERA noted that it had used different values for the same parameter, but then concluded that this did not give rise to an inconsistency:

> …the Authority is of the view that there is no inconsistency when the estimates of the value of cash dividends are used differently: (i) 75-80 cents per dollar when theta (then gamma) is estimated and (ii) 100 cents per dollar when return on equity is estimated.[90]

[87] DBP Draft Decision, Paragraph 656.
[88] Re GasNet Australia (Operations) Pty Ltd [2003] ACompT 6 (23 December 2003), Paragraphs 46-47.
[89] DBNGP [2012] ACompT 14, Transcript, pp. 121-122.
[90] DBP Draft Decision, Paragraph 657.

187. In summary, the regulatory view appears to be that different values can be used for the same parameter so long as some piece of evidence can be adduced to support each one. In our view, such an approach is unworkable as it would imply, for example, that:

    a) It would be open to the regulator to use one value for the risk-free rate when estimating the required return on equity and a different value when estimating the debt risk premium; and

    b) It would be open to the regulator to use one value for gearing when estimating the credit rating and a different value when taking the weighted-average to compute WACC and a third value when re-gearing equity beta.

188. Consequently, it is our view that, for a given parameter, the same value must be adopted consistently throughout a single WACC estimation process.

### Recent Tribunal decision

#### Summary and analysis of decision

189. In the DBP Case, the Tribunal has recently addressed the issue of different values being used for the value of cash dividends within a single WACC estimation exercise. In that case, it was acknowledged that the ERA had adopted two different values for a single parameter – the value of cash dividends. The ERA then submitted that there was a different piece of evidence to establish each of the two different values. The Tribunal then concluded that:

> …dividend drop-off studies and dividend yield studies do different work and measure different things. Estimation using dividend yields and theta estimation using dividend drop-off studies are separate steps in the determination of the CAPM-based rate of return. They are both necessary and appropriate steps but they are not linked steps. They seek independently of each other to estimate two different parameters.[91]

190. In our view, this conclusion is incorrect in that there are not two parameters, but two different values for a single parameter. It is clear, and undisputed, that two different values have been used for the value of cash dividends.

191. When the Tribunal refers to "two different parameters," they may mean two different parts of the WACC estimation exercise. That is, one value for cash dividends is used in the gamma step of the WACC estimation and a different value is used in the return on equity (CAPM) step. But there are a number of problems with this interpretation, as set out above. In particular, the integrity of the WACC estimation process is based on internal consistency and this is lost if different values can be used for the same parameter. While it is possible that different estimation techniques or different data sets might produce different estimates of the same parameter, the proper approach is to consider all relevant information, select an appropriate value for the parameter after considering all relevant evidence, and to then apply that parameter value consistently throughout the WACC estimation process. Allowing different values to be used for the same parameter destroys the integrity of the WACC estimation process, essentially rendering it a free-for-all.

192. In our view, the Tribunal has also erred in concluding that the two steps (i.e., the gamma step and the required return on equity step) are not linked. *All* steps in the same WACC estimation exercise are linked. But the link between the gamma step and the required return on equity step is particularly

[91] DBNGP [2012] ACompT 14, Paragraph 207.

strong and direct. As noted above, to determine the regulatory allowance for shareholders, the regulator must estimate the required return on equity net of the assumed value of franking credits:

$$r_e^* = r_e\left[\frac{1-T}{1-T(1-\gamma)}\right].$$

193. In the present case, the ERA has estimated the first term ($r_e$) on the basis that cash dividends are valued at 100 cents and has then estimated the second term (in square brackets) on the basis that cash dividends are valued at 85 cents. That is, the regulatory allowance to shareholders is based on the product of two terms – and the ERA has estimated each on the basis of a different estimate of the value of cash dividends.

### Logical analysis

194. The ERA's Decision, the ERA's submissions to the Tribunal, and the Tribunal's reasons for decision all deal at some length with dividend yield studies and dividend drop-off studies and some of the statistical and econometric issues relating to each. None of this is at all relevant to the question of consistency – it shows a fundamental misunderstanding of the point being argued. It is not disputed that some (U.S.) academic studies can be used to support a value of 100 cents for cash dividends and that other studies can be used to support a value of 85 cents. It is also not disputed that in every empirical study there are a range of statistical and econometric issues that one must consider when designing the study and when interpreting the results. The point is not whether the ERA can point to two different studies to support each of its two different estimates of the same parameter, but whether the ERA should be allowed to use two different estimates of the same parameter.

