GOLDFIELDS GAS TRANSMISSION

SUBMISSION ON THE ECONOMIC REGULATION AUTHORITY'S DRAFT RATE OF RETURN GUIDELINES

19 September 2013

Executive summary

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Goldfields Gas Transmission (GGT) welcomes the opportunity to comment on the ERA's Draft Rate of Return Guidelines and accompanying Explanatory Statement. In making this submission, we have also had regard to the AEMC's determination on the new rule 87, and the draft guideline prepared by the AER.

At the highest level, and as explained more fully in this submission, GGT is concerned with the ERA's Draft Guidelines and Explanatory Statement in two primary areas:

(a) the Draft Guidelines do not appear to follow the intent of the new rules, being to focus on an outcome rate of return commensurate with the efficient financing costs of a benchmark efficient entity with a similar degree of risk as that which applies to the service provider in respect of the provision of reference services (the allowed rate of return objective); and

(b) the Draft Guidelines do not follow the letter of the rules, specifically a clear requirement to have regard to a broad suite of relevant information (where "relevant" is a very low threshold).

The new rules include a foundational element, the allowed rate of return objective of rule 87(3). This key element of the rules is designed to remove any doubt that the regulator's rate of return determination is to be focused on the outcome, rather than on the methodology and inputs.

One area that requires considerably more development in the ERA's guidelines process is the definition of the benchmark efficient entity. The definition of the benchmark efficient entity is critical to the achievement of the allowed rate of return objective. If the benchmark efficient entity is not sufficiently well defined, it will not be possible for the regulator to demonstrate that its allowed rate of return achieves the allowed rate of return objective.

The new rules are also clear that the regulator must have regard to a broad range of relevant estimation methods, financial models, market data and other evidence. While the AEMC determination was quite clear that "relevant" was chosen as a very low threshold, the ERA has derived a set of criteria to guide its exercise of judgement which has the effect of rejecting all models save for the Sharpe-Lintner Capital Asset Pricing Model, and a simple model for estimation of the rate of return on debt.

As discussed more fully in this submission, GGT is concerned that the ERA's application of these "criteria" has undermined this key element of the NGR.

The result of the ERA's application of these "non-rule" criteria is that no other financial models or information sources remain in contention to inform the exercise of judgement or to allow the ERA to ascertain whether a candidate rate of return is the rate which achieves the allowed rate of return objective.

GGT is of the view that the process for rate of return determination which the ERA proposes under the Draft Guidelines is precisely the same as the process it applied before the rule change. In short, the ERA's Draft Guidelines demonstrate none of the evolution in rate of return determination reflected in the new rules.

GGT is concerned that the Draft Guidelines focus heavily on a single methodology to estimate the allowed rate of return, without sufficient focus on whether the outcome achieves the allowed rate of return objective.

Pipeline businesses must compete for capital in the open marketplace. To the extent the regulator's determination of the allowed rate of return falls short of the cost of capital in the marketplace, the pipeline business will not be able to source capital to invest in extending or expanding its regulated pipeline assets.

To the extent the rate of return resulting from the application of the ERA's guidelines is less than the rates of return investors can earn on non-regulated activities, then the pipeline business will not be able to attract capital to invest in its regulated assets.

Moreover, to the extent the allowed rate of return emanating from ERA decisions is lower than that in the decisions of the Australian Energy Regulator applicable to infrastructure businesses operating in the eastern states, capital will naturally flow to the higher-earning eastern states in preference to Western Australia.[1]

In either case (the ERA's rate of return being too low to attract investment in absolute terms, or being low relative to those emanating from AER decisions), the result will invariably be a chilling effect on Western Australian infrastructure investment, and a consequential chilling effect on those sectors of the Western Australian economy that rely on that infrastructure investment.

GGT urges the ERA, in accordance with the NGR, to ensure that its allowed rate of return is commensurate with the prevailing conditions in the market for funds, and to demonstrate this as per the requirements of the rules and the allowed rate of return objective.

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[1] Two primary areas in which the AER decisions are likely to resulting a higher allowed rate of return are:

(a) the AER's use of a ten-year term on Commonwealth Government Securities to determine an appropriate risk free rate for calculating the cost of equity, in contrast to the ERA's proposal to adopt a five-year term; and

(b) the AER's use of a seven year benchmark term on all debt, in contrast to the ERA's approach to use a portfolio with an average tenor of approximately five years.

1 Overview

Investors who finance gas pipelines and associated infrastructure have been concerned that the rates of return allowed in regulatory determinations under the National Gas Law (NGL) and the National Gas Rules (NGR) have been lower than the rates they require to invest in that infrastructure. Those investors saw changes to rule 87 of the NGR, the rule governing rate of return determination, made by the Australian Energy Market Commission in November 2012, as facilitating the alignment of expected and allowed rates of return.

The critical change was the inclusion of the allowed rate of return objective in the NGR. Rate of return determination would, as a result, become outcome-focused. It would be focused on delivering the right outcome: an allowed rate of return which 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.

To ensure that the right outcome could be delivered – to ensure that the allowed rate of return objective could be achieved – the AEMC's amendments to the NGR introduced flexibility into the process of rate of return determination by requiring that regard be had to relevant estimation methods, financial models, market data and other evidence.

The AEMC's amendments to the NGR also introduced a requirement for the regulator to periodically make and publish rate of return guidelines that set out the approach to be taken in determining the allowed rate of return. The AEMC saw guidelines as "safeguarding the framework against the problems of an overly-rigid prescriptive approach that cannot accommodate changes in market conditions".[2] They were not intended to lock-in any parameters or methodologies from which departure would not be permitted; their purpose and value at the time of particular regulatory decisions was that they would "narrow the debate".[3] This was necessary if rate of return determination was to have the flexibility needed to deliver an allowed rate of return which achieved the allowed rate of return objective.

In consequence, rule 87(14) of the NGR requires that the regulator make and publish rate of return guidelines which set out:

(a) the methodologies that the regulator proposes to use in estimating the allowed rate of return, and an explanation of how those methodologies are

[2] 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, page 46.

[3] Ibid., page 58.

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; and

(b) the estimation methods, financial models, market data and other evidence the regulator 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.

The *Draft Rate of Return Guidelines* (Draft Guidelines) issued by the Economic Regulation Authority (ERA) on 6 August 2013, and the supporting *Explanatory Statement for the Draft Rate of Return Guidelines* (Explanatory Statement), set out the methodologies that the ERA proposes to use, and the estimation methods, financial models, market data and other evidence the ERA proposes to take into account in estimating the rate of return on equity, the rate of return on debt and the value of imputation credits.

Unfortunately there is, in our view, little in the substance of the Draft Guidelines and the Explanatory Statement to suggest that the methodologies which the ERA is proposing to adopt have been prepared with regard to the rule change and to the reasons why it was made. There is no focus on achieving the right outcome – the allowed rate of return required by the allowed rate of return objective – and the flexibility introduced into rule 87 is seen as having only a minor role in the rate of return determination. The methodologies, models, estimation methods and data are those which have informed previous regulatory decisions by the ERA. There is no explanation of how their use might lead to the determination of a rate of return on equity, and a rate of return on debt, which are consistent with the allowed rate of return objective. Were the Draft Guidelines to become the ERA's rate of return guidelines, they would perpetuate the rigidly mechanical approach to rate of return determination which the AEMC sought to change through its November 2012 rule change.

In our view, the Draft Guidelines are not in accordance with the AEMC's intentions when it amended rule 87, and do not meet the requirements of the NGR.

We now have before us the draft rate of return guidelines which were issued by the Australian Energy Regulator (AER) on 30 August 2013. We have concerns about a number of aspects of the AER's proposed methodologies which are similar to the concerns which we have about the approach to rate of return determination proposed by the ERA. Nevertheless, we see from the AER's draft guideline:

(a) proposed use of multiple models, different data sources and other information in estimation of the rate of return on equity which will allow comparisons to be made and conclusions to be drawn on whether any

particular estimate of that rate of return might contribute to achieving the allowed rate of return objective; and

(b) a practical, rather than a theoretical, approach to estimation of the rate of return on debt which is more likely to deliver estimates of that rate of return which contribute to the allowed rate of return objective.

The AER is proposing to incorporate into its guidelines some of the flexibility in rate of return determination sought by the Australian Energy Market Commission.

With their apparent lack of concern for achieving the right outcome, and an absence of flexibility in estimation of the rates of return on equity and debt, there is a real prospect that the ERA's guidelines will lead to regulated rates of return which are lower than elsewhere in Australia.

We are concerned that, were the ERA's Draft Guidelines to be implemented, regulatory rate of return allowances in Western Australia will not be sufficient to allow regulated businesses to compete for capital in global financial markets. We are also concerned about the prospect of regulated rates of return in Western Australia which are lower than those delivered by the AER in eastern states. Investors may well choose to invest in assets in eastern Australia over Western Australia. Western Australian pipeline operations will have difficulty attracting capital, investment in pipeline infrastructure will slow, and further growth in the Western Australian economy will be constrained.

The reasons for our rather negative view on the ERA's Draft Guidelines are set out in the paragraphs which follow. In those paragraphs we comment on:

(a) the broad regulatory framework;

(b) the overall rate of return;

(c) the benchmark efficient entity and the risk of the service provider;

(d) gearing;

(e) the risk free rate of return;

(f) the return on equity and the equity beta;

(g) the market risk premium;

(h) the return on debt and the benchmark credit rating; and

(i) debt and equity raising costs.

2 Broad regulatory framework

2.1 Incentive regulation

A substantial part of the Draft Guidelines examines the general principles of incentive regulation and seeks to draw implications for the regulator's determination of the rate of return to be used in the setting of regulated prices.

We think that such an extensive discussion of incentive regulation is out of place in rate of return guidelines prepared in accordance with the requirements of rule 87. It does not, and cannot, provide support for the methodologies the ERA proposes to use, and for why those methodologies have been adopted.

The principles of incentive regulation may – or may not – have guided the design of the regulatory regime of the NGL and the NGR and, more recently, may or may not have guided changes to rule 87. However those principles are no longer relevant to either the rate of return guidelines, or to determination of the allowed rate of return. The rate of return guidelines must now be developed to meet the stated requirements of the NGL and the NGR.