195. Logically, there are only two possible outcomes:

a) The same value of the same parameter must be used throughout the same WACC estimation exercise (which appears to be the position from the Tribunal's GasNet Decision); or

b) The regulator may use different values for the same parameter in the same WACC estimation exercise, so long as they can point to different pieces of evidence to support each of the different values that are used (the Tribunal's DBP Decision).

196. The Tribunal's DBP decision would seem to override the Tribunal's GasNet Decision. A regulator could estimate market risk premium (one step of the WACC estimation exercise) based on a 10-year government bond yields, and then estimate the risk-free rate (another step of the same WACC estimation exercise) based on 5-year government bond yields – so long as the regulator could point to different studies to support each of the two different estimates.

### Misleading submissions and misunderstandings

197. A number of oral submissions made to the Tribunal on behalf of the ERA, and which were accepted by the Tribunal, were misleading and/or untrue.

198. For example, the ERA's submissions that "the cost of equity can be estimated from dividend yield studies"[92] and that when "undertaking dividend yield studies for CAPM purposes, you generally

[92] DBNGP [2012] ACompT 14, Transcript, p. 125.

assume that dividends have a value of one"[93] are both incorrect and misleading. Dividend yield studies are not used to calculate the return on equity and they are not used in any part of the CAPM estimation process. Moreover, when pursuing dividend yield studies it is *not* normally assumed that cash dividends are valued at 100 cents. Rather, the whole point of dividend yield studies is to *estimate* the value of cash dividends, so it would make no sense at all to *assume* a value as part of that exercise.

199. However, those submissions clearly influenced the Tribunal, which concluded that "when pursuing dividend yield studies for the CAPM return on equity calculations, it is normally assumed the value [of cash dividends] is 100 cents in the dollar."[94] This illustrates that the Tribunal had been misled.

200. As another example, the Tribunal states that a drop-off less than the size of the gross dividend is "in contrast to the theory."[95] However, there is no theory to suggest that the drop-off would be expected to equal the gross dividend. Indeed the whole point of the exercise is to *estimate* the drop-off. The implication is that an empirical study that estimates a drop-off less than the gross dividend is somehow inconsistent with the theory. But this is not the case. The only theory is that the size of the drop-off implies the market value of dividends and imputation credits, which is why the drop-off method is used.

[93] DBNGP [2012] ACompT 14, Transcript, p. 124.
[94] DBNGP [2012] ACompT 14, Paragraph 181.
[95] DBNGP [2012] ACompT 14, Paragraph 195.

## 8. Conclusions and recommendations

201. We have set out our conclusions and recommendations in the form of responses to the questions that are posed by the ERA in its Consultation Paper.

### Q56: What criteria should be used to select an approach/ model for estimating gamma?

202. In our view, when determining a value for gamma, a regulator should:

a) **Have regard to all relevant models, methods, data, and evidence** – clearly articulating its reasons for concluding that any particular piece of evidence is irrelevant;

b) **Give weight only to estimates that are based on observed market data**, not to theoretical assumptions that are inconsistent with the observed data;

c) **Give relatively more weight to empirical estimates that have been independently reviewed**. The weight applied should reflect the thoroughness of the review. For example, more weight would be given to a study for which all data and computer code had been provided to the reviewer. Similarly, more weight would be given to a study if the merits of that study had been considered by a court, which then endorsed the findings of that study. Similarly, other things equal, more weight would be given to an academic study that had been published in a leading international journal than in a local journal;

d) **Have regard to internal consistency when applying its estimate of gamma**. There are two aspects of consistency to consider. As explained in Section 5, the regulatory approach is to make two adjustments in relation to imputation credits. The regulator should ensure that these two adjustments are consistent (i.e., they should cancel each other out). As explained in Section 7, the regulator should select one single estimate of the value of cash dividends and apply that consistently throughout the WACC estimation process; and

e) **Compare the regulatory estimate of the ex-imputation required return on equity** (which relies on the regulator's estimate of gamma) **against the commercial market estimate of the ex-imputation required return on** equity (which requires no estimate of gamma). This is explained in more detail in the answer to Q58 below.

### Q57: What are the best methods and/or studies for estimating the value of gamma?

203. The ERA has noted in its discussion paper that it is standard for gamma to be estimated as the product of two components, the distribution rate ($F$) and theta.

204. As set out in Section 3, two approaches have been proposed for estimating $F$:

a) Empirical observation; and

b) Theoretical assumption.

205. For the reasons set out in Section 3, our view is that $F$ should be estimated empirically with reference to observed data. As set out in Section 3, the current best estimate of $F$ is 70%.