There is, for example, no explicit requirement for the rate of return to "remunerate the efficient financing costs of the service provider over the lives of the assets, in terms of net present value".[4] If the ERA believes that the rate of return is to achieve this outcome, it should explain how such a requirement follows from the principles set out in the NGL and the NGR, and not from an extraneous view of what might constitute incentive regulation.

We see, in the implications which the ERA has drawn from its discussion of incentive regulation, the first indications of a departure from the requirements of the NGL and the NGR which persists throughout the Draft Guidelines and the Explanatory Statement.

2.2 Criteria to guide the exercise of judgement

We are concerned with the apparent disregard for the requirements of the NGL and the NGR, which appears to have led the ERA to adopt, as part of the Draft Guidelines, an arbitrary set of criteria for decision making. These criteria are introduced as being required to guide the exercise of regulatory discretion. However, they are not used in that way. They become the primary criteria against which the ERA assesses its guideline proposals.

We see this as disregarding the requirements of rule 87.

[4] Draft Guidelines, paragraph 26.

We do not disagree with the view, in paragraph 33 of the Draft Guidelines, that the ERA will need to exercise judgement in meeting the requirements of the NGL and the NGR, and that an explicit set of criteria will provide a framework for that exercise of judgement which enhances transparency in the process of decision making, and enhances predictability.

The ERA advises, in paragraph 34 of the Explanatory Statement, that these criteria are not intended to supplant the NGL and the NGR; rather they are subordinate to the requirements of the law and the rules.

We agree that the criteria must be subordinate to the requirements of the NGL and the NGR. They cannot replace those requirements. If the criteria are to provide a framework for the exercise of judgement as the ERA proposes, the circumstances in which the requirements of rule 87 are silent should be explained, and the criteria which are to be applied in those circumstances should be grounded in the requirements of the rule. If the criteria are not so grounded, there will be no reason to expect that their application will assist in the determination of an allowed rate of return which achieves the allowed rate of return objective.

In our view, neither the Draft Guidelines, nor the Explanatory Statement, grounds the criteria set out in paragraph 35 of the Draft Guidelines in the requirements of the NGL and the NGR, or explains how those criteria are to be interpreted as being subordinate to the law and the rules.

Appendix 3 of the Explanatory Statement provides an extensive commentary on the criteria, but the links which it seeks to make with the requirements of the NGL and the NGR are, at best, tenuous and, in a number of instances, they are non-existent.

In the following subsections of this submission, we further examine the ERA's criteria and the explanation provided for their inclusion in the Draft Guidelines.

2.2.1 Theoretical underpinning

Paragraphs 9 and 10 of Appendix 3 purport to link economic principles and strong theoretical foundations with the national gas objective. The implication of paragraph 11 is that this link is via the concept of economic efficiency. However, the link to efficiency is not explicitly made, and we doubt whether such a link can be made. The national gas objective is concerned, pragmatically and in our view appropriately, with efficient investment and the long term interests of consumers. It does not use the term "economic efficiency". Where that term is used, in the revenue and pricing principles of section 24 of the NGL, its use refers to practical behaviours in the context of developing, operating and using a specific pipeline system.

We raised these issues in our 8 July 2013 submission responding to ERA's cost of debt working paper. That the relevant minister may have said, in his second reading speech on the bill which would implement the NGL in South Australia, that the national gas objective was about economic efficiency does not eliminate the need to properly interpret the objective and the other provisions of the law and the rules which make reference to efficiency.

We think that economic principles might usefully guide the exercise of judgement, but only when no clear guidance is provided by the NGL and the NGR. We note, though, that this is strictly a matter of legal interpretation. No reference is made to the legal interpretation of rule 87 in either the Draft Guidelines or the Explanatory Statement.

We agree that economic theory provides important insights relating to the conditions of economic efficiency. We note that economic theory defines economic efficiency in terms of an allocation of goods and services to all consumers in an economy, and of inputs to the production of those goods and services to all producers. (Economic theory does not use the slogans "allocative efficiency", "productive efficiency" and "dynamic efficiency".) An allocation is economically efficient (or Pareto optimal) if there is no other allocation in respect of which all consumers are at least as well off, and at least one consumer is better off.

Economic theory then makes two substantial propositions about economic efficiency. These are the so called First and Second Welfare Theorems. The First Welfare Theorem is a statement that an allocation will be economically efficient if it is an equilibrium of exchanges in competitive markets, where those exchanges are effected in response to prices. The Second Welfare Theorem asserts that any economically efficient allocation can be achieved as the allocation of a competitive equilibrium after an appropriate lump sum redistribution of wealth among consumers.[5]

Some, but not all, of the conditions in which these theorems apply can be loosely summarised using the terms "allocative efficiency", "productive efficiency" and "dynamic efficiency".

We do not dismiss economic theory as a means of informing decisions about the application of economic regulation, but the way in which that takes place must be carefully thought out. The First and Second Welfare Theorems are ideals which are unlikely to be found in the conditions of real economies. Economic efficiency is, then, an ideal that might be approximated by public policies designed to

[5] The way in which the notion of economic efficiency is incorporated into economic theory, and its implications are complex and subtle. A recent and careful textbook presentation of the arguments can be found in Truman F Bewley (2007), *General Equilibrium: Overlapping Generations Models, and Optimal Growth Theory*, Cambridge, Massachusetts: Harvard University Press.

restore the conditions underlying the theorems. The qualifier "might" is important in this context. If a policy restores the conditions for efficiency in one sector of the economy, but the required conditions do not obtain in other sectors, then nothing can be said about the efficiency implications of that policy. Complete competitive markets can deliver an economically efficient allocation, but an economy is either efficient, or it is not. Economic theory has no notion of "efficiency improvement". This rather negative conclusion comes from the relatively neglected "theory of the second best".[6]

In our view, the Draft Guidelines and the Explanatory Statement do not make a case for strong theoretical underpinnings which links to the requirements of the NGL and the NGR. In those parts of the Explanatory Statement where the criterion of "strong theoretical underpinnings" is invoked, it appears as a criterion which has been arbitrarily introduced. Any links to the allowed rate of return objective, and to the requirements of the NGR and the NGL more generally, have been lost.

2.2.2 Fit for purpose

We agree that economic principles, particularly principles with strong empirical support, may provide some guidance where the rules are silent and an exercise of judgement is required. Reference to such principles may provide support for that exercise of judgement in those limited circumstances where no guidance is provided by the NGL and the NGR.

We are less clear on what role a "fit for purpose criterion" might play, and found little to assist us in the Explanatory Statement.

Paragraph 25 of Appendix 3 informs us that methods which could be demonstrated to perform best in estimating the rate of return on equity and the rate of return on debt would be most fit for purpose. But what does "perform best" mean?

In our view, the NGR are clear on what is required. There is a clear hierarchy of objectives in rule 87 for the purpose of deciding on how the rate of return is to be determined. At the top of that hierarchy is the allowed rate of return objective of rule 87(3). The allowed rate of return is to be determined such that it achieves this objective (rule 87(2)).

In accordance with rule 87(4), the allowed rate of return is to be a weighted average of the rate of return on equity and the rate of return on debt. Rule 87(6) then requires that the rate of return on equity be estimated such that it contributes to achievement of the allowed rate of return objective. Similarly, rule

[6] R G Lipsey and Kelvin Lancaster (1956-1957), "The General Theory of Second Best", Review of Economic Studies, 24(1): pages 11-32.

87(8) requires that the rate of return on debt be estimated such that it also contributes to the achievement of the allowed rate of return objective.

We do not see circumstances arising in which there might be a need to invoke a criterion of "fit for purpose" which exists independently of the primary requirements of rule 87 that the allowed rate of return satisfy the allowed rate of return objective, and that its component rates of return on equity and debt contribute to the achievement of that objective.

2.2.3 Implemented in accordance with best practice

Implementation of rule 87 in accordance with "best practice" means, we are advised in paragraph 29 of Appendix 3 of the Explanatory Statement, that the ERA's rate of return methods will be robust, transparent, internally consistent, and derived from available, current and credible data sets.

These are all, we think, reasonable requirements. There is, however, a risk that, apart from transparency, each of them will conflict with the allowed rate of return objective.

Robust of methods are desirable, but choice of a method for reasons of its robustness cannot displace the requirement for a rate of return which meets the allowed rate of return objective. An estimation method, applied to an inadequate model, cannot produce the required rate of return no matter how robust the estimation method might be.

Similarly, a criterion that data sets be current and credible is not unreasonable, but the choice of data cannot override the achievement of the allowed rate of return objective.

We see the choice of data as a potentially significant issue. In our view, the data required to establish the benchmark efficient entity and its efficient financing costs will not be easily obtained. However, that there are difficulties in obtaining the required data cannot justify the use of other data – for example data pertaining to utilities businesses which do not provide pipeline services – just because those other data are current and because they come from a source which can be regarded as credible. Any data used must be relevant to rate of return determination in accordance with the specific requirements of rule 87.

2.2.4 Ability to reflect changing market conditions and new information

We see no need for an independent criterion which examines ability to reflect changing market conditions and new information, especially when that criterion is one introduced to "fill the gaps" in circumstances in which the requirements of the rule 87 are silent and the exercise of judgement is required.

The allowed rate of return objective requires that the allowed rate of return be commensurate with the efficient financing costs of the benchmark efficient entity. It does not indicate that the assessment of commensurability is to be made with respect to efficient financing costs at some time in the past. The use of the present tense in the statement of the objective, and the place of the objective in the regulatory scheme of the NGR, indicate that the rate of return is to properly take into account changing market conditions and new information.

This is reinforced by rules 87(7) and 87(10).

Through its requiring that regard be had to prevailing conditions in the market for equity funds when estimating the rate of return on equity, rule 87(7) requires that account be taken of changing market conditions and new information. Similarly, if the rate of return on debt is to be estimated as the rate that would be required by debt investors in a benchmark efficient entity which raised debt at the time of a regulatory decision, as is permitted under rule 87(10)(a), then account must be taken of market conditions and new information available at that time.