206. As set out in Section 4, the best available dividend drop-off estimate of theta is the SFG estimate of 0.35.

207. The Tribunal has held that the current best available estimate of gamma is 0.25.

208. Other approaches that might be used to estimate theta are discussed in the answer to Q 59 below.

**Q58: What are the main rationales for estimating gamma via the estimates of the payout ratio and theta? Is it possible to estimate gamma directly from available market data?**

209. We are unaware of any method for estimating gamma directly from market data. As the ERA has noted in its Consultation Paper, the empirical methods that have been used in the literature and in practice provide separate estimates of *F* and theta.

210. However, as noted in Section 5 above, the practice that is adopted everywhere other than in the regulatory sector, does not require any estimate of gamma at all. Whereas the regulatory approach estimates the ex-imputation required return on equity using an estimate of gamma in two places (grossing-up the estimate of MRP and then reducing the allowed return on equity) the market estimates the ex-imputation required return on equity directly.

211. At a minimum, the market-based estimate of the ex-imputation required return on equity should be compared with the regulatory estimate of the ex-imputation required return on equity to check that:

a) Each of the two-steps of adjustment in the regulatory approach have been applied consistently; and

b) The regulatory estimate of gamma is sensible.

**Q59: Are there methods – other than for dividend drop off studies – which could estimate the value of imputation credits and better meet the new NGR RoR objective and requirements?**

212. A number of studies have sought to estimate *F* using observed data on the year-by-year ratio of (a) the amount of imputation credits distributed during the year, to (b) the amount of imputation credits created during the year. These studies have consistently reported estimates close to 70%.

213. Three types of studies have been proposed to estimate theta:

a) Redemption rates;

b) Dividend drop-off studies; and

c) Simultaneous price studies.

214. As set out in Section 4 above, the Tribunal has confirmed that redemption rate data cannot be used to estimate theta.

215. Simultaneous price studies infer a value of theta (and a corresponding value of cash dividends) from the simultaneous prices of two securities. For example, Cannavan, Finn and Gray (2004) use data on the simultaneous traded prices of shares in a company (which entitle the holder to dividends and the associated imputation credits) and futures contracts for the same company (which involve no such entitlement). The difference in the prices of the two instruments provides an estimate of the value of the dividend and the associated imputation credit.

216. Some of the studies set out in the table of dividend drop-off studies in the Consultation paper are in fact simultaneous price studies. For example, Walker and Partington (1999) investigate a special market in which shares can be traded cum-dividend even after the ex-dividend date on the ASX. This enabled some investors (volumes are very small) to trade shares cum-dividend and ex-dividend at the same time in order to effectively transfer imputation credits from one investor to another. This study used data prior to the introduction of the 45-day rule that was designed to prevent the transfer of imputation credits between investors.

217. In summary, the simultaneous price method and the dividend drop-off method can both be used to empirically estimate theta.

218. Finally, we note that in a report for the AER, McKenzie and Partington (2010) submit that the approach of Dempsey and Partington (2008) makes it possible to "undertake valuations which correctly account for franking credits without explicit consideration of their value."[96] This approach estimates the combined value of dividend plus franking credit and seeks to perform valuation exercises without separating the combined value into its component pieces.

219. McKenzie and Partington note, however, that "we doubt that it had extensive use."[97] Indeed, they submit no evidence of it having any use whatsoever. Moreover, under the DP approach, retained earnings are more valuable than new equity to the extent that undistributed franking credits are assumed to have some value. This means that when a regulated investment is financed by retained earnings "the investment base for price regulation should be adjusted accordingly."[98]

220. Dempsey and Partington also note that "in most regulatory hearings, the utilities argue for a zero value for imputation credits … to justify higher prices. Under the proposed system, it is possible that such argument would actually be reversed."[99] They conclude that "quite different valuations can arise using the [proposed] method relative to either the traditional method or the Officer (1994) method."[100]

221. In our view, the Partington approach should not be used (and has not been used) in any commercial or regulatory setting. However we do agree with two conceptual points made by McKenzie and Partington:

    a) Every estimate of theta is paired with a corresponding estimate of the value of cash dividends. It would be inconsistent and wrong to use an estimate of theta from one approach together with an inconsistent estimate of the value of cash dividends from another approach; and

    b) To the extent that retained credits are assumed to have value, financing investments with retained earnings must be more expensive than new equity and a higher required return would be appropriate – it would be inconsistent and wrong to assume that retained franking credits have material value, but then to assume that the required return on retained earnings is the same as on new equity.

[96] McKenzie and Partington (2010), p. 28.
[97] McKenzie and Partington (2010), p. 28.
[98] Dempsey and Partington, p. 445.
[99] Dempsey and Partington, p. 445.
[100] Dempsey and Partington, p. 454.

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