However, paragraph 45 of the Appendix 3 of the Explanatory Statement advises that the ERA sees the criterion of "ability to reflect changing market conditions and new information" as having application in circumstances outside the scope of rules 87(7) and 87(10). The criterion, the ERA advises, is intended to apply, not in respect of the market conditions themselves, but to the choice of estimation methods which capture prevailing market conditions or past changes in those conditions.

If this is its purpose, then a criterion of ability to reflect changing market conditions and new information is redundant. Rule 87 is clear: the rate of return on equity and the rate of return on debt are to be estimated such that they contribute to the allowed rate of return objective. Rule 87 provides the criteria for the choice of estimation methods. A further criterion for this purpose, which has no grounding in the NGL or the NGR, is not required and is not admissible.

2.2.5 Supportive of specific regulatory aims

We appreciate the desirability of rate of return methods which lead to consistent regulatory decisions across industries, service providers and time. Furthermore, we understand that those methods should also contribute to meeting the broader requirements of the NGL including the national gas objective of section 23, and the revenue and pricing principles of section 24.

There is, however, no requirement, either explicit or implicit, in the scheme of the NGL and the NGR which requires regulatory decisions which are consistent across industries, service providers and time. There does not need to be. If consistency is required, it is consistency in outcome: where a rate of return is

required, it should be the efficient financing costs of service provision. Consistency in regulatory decisions across industries, service providers and time, will be achieved by having objectives similar to the allowed rate of return objective of rule 87(3) in other regulatory instruments. But that is a matter for public policy makers; it is not a matter for the rate of return guidelines.

Rule 87 is an element of the broad scheme of economic regulation set out in the NGL and the NGR, and its application should also contribute to meeting the broader requirements of the NGL including the national gas objective of section 23 and the revenue and pricing principles of section 24. In these circumstances, a requirement that rate of return determination support a range of specific regulatory aims including consistency with competitive market outcomes; ensuring "NPV = 0"; providing incentives for efficient financing; promoting simple rather than complex approaches; promoting reasoned, predictable and transparent decision making; and enhancing the credibility and acceptability of a decision are either extraneous, and not admissible, or redundant.

A criterion which requires that the rate of return be consistent with competitive market outcomes because those outcomes are efficient is redundant. The allowed rate of return is to be commensurate with the efficient financing costs of a benchmark efficient entity (see below). The requirement for efficiency, irrespective of whether markets are, or are not, competitive is already incorporated into rule 87.

That rate of return determination should ensure that the net present value of returns is sufficient to cover a service provider's efficient expenditures (the 'NPV = 0 condition) is quite unclear. Even if this criterion were to be reformulated, there would be a risk that the result would be either inconsistent with section 24(3) of the NGL, or redundant (because of the existence of that section).

A criterion which requires that rate of return determination provides incentives for efficient financing is redundant. The requirement for efficient financing is already incorporated into rule 87 through the allowed rate of return objective.

A preference for simple over complex approaches, where appropriate, is, in our view, redundant. The level of complexity of approach will be determined by the requirement that the rate of return achieve the allowed rate of return objective, and the component rates of return on equity and on debt also contribute to the achievement of that objective.

Finally, the credibility and acceptability of a rate of return decision, or of a regulatory decision in the context of which a rate of return decision is made, will be enhanced by that decision having the right outcome. Rate of return methodologies which deliver that outcome – which achieve the allowed rate of return objective – will be credible and acceptable. Criteria for credibility and

acceptability, established independently of the NGL and the NGR, are extraneous and inadmissible.

2.2.6 Conclusions

The criteria are, in our view, inherently arbitrary and largely unnecessary. Some arbitrariness may be necessary if the purpose of the criteria is, as the Draft Guidelines suggest, to facilitate decision making where the NGL and the NGR are silent and the exercise of judgement is required.

Unfortunately, in the ERA's application of the criteria, there is no indication that they are seen as being anything less than primary guides to decision making. They supplant the requirements of the NGR and the NGL. They replace the hierarchy of objectives in rule 87 for the purpose of deciding on how the rate of return is determined. In consequence, the Draft Guidelines give little or no consideration to delivering an allowed rate of return which achieves the allowed rate of return objective, and to how flexibility is to be incorporated into the process of rate of return determination to allow the objective to be achieved.

The hierarchy of objectives in rule 87 provides the primary criteria for determination of the allowed rate of return. It therefore provides the primary criteria against which guidelines proposals must be assessed. We find no assessment against these primary criteria in either the Draft Guidelines or in the Explanatory Statement. Instead, we find that a set of inherently arbitrary criteria, introduced purportedly to assist decision making at "lower levels", where the rules cease to provide guidance and where judgement is required, supplant the specific requirements of the NGL and the NGR.

3 Overall rate of return

3.1 Nominal post-tax modelling framework

The ERA advises, in paragraph 37 of the Draft Guidelines, that it will apply an explicit nominal post tax modelling framework for its future decisions.

There is, we believe, no choice in this matter. Rule 87(4) requires that, subject to the allowed rate of return being determined such that it achieves the allowed rate of return objective, it is to be determined on a nominal vanilla basis that is consistent with the estimate of the value of imputation credits referred to in rule 87A.

As Officer has shown, the nominal vanilla form of the weighted average cost of capital is the rate of return to be applied to cash flows which include an explicit estimate of the cost of tax.[7] Rule 76, which was amended by the AEMC in November 2012, now requires an explicit estimate of the cost of corporate income tax as a component of total revenue where, previously, it was optional (and could be taken into account via a pre-tax weighted average cost of capital).

Rule 87 may mandate the use of a nominal vanilla weighted average of rates of return on equity and debt. It does not mandate that the term of the estimates for the rate of return be consistent with the term of the regulatory period. We find the requirement of paragraph 41 of the Draft Guidelines is without foundation for reasons which we set out later in this submission.

3.2 Point estimates and ranges

Paragraph 43 of the Draft Guidelines advises that the ERA intends that the estimates it makes for rate of return determination be point estimates, which may be determined from within a range, or derived directly.

We appreciate the need to use point estimates in determining a specific rate of return for use in total revenue calculation and reference tariff setting. In this context, we also appreciate the need for point estimates at the level of the return on equity and the return on debt. The ERA advises, in paragraph 44 of the Draft Guidelines, that these point estimates may be derived from a single estimation method, or from a range informed by multiple estimation methods, financial models, market data and other evidence.

Point estimates will ultimately be required for an allowed rate of return which is used in total revenue and reference tariff determination, but those estimates should, wherever possible, be informed by multiple estimation methods, financial

[7] R. R. Officer (1994), "The Cost of Capital of a Company Under an Imputation Tax System", Accounting and Finance, May, pages 1 – 17.

models, market data and other evidence. The AEMC clearly intended that this be the case, and explicitly provided for it in amended rule 87. The flexibility which the use of multiple estimation methods, financial models, market data and other evidence allows is essential to rate of return determination delivering allowed rates of return which achieve the allowed rate of return objective.

3.3 Tests of reasonableness

Paragraph 47 of the Draft Guideline advises that the ERA will consider appropriate tests of reasonableness for the outcomes of the WACC models or approaches. The paragraph also notes that these tests of reasonableness need to be interpreted with care, to ensure that any comparisons are made on a transparent and consistent basis.

This concerns us in three ways.

First, no real guidance is provided on what these tests of reasonableness might be. Paragraph 695 of the Explanatory Statement lists a number of sources of information which might be used to construct reasonableness checks, and some explanation of each of these is provided in paragraphs 696 to 700. Those paragraphs do not describe "reasonableness checks".

Second, none of the proposed sources of information, apart from, perhaps, the brokers' estimates, allows a check on whether a candidate rate of return is the allowed rate of return required by rule 87. None provides information which might be used to assess whether a candidate for the allowed rate of return might represent 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.

Moreover, asset sales information and trading multiples cannot be used to infer rates of return without large amounts of additional information about the businesses concerned. That additional information will generally not be available to the service provider, or to the regulator, either precluding its use in a check or forcing assumptions to be made which lead to doubt about the validity of any test of reasonableness.

Third, three new criteria are invoked: reasonableness, transparency and consistency. We acknowledge that references to transparency and consistency can be found in the criteria listed in paragraph 35, but there is no link between transparency and consistency and the primary requirement of achieving the allowed rate of return objective. "Reasonableness" is new. Our views on what is reasonable may well differ from those of the ERA. Rule 87 avoids this potential problem by advancing an objective test for a candidate rate of return: the allowed rate of return 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.

In our view, the rate of return guidelines should not include arbitrary and unreliable tests of the reasonableness for the rate of return. The guidelines should focus on methods which can be shown, and which are shown, to be capable of producing rates of return consistent with the allowed rate of return objective.

4 Benchmark efficient entity and risk

The allowed rate of return of rule 87 is to be commensurate with the efficient financing costs of the benchmark efficient entity. Furthermore, it is to be a nominal vanilla weighted average of estimates of the rate of return on equity and the rate of return on debt. The rate of return on equity used to calculate that nominal vanilla weighted average is to be estimated such that it contributes to achievement of a rate of return commensurate with the efficient financing costs of the benchmark efficient entity. The rate of return on debt used to calculate the nominal vanilla weighted average must also be estimated such that it contributes to achievement of a rate of return commensurate with the efficient financing costs of the benchmark efficient entity.

Identification of the benchmark efficient entity is, then, central to determination of the rate of return required by rule 87.

However, identification of that entity receives minimal attention in the Draft Guidelines, and is inadequately dealt with in the Explanatory Statement. Different benchmarks are invoked at different places in the Explanatory Statement without any consideration of whether they have the attributes required by rule 87.

We see this as a major deficiency in the ERA's proposals, which should be addressed before rate of return guidelines are made and published. If this deficiency is not addressed, those guidelines will not provide methods that can lead to a rate of return which achieves the allowed rate of return objective.

4.1 Risk

The benchmark entity is to have two attributes: it is to be efficient, and it is to have a similar degree of risk as that which applies to the service provider in respect of the provision of reference services.

Paragraph 54 of the Draft Guidelines advises that estimates of efficient financing costs are to be derived from samples of comparable firms with efficient financing costs that are judged to be similar to a single benchmark efficient entity for the provision of gas pipeline and network services in Australia. (Here we see an early instance of the ERA's use of different benchmarks in different places. In the preceding paragraph, the benchmark was defined as a gas network business.)

Paragraph 55 explains that the ERA will use its judgement to determine whether any adjustment needs to be made to the rate of return parameters to account for any material difference in the risk faced by the benchmark efficient entity as compared to the regulated entity providing the reference services.

In paragraph 56, the key risks the ERA will need to consider in ascertaining whether any adjustment needs to be made are identified as those which have the potential to introduce material differences in the exposure to systematic risk, and which are likely to arise from downstream demand risk.

The Explanatory Statement develops the ERA's reasoning on the guidance provided in paragraphs 54, 55 and 56 of the Draft Guidelines.

We agree that the term "similar" recognises the practicalities of approximating risk profiles (Explanatory Statement, paragraph 201). Moreover, provided there is not a material difference between the risk profile of the benchmark efficient entity and the profile of the service provider in its provision of reference services then, in respect of risk, the requirement of the allowed rate of return objective is likely to be satisfied.

We also agree that consideration of "similar" will entail a trade-off between the degree of difference which is acceptable in ascertaining that risk profiles are similar, and the number of entities which might then be found to have a similar degree of risk (Explanatory Statement, paragraph 203). To the extent that "similar" is narrowly interpreted, there will be few, if any, entities which have a degree of risk similar to that of the service provider in its provision of reference services.

Unfortunately, neither the Draft Guidelines, nor the Explanatory Statement, addresses the issue of how the risk profile of the service provider is to be established.

Paragraph 187 of the Explanatory Statement explains that the key issues in assessing risk are the question of whether risk is systematic or non-systematic, and the degree to which risk may be offset. The risks that matter for the investor, and hence for the rate of return, are seen as being systematic, or exogenous, risks, and not non-systematic risks which are diversifiable (paragraph 220). The first steps in establishing the benchmark are, then:

(a) identification of the range of potential risks (paragraph 222);

(b) classification of those risks into risks which are systematic and risks which are non-systematic (paragraph 222); and

(c) identification of those systematic risks which are material to the investor and which, therefore, need to be accounted for in the rate of return (paragraph 223).

We do not agree with this way of assessing the risk in the context of rule 87(3).

The Draft Guidelines conflate two quite distinct and separate classes of risk. These are:

(a) the risks to which the benchmark entity is exposed, and which are to be in degree similar to the risks of the service provider in respect of the provision of reference services; and

(b) the risks for which investors might be compensated through the market determined prices of financial assets.

The first of these classes of risk – the risks to which the benchmark entity is exposed – must be assessed before any consideration can be given to risks in the second class.

The costs of a business which operates in a low risk environment are likely to be very different from those of a similar business which operates in a high risk environment. This difference will be attributable, at least in part, to costs which the business in the high risk environment incurs to mitigate risk.

For example, the costs of a gas transmission pipeline which traverses a major urban area (a high risk environment for transmission pipeline operation) will be higher than the costs of a similar pipeline which traverses a region with little human habitation. In the urban area, among other things, easement and land costs will be higher, thicker-walled pipe must be installed at higher cost, costly reinforcement will be required where roads or railways cross the pipeline, and costs must be incurred for the sound proofing of compressor facilities.

Careful consideration must be given to these differences in costs arising from differences in risks, broadly defined, in the process of establishing the benchmark entity. An entity with lower costs may not be more efficient than one with higher costs if the low cost entity operates in a low risk environment. To ensure that the benchmark entity is, in fact "the benchmark", it is to be of similar degree of risk to the service provider in its provision of reference services. That degree of risk must be assessed by giving consideration to all of the risks involved in pipeline operation.

The benchmark entity must be established with reference to the risk profile of the service provider in its provision of reference services before any consideration is given to the risks for which investors are to be compensated through the prices of financial assets. In the context of paragraph 54 of the Draft Guidelines, the risk profile of the service provider must be established before a sample of comparator firms is drawn.

The risk profile of the service provider guides identification of the required comparator firms and establishment of the benchmark.

Once the benchmark has been properly identified, in accordance with the requirements of rule 87, consideration can then be given to the risks for which investors require compensation through the prices of financial assets (the rates of return on equity and on debt).

If, for example, an equity beta is to be used in calculating a premium for risk in a rate of return on equity, as might be done when applying the Sharpe-Lintner Capital Asset Pricing Model (CAPM), then that beta must be the beta for the benchmark entity. The benchmark entity must be identified and established before the equity beta can be calculated.

If an equity beta is calculated – to estimate the compensation which equity investors require for risk – from a sample of entities which do not have a degree of risk similar to that of the service provider in its provision of reference services, there will be no reason to expect that the rate of return on equity estimated using that beta will contribute to achievement of the allowed rate of return objective.

Through the conflation of two classes of risk, the Draft Guidelines fail to provide the proper basis for establishing the benchmark efficient entity required by rule 87(3).

4.2 Efficiency

The allowed rate of return of rule 87 is to be commensurate with the efficient financing costs of a benchmark entity. That benchmark entity is to be efficient.

Paragraph 50 of the Draft Guidelines explains that financial markets will provide the observations required to evaluate the efficient financing costs of the benchmark efficient entity. We agree. But how are we to ascertain what financing costs are efficient? More fundamentally, how do we ascertain the efficiency of the benchmark entity itself?

The ERA gives some consideration to these issues in chapter 4 of the Explanatory Statement. However, the position established in that chapter is inadequate in terms of meeting the requirements of rule 87.

Paragraph 144 of the Explanatory Statement makes an important point: the requirement for efficient financing costs is consistent with the broad efficiency considerations of the national gas objective and the revenue and pricing principles of the NGL.

We agree, and observe that this will be the case if references to efficiency in the national gas objective and the revenue and pricing principles are interpreted pragmatically and without reference to the abstract and theoretical concept of economic efficiency.

Subsequent paragraphs point to the need to use financial market data, and we accept that such data will have to be used. Paragraph 148 then introduces efficient (financial) markets, and paragraph 151 concludes that the costs of equity and debt observed in financial markets provide the main reference point for establishing efficient financing costs. Brealey and Myers, the authors of a well-known textbook on corporate finance, are quoted, apparently in support of this conclusion: "the concept of an efficient [financial] market is simple and generally supported by the facts".

This may be the case, but it is, at best, only "a part of the story".

Financial market efficiency can be defined in a number of ways but, broadly, it means that the prices at which financial assets are exchanged in those markets fully reflect available information.

The allowed rate of return is to be commensurate with the efficient financing costs of the benchmark efficient entity. Those efficient financing costs may well be based on prices which fully reflect available information. However, that does not mean that those costs are efficient for the purposes of rule 87. It does not mean that they are the lowest costs of financing the benchmark entity. Nor does it mean that the benchmark entity itself is efficient. The efficiency of the benchmark entity – its delivery of pipeline services at low cost – is the outcome of a range of decisions about markets and technology which extend well beyond decisions about how the business is financed. The fact that financial markets are efficient in the sense that the prices at which financial assets trade fully reflects available information is not sufficient to infer that the financing costs of the benchmark entity are efficient, and it is not sufficient to claim, more broadly, that that entity itself is efficient.[8]

Neither the Draft Guidelines, nor the Explanatory Statement, explains how the efficiency of the ERA's proposed single benchmark entity is to be ascertained, and how the efficiency of the financing costs of that entity is to be demonstrated.

These are, in our view, fundamental issues which must be addressed in a methodology for determination of the rate of return required by rule 87 of the NGR, and explained in the rate of return guidelines.

One way in which these requirements for efficiency could be addressed is through formal efficiency analysis using, for example, data envelopment techniques or stochastic frontier methods. Analysis of this type requires data from multiple entities using the same production processes in similar

[8] We continue to interpret efficiency in a pragmatic way, as using the least resources or as achieving low cost. As we explained earlier, we do not see efficiency in the NGL and the NGR as meaning economic efficiency. However, were efficiency to have its technical, economic, meaning, financial market efficiency is neither necessary nor sufficient for economic efficiency (see Joseph E. Stiglitz (1980), "The Allocation Role of the Stock Market: Pareto Optimality and Competition", Journal of Finance, 36(2): pages 235-251.

circumstances. Sufficient data of the type required may not be available from Australian entities, and assessment of the efficiency of the benchmark entity may require recourse to data from businesses operating in markets outside Australia.

However, paragraph 51 of the Draft Guidelines advises that the ERA will constrain the estimation boundaries for the rate of return to Australian domestic financial markets.

4.3 Domestic or international financial markets?

Constraining the estimation boundaries for rate of return determination to domestic markets is, as paragraph 52 of the Draft Guidelines notes, driven by a concern for internal consistency, and by the ERA's preference that all rate of return parameters be estimated from Australian data.

Two new criteria, "internal consistency" and "the ERA's preference that all rate of return parameters be estimated from Australian data" are introduced. Neither appears in the list of criteria in paragraph 35 of the Draft Guidelines. Nor is there any explanation, in either the Draft Guidelines or the Explanatory Statement, of how these new criteria might assist in establishing the efficient financing costs of the benchmark efficient entity.

Again, we find that arbitrary criteria have displaced the primary criterion of rule 87 that the allowed rate of return be commensurate with the efficient financing costs of a benchmark efficient entity with a similar degree of risk as that of the service provider in respect of the provision of reference services.

We appreciate the point made in paragraph 154 of the Explanatory Statement that, where a particular financial market boundary is adopted, then it is desirable that the same boundary be applied across all elements of the rate of return calculation so as to ensure internal consistency. But internal consistency in calculation methods is not a requirement of rule 87 (hence our concern, noted in paragraph 2.2.3 above, about its inclusion in the criteria of paragraph 35 of the Draft Guidelines).

Paragraph 161 of the Explanatory Statement advises that the ERA has given consideration to expanding the boundaries of the data set used for the determination of efficient financing costs to incorporate overseas data. The ERA's key findings, for equity and debt markets, are summarised in paragraphs 156 to 160. In paragraph 162, a qualitative cost benefit analysis is undertaken, and the paragraph concludes: an expansion of the boundaries to allow international data could have benefits, but there would likely be significant costs, as well as potential for error. Nevertheless, paragraph 164 advises that the ERA may consider international influences to the extent that they directly impact on Australian domiciled firms.

All of this is, in our view, inconsistent with the requirement of rule 87. Rule 87 requires that the allowed rate of return be commensurate with the efficient financing costs of the benchmark efficient entity. Unfortunately, the Draft Guidelines do not assist in making a proper identification of the benchmark entity. Were they to do so, identification of the benchmark may require, as we noted in section 4.2 above, recourse to data from businesses operating in markets outside Australia.

The ERA's failure to properly consider the requirements of rule 87, and its conflation of the different classes of risk relevant to rate of return determination in accordance with the rule, lead to an unwarranted focus on financial markets, and to constraining the estimation boundaries for rate of return determination to domestic markets. This is justified for reasons of internal consistency, the ERA's particular preferences, and costs relative to benefits. None of these is grounded in the requirement of rule 87 for a rate of return which achieves the allowed rate of return objective.

4.4 Establishing the benchmark efficient entity

Paragraph 209 of the Explanatory Statement notes that there are two ways of ensuring that the allowed rate of return takes account of the risks associated with the service provider's provision of reference services. It may do so either through a single benchmark, which is then adjusted, or through the development of multiple benchmarks recognising that different service providers provide different reference services with potentially different degrees of risk.

Our preference is for multiple benchmarks, each of which would have a degree of risk similar to that of a particular service provider in respect of its provision of reference services. This would require characterisation of the risk profile of the service provider, use of that profile in identification of possible comparators (each of which would have to be tested for efficiency), and selection of the benchmark, which might be one of the comparators (the most efficient?), or a "composite" having characteristics derived from the set of efficient comparators (for example, a gearing which was the average gearing of the those comparators on the efficiency frontier).

That said, in paragraph 210 of the Explanatory Statement, the ERA advises that it prefers a single benchmark which can then be adjusted, when necessary, for the risk circumstances of a particular service provider. However, neither the Draft Guidelines, nor the Explanatory Statement, explain how this single benchmark is to be established, and how it is to be adjusted for the circumstances of a specific service provider.

Paragraph 54 of the Draft Guidelines indicates that estimates of efficient financing costs are to be derived from samples of comparator firms with efficient

financing costs that are judged to be similar to a single benchmark efficient entity for the provision of gas pipeline and network services in Australia. Paragraph 180 of the Explanatory Statement elaborates: a conceptual definition of the benchmark is to be established, and information is to be gathered from actual comparators which resemble the conceptual entity to inform estimation of the rate of return parameters of the benchmark.

The ERA's conceptual definition of the benchmark is set out in paragraph 53 of the Draft Guidelines. It is:

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

Two things are immediately apparent from the definition.

First, the requirement of rule 87 that the benchmark be an efficient entity has been lost. Without its inclusion, the use of this definition cannot lead to a rate of return which achieves the allowed rate of return objective.

Second, the definition is inconsistent with a single benchmark approach. If the ERA's preference is for a single benchmark, in relation to which it will make adjustments for the risk circumstances of a particular service provider, then the benchmark cannot be defined in terms of an entity with a similar degree of risk as that which applies to the service provider in respect of the provision of reference services.

Nevertheless, we do not dismiss the possibility of proceeding from a suitably defined benchmark which is the foundation for a single benchmark approach.

Paragraph 55 of the Draft Guidelines advises that the ERA will use its judgement to determine whether any adjustment needs to be made to the rate of return parameters determined for its single benchmark to account for any material difference in the risk faced by the benchmark as compared to the regulated entity providing the reference services. Paragraph 56 then indicates that all that will be required are adjustments for material differences in systematic risk, and these differences are likely to be restricted to differences in downstream demand risks.

We further consider systematic risk later in this submission in section 7.1). "Systematic risk" is a label on a box without much content, and this precludes any consideration of material differences in systematic risk, and of adjustments which might be made for those material differences.

If a single benchmark is used, the question arises as to how that benchmark is to be established. It cannot be established from comparators with similar risks to the service provider in respect of its provision of reference services. That would

lead to multiple benchmarks. What the Draft Guidelines and the Explanatory Statement assume is that the benchmark can be established without reference to efficiency, and without any explicit basis for the selection of comparators. (We note that paragraph 171 of the Explanatory Statement endorses the past practice of Australian regulators when estimating gearing, credit rating and the equity beta. That practice did not give consideration to the efficiency requirement previously in rule 87 of the NGR.)

This might be a way of proceeding but, without a "correction" for efficiency, the financing costs of the benchmark could not be those required by rule 87.

However, neither the Draft Guidelines, nor the Explanatory Statement, indicates how the efficiency of the comparators used to establish the benchmark is to be demonstrated, and how the rate of return parameters might then be corrected for efficiency. The assumption made in the Draft Guidelines is that, because they have been determined using financial market data, and financial markets are efficient markets, then the financing costs must be efficient. That assumption is invalid. Irrespective of whether the efficiency which rule 87 requires is the efficiency of economic theory, or a more pragmatic concept of efficiency, that efficiency is not implied by efficient (financial) markets.

The proposed single benchmark approach cannot lead to the allowed rate of return of rule 87.

4.5 Were they to be implemented, the Draft Guidelines would not lead to the rates of return required by rule 87

The benchmark efficient entity is, in our view, central to determination of the allowed rate of return of rule 87. The allowed rate of return is to be commensurate with the efficient financing costs of the benchmark efficient entity.

The Draft Guideline is, however, inadequate in the guidance it provides on the benchmark.

The Explanatory Statement does not assist. We find, in the Explanatory Statement, much evidence of calculation, but very little consideration of what should be calculated, and of what data are required, for the purposes of the rule.

Were they to be implemented, the proposals of the Draft Guidelines would not lead to the rates of return required by rule 87.

The rate of return guidelines must provide guidance on how the ERA intends to identify the benchmark efficient entity and, once that entity has been identified, how the ERA intends to use it to establish the allowed rate of return.

5 Gearing

Rule 87(4)(a) requires that, subject to the allowed rate of return being determined such that it achieves the allowed rate of return objective, it is to be a weighted average of the rate of return on equity and the rate of return on debt.

That this weighted average is to be determined on a nominal vanilla basis, in accordance with rule 87(4)(b), indicates that the weighting should be as shown in the formula in paragraph 40 of the Draft Guidelines. The rate of return on equity should be weighted by the proportion of equity in the total financing (comprising equity and debt), and the rate of return on debt should be weighted by the proportion of debt in the total financing.

Paragraph 57 of the Draft Guidelines advises that the gearing should be determined from the average gearing of a benchmark sample of Australian utility businesses subject to risk similar to that of the regulated entity providing the reference services. In accordance with paragraph 58, these utility businesses must satisfy three criteria:

(a) the business must be a network service provider in the electricity and/or gas industry in Australia;

(b) the company must be listed so that the market value can be estimated using available data sources such as the Bloomberg service; and

(c) data on the values of debt and equity must be available.

We agree in principle. However, the gearing must be the gearing of the benchmark efficient entity. It may well be determined as the average of the gearings of a "composite" derived from a set of comparators each of which has been shown to have risks, broadly defined, which are in degree similar to the risks of the service provider in the provision of reference services, and each of which has been shown to be efficient.

We also agree that each of the comparators in the set must be listed so that its market value can be estimated using data from sources such as the Bloomberg service, and that data on the values of its debt and equity must be available to service providers and to the regulator. Indeed, a requirement that data be available, although obvious, might usefully have been included among the criteria of paragraph 35 of the Draft Guidelines.

However, the gearing cannot be established from an arbitrary sample of Australian gas and electricity network service providers. If it were determined from such an arbitrary sample, there would be no reason to expect that a

candidate rate of return determined using that gearing was a rate of return which achieved the allowed rate of return objective of rule 87(3).

That Australian economic regulators have, over the past decade, determined gearings from a sample of listed Australian electricity and gas network service providers is an interesting historical fact (reported in paragraph 59 of the Draft Guideline), but is extraneous to estimating a gearing which might lead to a rate of return which achieves the allowed rate of return objective of rule 87.

Nor does the argument of paragraphs 265 to 269 of the Explanatory Statement assist. In paragraph 270, the ERA concludes from that argument that, based on the various theories of the capital structure of the firm, the benchmark gearing is to be the capital structure of a benchmark efficient utility business. However, those theories of capital structure have nothing specific to say about utility businesses. Although the theories suggest benchmark levels of gearing, that "suggestion" is largely irrelevant in the context of the application of rule 87. Irrespective of any theory which may seek to explain the observed clustering in gearing, rule 87 requires a rate of return commensurate with the efficient financing costs of the benchmark entity specified in the rule. If that is to be the case, the benchmark must be an efficient entity with similar degree of risk to the service provider in the provision of reference services.

We acknowledge that our views on gearing reflect our preference for a multiple benchmarks approach, and they do not necessarily provide reasons for rejection of the single benchmark approach preferred by the ERA.

However, the ERA's benchmark constructed from listed Australian electricity and gas network service providers, for which data on the values of debt and equity are available, is not the benchmark entity of rule 87. Using this single benchmark to determine the gearing required in applying the rule shows the difficulties inherent in the single benchmark approach. No test for efficiency has been applied, and no attempt has been made to show that the benchmark has a degree of risk similar to that of the service provider in the provision of reference services. In consequence, there is no reason to expect that the gearing from the single benchmark aligns with the gearing of the benchmark efficient entity of rule 87. In our view, that alignment must be explicitly demonstrated and, if the gearing of the single benchmark is found not to align with the gearing of the benchmark efficient entity, it must be adjusted. How this alignment, and adjustment of the gearing, might be carried out is not at all clear to us. The issue is not addressed in the Draft Guidelines, or in the Explanatory Statement, and we are left with the view that the single benchmark approach relies on unsubstantiated assumptions rather than any systematic assessment of efficiency and risk to ensure that the outcome – in this case, the gearing – is the outcome required by rule 87.

The Draft Guidelines suggest use of a gearing of 60% debt in the application of rule 87. We are concerned that there has been no demonstration that the use of this gearing can lead to a rate of return which achieves the allowed rate of return objective. Were it to be adopted, as the ERA appears to indicate in paragraph 59, it would, we believe, be open to challenge.

6 Risk free rate of return

Application of the SLCAPM, which the ERA proposes be used to estimate the rate of return on equity, and of the model the ERA proposes for estimation of the rate of return on debt, requires an estimate of the nominal risk free rate of return.

The risk free rate is a theoretical construct, for which an estimate must be made using rates of return on traded financial assets. Paragraph 67 of the Draft Guidelines advises that there are three key issues to address when making this estimate. These are:

(a) the choice of proxy for the risk free asset;

(b) the term to maturity of the risk free rate; and

(c) the averaging period.

6.1 Proxy for the risk free asset

The choice of proxy for the risk free asset is addressed in paragraph 68 of the Draft Guidelines. Commonwealth Government bonds are identified as the best proxy for the risk free asset in Australia, and yields on those bonds, as reported daily by the Reserve Bank of Australia, should be used for the purpose of estimating the risk free rate of return.

We agree that Commonwealth Government bonds are low risk, and are the best proxy available for the risk free asset in Australia. Yields on these bonds should be used to estimate the nominal risk free rate of return.

6.2 Term to maturity of the proxy

Paragraph 41 of the Draft Guidelines advises that the terms of the estimates to be used in determining the allowed rate of return are to be consistent with the term of the regulatory period. Since the term of the regulatory period is five years, paragraph 42 advises that the terms of the estimates for the rate of return will be five years.

More specifically, paragraph 69 of the Draft Guidelines states that the term to maturity of the Commonwealth Government bonds which are to be used to estimate the risk free rate of return is to be five years.

We disagree.

Established commercial and regulatory practice is the estimation of the risk free rate of return from the yields on low risk securities with long terms to maturity. This is seen as being consistent with the commercial principle that long lived

assets should be financed long term. In Australia, the risk free rate has been estimated from Commonwealth Government bonds with terms to maturity of 10 years, not because asset lives are 10 years but because these are the low risk securities with longest term to maturity which have been regularly issued and traded in Australian financial markets.

In the Explanatory Statement, three reasons are advanced for departure from past commercial and regulatory practice. They are:

(a) matching the terms of the securities used to estimate the risk free rate to the regulatory period will ensure that total costs are recovered in present value terms;

(b) the average term to maturity of debt raised by Australian rated utilities is approximately 5 years; and

(c) the current debt profiles of Australian electricity network and gas pipeline service providers do not contradict the term of five years implied by the NPV = 0 principle.

We do not find these reasons for a significant departure from previous commercial and regulatory practice to be convincing.

6.2.1 The NPV = 0 principle (1): Marshall et al. and Schmalensee

In support of its proposal that the estimates to be used in determining the allowed rate of return are to be consistent with the term of the regulatory period (five years), the ERA advances theoretical arguments that this is required if the NPV of service provider cash flows, over the regulatory period, is to be zero.

We have examined these theoretical arguments and find that they are deficient.

We do not question whether NPV = 0 is an appropriate valuation rule, although we note that section 24(2) of the NGL does not limit service provider recovery of efficient costs in this way: the service provider is to be given the opportunity to recover at least the efficient costs incurred in providing reference services. This is what we would expect to find in a regime incorporating principles of incentive regulation.

Our issue is with the term of the risk free rate.

Paragraph 3 of the Appendix 2 to the Explanatory Statement notes that, under the assumption that future interest rates are the only source of uncertainty, and that a regulated business is financed entirely by equity, Marshall, Yawitz and Greenberg concluded that the period associated with the risk free rate should

match the regulatory period.[9] Marshall, Yawitz and Greenberg argue, according to Appendix 2, that if the NPV = 0 principle is not satisfied, the equity investors are either over compensated or undercompensated by the regulator.

Marshall, Yawitz and Greenberg analysed price setting for a regulated monopolist under demand (not interest rate) uncertainty. They argued, among other things, that for the monopolist to receive a fair return on its investment, the capital market value of its uncertain income must exactly equal the purchase price of its beginning of period investment in physical capital (in the ERA's terminology, "NPV = 0"). Marshall, Yawitz and Greenberg made no assertion concerning the period associated with the risk free rate. Their one period valuation model used certainty equivalent cash flows discounted at the risk free rate of return. The analysis was theoretical (although a key result was illustrated using a numerical example). The analysis required only that a risk free rate of return exist, and Marshall, Yawitz and Greenberg made no assertion concerning the period associated with the risk free rate.

Paragraph 4 of Appendix 2 to the Explanatory Statement advises that Richard Schmalensee similarly assumed no debt and no source of risk other than future interest rate uncertainty, and concluded that the term of the risk free rate and the term of the debt margin should be matched with the regulatory control period to ensure that equity holders were not under- or over-compensated.[10]

Schmalensee demonstrated that, if a regulated firm were allowed to earn its actual (nominal) cost of capital on the depreciated original cost of its investment, and if actual earnings were equal to allowed earnings, then the present value of the investment would be zero for any method of computing depreciation. For this demonstration, Schmalensee required only that the allowed rate of return per period, and the firm's actual cost of capital per period, exist. He did not require, and nor did he assume, any disaggregation of the allowed rate of return, or of the firm's actual cost of capital, into its component parts, and did not make any assertions concerning the risk free rate of return or the debt risk premium. Schmalensee's NPV = 0 result was obtained with reference to the accounting life of an investment in regulated assets, and not from any consideration of the regulatory period.

Neither the paper by Marshall, Yawitz and Greenberg, nor the paper by Schmalensee, asserts that the term of the risk free rate of return should match the regulatory period. Neither paper supports the ERA's view that the term of the risk free rate should be five years.

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[9] William J. Marshall, Jess B. Yawitz and Edward Greenberg (1981), "Optimal Regulation Under Uncertainty", Journal of Finance, 36(4): pages 909-921.

[10] Schmalensee, Richard (1989), "An Expository Note on Depreciation and Profitability Under Rate-of-Return Regulation", Journal of Regulatory Economics, 1(3): pages 293-298.

6.2.2 The NPV = 0 principle (2): Lally (2007)

Unlike the papers by Marshall, Yawitz and Greenberg, and by Schmalensee, papers by Lally, in 2004 and 2007, to which the ERA refers, explicitly address the question of the period of the risk free rate to be used in determining rates of return which are, in turn, to be used in setting regulated prices.

We have not reviewed Lally's 2004 paper, but examine the argument of his later paper. In his 2007 paper, Lally advises that, although the analysis of the earlier paper has been extended to a regulated firm which is at least partly debt financed, it continues to show that the term of the risk free rate used by the regulator should match the regulatory cycle.[11]

Analysis of Lally (2007) indicates that this conclusion is incorrect.

Lally's analysis assumes two regulatory periods, or "years", which span the life of a regulated asset. He considers four cases, or "policies", which assume (variously) terms to maturity of one "year" or two "years" for debt and the risk free rate of return.

These four policies are analysed under two assumptions regarding the cost of debt and regulated rates of return. In section 2 of his paper, Lally assumes that under each of his four policies the regulated firm borrows at the risk free rate and the regulated rate of return set by the regulator is also the risk free rate. In section 3, he extends the analysis to costs of debt comprising the risk free rate plus a premium.

The approach in section 3 reflects the model for estimating the rate of return on debt proposed by the ERA.

In both sections 2 and 3 of his paper, Lally uses the "NPV = 0" criterion (termed the "present value principle") to establish whether or not the term of the debt should match the duration of the regulatory period. Lally's application of the criterion sets the present value of cash flows to equity holders, received after debt has been serviced, equal to the present value of investments made by those equity holders in the regulated firm.[12]

In section 2 of his 2007 paper, Lally sets out a series of equations representing the present values of cash flows to equity holders for each of his four policies. He concludes from these equations that "the only situation in which the present value principle is in general satisfied is the first case [i.e. Policy 1], in which both the risk free rate used by the regulator and the duration of the firm's debt

[11] Martin Lally (2007), "Regulation and the Term of the Risk Free Rate: Implications of Corporate Debt", Accounting Research Journal, 20(2): pages: 73-80.

[12] For the purpose of his analysis, Lally can, and does, ignore operating costs.

matches the regulatory cycle".[13] If the term to maturity of the debt does not match the regulatory period exactly (as assumed under policies 2, 3, and 4), the "NPV = 0" criterion is not satisfied.

Careful reconstruction of the equations which Lally sets out in section 2 of his paper for policies 2, 3, and 4 (cases where the term of debt does not match the regulatory period) shows, we believe, the following errors:

(a) an incorrect regulated rate of return is used in the analysis of policy 2; and

(b) an incorrect discount factor is used in the present value calculations of policies 3 and 4.

This leads us to doubt Lally's conclusion, in section 2, that the "present value principle" is not satisfied under policies 2, 3, and 4 (the cases where the term of debt term does not match the regulatory period). The equations of section 3 of Lally's paper are extensions of the equations of section 2. In consequence, we doubt the validity of the conclusions from section 3 that the "present value principle" is not satisfied under policies 2, 3, and 4 (again, the cases where the term of the debt term does not match the regulatory period).

We do not think that Lally's work supports the conclusion that, in all circumstances, the term of the risk free rate should match the regulatory period.

That this is the case can be seen more clearly from analysis by Melbourne University Professor Kevin Davis although Davis, like Lally, concludes, in our view inappropriately, that the term to maturity of debt used in determining regulated access prices should correspond to the regulatory period.[14]

6.2.3 The NPV = 0 principle (3): Davis

Davis uses a simple two period model to examine the implications of five borrowing strategies available to the regulated business, and four potential choices for the setting of the cost debt by the regulator. The five borrowing strategies are:

(a) short term debt (2 x one period borrowings);

(b) fixed long term risk free cost, with credit spread variable across periods;

(c) long term floating rate note;

(d) long term fixed rate debt;

[13] Lally (2007), page 76.

[14] Davis's most recent exposition of this view is in his working paper "The Debt Maturity Issue in Access Pricing", Draft 3, 2 September 2012, available at http://kevindavis.com.au/

(e) long term debt redeemed when it has one period remaining, repeated in the second period.

The four potential choices available to the regulator for the setting of the cost of debt are:

(a) use a one period cost of debt each period;

(b) use a two period cost of debt each period

(c) use a two period cost of debt in period 1, and do not reset in period 2; and

(d) use a two period cost of debt in period period1, and use a one period cost of debt in period 2.

Davis therefore contemplates 20 cases. We illustrate his analysis for the case of the regulated business borrowing short term, and the regulator using a one period cost of debt each period. In this case:

(a) the regulator allows a costs of debt $r_{01} + s_{01}$ at date 1 and $r_{12} + s_{12}$ at date 2, where r_{ij} is the risk free rate prevailing at date i for maturity j, and s_{ij} is the debt margin for the regulated business at date i for maturity j;

(b) at date 1, the regulated revenue (net of operating costs and assuming all capital is recovered at the end of period 2) is $r_{e0} + r_{01} + s_{01}$, where r_{e0} is the allowed rate of return on equity in period 1;

(c) at date 2, the regulated revenue (net of operating costs and assuming all capital is recovered at the end of period 2) is $r_{e1} + r_{01} + s_{01} + D$, where r_{e1} is the allowed rate of return on equity in period 2, and D = 2 is the depreciation (return of capital);

(e) at date 1, the return to equity is:

$$e_1 = r_{e0} + r_{01} + s_{01} - r_{01} - s_{01} = r_{e0;}$$

(f) at date 2, the return to equity is:

$$e_2 = r_{e1} + r_{12} + s_{12} + 2 - r_{12} - s_{12} - 1 = r_{e1} + 1,$$

where the end of period return of equity is 1 (gearing is assumed to be of 50%).

This case shows that, when the regulated business borrows with term to maturity of the debt the same as the regulatory period, and the regulator sets the cost of debt at rates consistent with this borrowing strategy, the equity investors receive

their allowed return in each period. This seems to be the NPV = 0 principle invoked by the ERA.

Once this result is established, the most interesting case is, in our view, the case where the regulated business uses long term fixed rate debt, and the regulator uses a two period cost of debt in period 1, and does not reset that cost in period 2. This is the case where the business borrows long term, and the regulator uses that long term borrowing cost to determine regulated revenue and prices regulatory period by regulatory period. In this case:

(a) the regulator allows a costs of debt $r_{02} + s_{02}$ at date 1 and $r_{02} + s_{02}$ at date 2;

(b) at date 1, the regulated revenue (net of operating costs and assuming all capital is recovered at the end of period 2) is $r_{e0} + r_{02} + s_{02}$;

(c) at date 2, the regulated revenue (net of operating costs and assuming all capital is recovered at the end of period 2) is $r_{e1} + r_{02} + s_{02} + D$;

(e) at date 1, the return to equity is:

$$e_1 = r_{e0} + r_{02} + s_{02} - r_{02} - s_{02} = r_{e0;}$$

(f) at date 2, the return to equity is:

$$e_2 = r_{e1} + r_{02} + s_{02} + 2 - r_{02} - s_{02} - 1 = r_{e1} + 1.$$

When the regulated business borrows with term to maturity of the debt the same as the life of the regulated asset, and the regulator sets the cost of debt at rates consistent with this borrowing strategy, the equity investors receive their allowed return in each period. The ERA's NPV = 0 principle continues to apply. Davis, however, does not analyse this case in his paper. His analysis does not, therefore, allow the conclusion that term to maturity of bond used to estimate the risk free rate of return should correspond to the regulatory period.

Davis disposes of the relevant case by arguing "that it is not difficult to show that unless the service provider can borrow for the same maturity as the life of the asset, this increases the risk facing the service provider".[15] This may or may not be the case. As we note in section 6.2.4 below, service providers borrow for terms to maturity longer than the regulatory period. Davis's method of analysis can be used to show that if this is the case, and the regulator uses a rate of return consistent with the term to maturity of the service provider's debt, equity investors receive their allowed rates of return. The NPV = 0 principle continues to apply.

[15] Davis, September 2012, page 8.

6.2.4 Average term to maturity and current debt profiles

In support of the proposal of the Draft Guidelines, that the term to maturity of the Commonwealth Government bonds which are to be used to estimate the risk free rate of return be five years, paragraph 393 of the Explanatory Statement advises that Standard and Poor's industry report cards for December 2012 indicate that the average term to maturity of debt raised by Australian rated utilities is approximately 5 years.

However, as the ERA acknowledges in paragraph 394, the average term to maturity at a particular date does not indicate the term of debt at issuance.

When we turn to data on the term at issuance we find, in Table 6 of the Explanatory Statement, that the average term for a sample of Australian gas and electricity network service providers is 11.5 years.

In paragraph 400 of the Explanatory Statement we are told that the yield required to service a firm's cost of debt is a function of the remaining term to maturity, and not the term to maturity at issuance; the term to maturity at issuance is therefore irrelevant for the pricing of debt. This may be the case for debt trading in secondary markets. It is not the case for the pricing of primary issues. The pricing of those primary issues is determined by, among other things, the term to maturity of the debt.

The price of debt trading in secondary markets may be above or below the price at issue, but that is irrelevant for the scheme of Part 9 of the NGR. When applying that scheme, the service provider is to be given a reasonable opportunity to recover costs which are efficiently incurred in the provision of reference services (NGL, section 24(2)). The service provider's cost of debt is, loosely, the product of the amount of debt issued and the rate of return which the issuer requires on that issued debt. Rule 87 requires that the estimate which is made of the rate of return sought by the issuer be the rate of return appropriate to a benchmark efficient entity. The data presented in the Explanatory Statement suggest (they are not data for the benchmark efficient entity) that an efficient service provider is likely to issue debt with a term to maturity longer than 5 years and probably longer than 10 years. It is the rate of return on this long term debt of the benchmark efficient entity which must then be used in determining the costs of the service provider. These are the costs which an efficient service provider would expect to incur, and which an efficient service provider should expect to recover through regulated prices.

The efficient service provider's costs are not determined by the prices at which debt trades in secondary markets. They are not determined by the remaining term to maturity of debt which has been issued.

6.3 The averaging period

Yields on Commonwealth Government bonds reported today incorporate the latest market information and expectations about future rates. The world is not, however, ideal, and today's reported yields (like yesterday's) contain a random component ("noise"). Some averaging of yields should reduce the effect of this noise on the estimate of the risk free rate of return, with longer-term averages achieving better noise reduction. However, longer term averaging introduces a bias because greater weight is given to superseded prior expectations. The use of an averaging period of 20 trading days, as proposed in paragraph 70 of the Draft Guidelines, effects noise reduction without giving undue weight to superseded prior expectations. Use of a risk free rate determined using an averaging period of 20 trading days would not, in our view, be inconsistent with the requirement of rule 87(7) that regard be had to the prevailing conditions in the market for equity funds when estimating the rate of return on equity.

6.4 Conclusions: risk free rate of return

We agree that Commonwealth Government bonds are the best proxy available for the risk free asset in Australia, and that the nominal risk free rate of return should be estimated from yields on these bonds. Some averaging of the yields should reduce the effect of "noise" in the estimate, and an averaging period of 20 trading days, as proposed in paragraph 70 of the Draft Guidelines, in appropriate.

There is, however, no case for requiring that estimation of the risk free rate of return be restricted to averaging the yields on Commonwealth Government bonds with terms to maturity of five years. Neither the academic evidence nor the empirical evidence advanced by the ERA supports such a requirement.

Davis's method of analysis shows that if the regulator uses a rate of return consistent with the term to maturity of the service provider's debt, equity investors receive their allowed rates of return. The NPV = 0 principle continues to apply.

This indicates that the term of the risk free rate must, then, approximate the original term to maturity of the firm's debt at the time of issue.

As shown in Table 6 of the Explanatory Statement, that the average term for a sample of Australian gas and electricity network service providers is 11.5 years.

Therefore, if the ERA is to rely on the NPV = 0 principle to inform its decision on the risk free rate, then the terms to maturity of the Commonwealth Government bonds used as the proxy to measure that risk free rate must be aligned, to the extent possible, to the average term of debt at the time of issuance.

The ERA's analysis clearly indicates then, that the correct term for the benchmark risk free rate is ten years rather than five years.

We note that the AER's *Draft rate of return guideline*, issued on 30 August 2013, proposes estimation of the risk free rate of return from yields on Commonwealth Government bonds with terms to maturity of 10 years.

7 Rate of return on equity and the equity beta

Paragraph 77 of the Draft Guidelines is unequivocal: the CAPM is the only model for determining the return on equity that meets the criteria for acceptability in the Australian context at the current time.

We do not agree.

We expect that the CAPM will have a role to play estimating the rate of return on equity to be used in determining the allowed rate of return. However, what that role will be, and how the CAPM is to be applied, have to be carefully assessed against the requirements of the NGR and the NGL. In particular, the CAPM has to be assessed for whether its use leads to an estimate of the rate of return on equity which contributes to the achievement of the allowed rate of return objective.

The ERA notes, in paragraphs 586 and 587 of the Explanatory Statement, that:

(a) the CAPM has been used by Australian regulators concerned with estimating the rate of return on equity;

(b) the rules governing rate of return in versions of the NGR earlier than version 14 specifically referred to the CAPM as an example of a well-accepted financial model; and

(c) other regulators have adopted the CAPM as the primary means of estimating the rate of return on equity.

In paragraph 588, the ERA advises that, in accordance with rule 87(5)(a), it must have regard to relevant estimation methods, financial models, market data and other evidence. The question therefore arises as to whether possible alternative models and other evidence, listed in paragraphs 572 to 574 of the Explanatory Statement, are "relevant" to estimating the rate of return on equity, while also meeting the broader requirements of the NGL, including the national gas objective and the revenue and pricing principles.

The requirement of rule 87(5)(a), that in determining the allowed rate of return, regard be had relevant estimation methods, financial models, market data and other evidence, provides only a loose "screening" of those methods, models data and other evidence. "Relevant" means "to have bearing on" or "making reference to" the matter under consideration. All of the models and other evidence in paragraphs 572 to 574 are relevant to determination of the allowed rate of return because they have bearing on, or make reference to, the rate of return on equity. Rule 87(6) then provides further guidance on which of them should be taken into account in estimating that rate of return:

The return on equity for an access arrangement period is to be estimated such that it contributes to the achievement of the allowed rate of return objective.

Only those methods, models and data, and only that other evidence, which can produce an estimate of the rate of return on equity which contributes to achievement of the allowed rate of return objective can be considered.

This has three implications for the approach to the rate of return on equity set out in the Draft Guidelines and the Explanatory Statement.

First, that the CAPM has been used by Australian regulators concerned with estimating the rate of return on equity, that the rules governing rate of return in versions of the NGR earlier than version 14 specifically referred to the CAPM as an example of a well-accepted financial model, and that other regulators have adopted the CAPM as the primary means of estimating the rate of return on equity, are interesting observations. However, none of them is sufficient to infer that use of the CAPM can produce an estimate of the rate of return on equity which contributes to achievement of the allowed rate of return objective.

Second, there is no basis for assuming that the CAPM can produce the required estimate of the rate of return, and then proceeding to find that possible alternative methods and models for estimation of the rate of return on equity are inadequate. The CAPM must be assessed for whether it can produce the required estimate of the rate of return on equity, along with any other financial models, from the set of relevant models, which might be proposed for that purpose. This has not been done in either the Draft Guidelines or in the Explanatory Statement.

Third, the absence of any relationship between the ERA's criteria for the application of regulatory discretion and the allowed rate of return objective means that those criteria cannot guide the selection of financial models and other evidence for estimation of a rate of return on equity which can be expected to contribute to the achievement of that objective. Furthermore, even if a relationship between the criteria and the allowed rate of return objective were to be clearly demonstrated (and we doubt that it can be), then the application of the criteria does not lead to the conclusions which the ERA draws concerning possible alternatives to the CAPM.

7.1 Estimating the rate of return on equity using the CAPM

Section 10.2.4 of the Explanatory Statement commences with a discussion of the CAPM. Paragraphs 592 to 594 advise that:

(a) the CAPM estimates the rate of return on equity by quantifying a premium for risk over and above the return on a risk free asset;

(b) the premium is only for systematic risk; non-systematic risks are eliminated through portfolio diversification; and

(c) the effect of systematic risk is quantified through the equity (asset) beta.

This discussion is supplemented by Appendices 11 and 12 of the Explanatory Statement. Paragraph 9 of Appendix 11, and paragraph 18 of Appendix 12, note that the model is based on the following assumptions:

(a) investors invest for one period;

(b) investments are limited to publicly traded assets;

(c) investors are risk averse and, when choosing among portfolios, choose mean-variance efficient portfolios;

(d) investors take the asset returns as given; they are "price takers";

(e) investors agree on the joint distribution of asset returns, and this agreed joint distribution is the correct distribution of those returns;

(f) investors face no taxes or transaction costs;

(g) borrowing and lending can occur freely at a risk free rate of return which is the same for all investors and does not depend on the amount borrowed or loaned.

Apart from (b), these are assumptions usually made for derivation of the CAPM. Derivation of the CAPM does not require that investments be limited to publicly traded assets. The CAPM is a general model for the pricing of financial assets.

Appendix 12 presents a derivation of the CAPM. In paragraphs 16 and 17, the model is described as follows:

$E(r_i) = r_f + \beta_i \times [E(r_m) - r_f]$,

where:

$E(r_i)$ is the expected rate of return on asset i;

r_f is the risk free rate of return;

β_i is a measure of the systematic risk present in asset i; and

$E(r_m)$ is the expected rate of return on a market portfolio of assets.

Paragraph 17 of Appendix 12 advises that the difference between the expected rate of return on asset i and the risk free rate of return, $E(r_m) – r_f$, is called the market risk premium (MRP).

The ERA's exposition tells us that the MRP is the difference between the expected rate of return on the market portfolio at the commencement of the single period over which investors invest, and the risk free rate at that point in time. Moreover, the expected rate of return on the market portfolio is the mean of the joint probability distribution of asset returns in respect of which all investors are in agreement, and which is assumed (for the purpose of deriving the model) to be the correct distribution of those returns, at that time. The asset returns which are the support of that joint distribution are the returns expected to prevail one period hence.

The CAPM is, then, "forward looking", but the length of the single period over which investors invest is not explicitly defined.

Through the derivation of the CAPM presented in Appendix 12, the ERA makes clear the meaning of the term "systematic risk", which is used extensively in the Explanatory Statement. Paragraph 7 of the Appendix explains that systematic risk is the risk attributable to a portfolio comprising a large number of assets. Paragraph 15 advises that diversification is assumed to be costless, and this implies that an optimal portfolio will only compensate investors for bearing systematic risk. We are told that as systematic risk is market risk, the fully diversified portfolio will be exposed only to macroeconomic risks, and as a consequence investors will only earn a return for bearing macroeconomic risks.

Paragraph 596 of the Explanatory Statement concludes that the CAPM is grounded solidly in theory, and therefore performs well against the criterion that the estimate be based on a strong theoretical foundation.

There is nothing in the Draft Guidelines or in the Explanatory Statement which supports the view that the CAPM is solidly grounded in theory. "Strong" is a relative term. What is "theoretically weak" relative to which the claim that the CAPM has a strong theoretical foundation is made? A comparative analysis is required. However, all that we are provided with, in Appendix 12 of the Explanatory Statement, are a textbook exposition of portfolio theory, and a brief derivation of the CAPM based on the usual assumptions.

None of this provides any support for the view that the CAPM has a strong theoretical foundation. We do not agree that a single period static model of the type presented in Appendix 12 constitutes a "strong theoretical foundation". Much of the more recent work in asset pricing has its foundations in the standard dynamic stochastic general equilibrium model which is the cornerstone of contemporary (neoclassical) economic theory. The use of that approach in asset

pricing was pioneered by Merton in 1973.[16] The importance of Merton's work lies in its theoretical foundations, rather than in its development of a model which might be used to estimate expected asset returns either in Australia or elsewhere.

We agree that the CAPM is widely used, and that one reason for its widespread use is its simplicity (paragraph 599 of the Explanatory Statement). With careful application the CAPM can provide estimates of the rate of return on equity (paragraph 599). This is why we see the CAPM, despite its limitations, as having a role to play in estimation of the rate of return on equity to be used in determining the allowed rate of return.

In paragraph 606 of the Explanatory Statement, the ERA concludes that the CAPM remains an important tool for evaluating the rate of return on equity, and we concur.

Paragraph 606 further advises that the CAPM may not explain investor returns with precision, but explains these returns as well as, if not better than, many other models ex ante.

We agree that the CAPM does not explain investor returns with precision. This is the principal issue with use of the CAPM in the estimation of rates of return on equity.

The CAPM does not explain investor returns with precision and, if the CAPM is used, then its use should be supplemented by other evidence, including the results from alternative financial models and market data on equity returns, to establish a rate of return on equity which contributes to achievement of the allowed rate of return objective. This is no more than the requirement of rule 87(5)(a) that regard be had to relevant estimation methods, financial models, market data and other evidence.

The claim, in paragraph 606, that the CAPM explains returns as well as, if not better than, many other models ex ante is puzzling. It is a claim that, "from before", the CAPM is as good as, if not better than, other models of explaining asset returns. But before what? A clue is provided in the reference to a recent book by Haim Levy in the preceding paragraph. Levy refers to the theoretical proposition which is the CAPM as the ex ante CAPM, in comparison to the ex post CAPM, by which he means a particular realization of the theoretical model obtained by estimating beta using time series data.[17] Levy's claim in respect of the theoretical model – the ex ante CAPM – is quite limited: the theoretical

[16] Robert C Merton (1973), "An Intertemporal Capital Asset Pricing Model", Econometrica, 41(5): pages 867-887.

[17] Haim Levy (2012), *The Capital Asset Pricing Model in the 21st Century: Analytical, Empirical and Behavioral Perspectives*, Cambridge: Cambridge University Press.

model is not invalidated by the ex post model. That is, the theoretical model is not invalidated by the econometric studies which have sought to test the model using time series data.

Neither Levy, nor the Draft Guidelines and the Explanatory Statement, provides any evidence that the CAPM, as a purely theoretical proposition, explains returns as well as, if not better than, other models. The vast literature on asset pricing which has accumulated since the 1960s (when Sharpe, Lintner and Mossin published the first papers on the CAPM) generally attests to the fact that it does not.

We observe that the ERA's own estimates pertaining to the CAPM clearly indicate that the model does not explain investor returns with precision.

Table 23 of the Explanatory Statement shows that the coefficients of determination (R-squared) associated with the ordinary least squares (OLS) estimates of beta for individual Australian utility businesses are quite small, the largest (for APA Group) being 16.19%. We understand the accompanying comments in paragraph 906, that most of the beta estimates made using OLS are statistically significant, and that all of the estimates of beta made using more robust estimation methods are statistically significant at the 5 per cent level.

In paragraph 1769 of its September 2012 Final Decision on proposed revisions to the Access Arrangement for Western Power Network, the ERA advised:

The Authority is of the view that low R-Squares are common in asset regression and they do not indicate, or allow one to conclude that, results are statistically unreliable. The Authority considers that, traditionally, more emphasis is placed on the statistical significance of estimated parameters and that their signs from the estimates are consistent with a priori expectations.

We agree that emphasis is placed on the statistical significance of estimated parameters, and on the consistency of their signs with prior expectations, in the statistical testing of economic theories. A statistically significant beta with the correct sign provides support for a prior theoretical proposition that beta has a role to play in the explanation of the rate of return on equity.

However, in the context of beta estimation and use of the CAPM to estimate the rate of return on equity, the validity of the underlying theoretical proposition is only "a part of the story". If the theoretical proposition – the CAPM – does not explain a large proportion of variation in the data on equity returns, then it cannot, in any specific set of circumstances, provide a precise estimate of the rate of return on equity in those circumstances.

The estimated betas may be statistically significant, indicating that beta is likely to have a role to play in an explanation of the return on equity. However, the low values for the coefficient of determination indicate that only a small proportion of the variation in the ERA's equity returns data is explained by beta. Other factors, as yet unidentified, and therefore omitted from the ERA's regressions, play a major role in explaining those equity returns.

This problem is not unique to the ERA's estimation methods or data.

Early in the history of the CAPM, Miller and Scholes found a coefficient of determination for the model of only 0.19.[18] Roll explored the issue in his presidential address to the American Finance Association in 1987.[19] Using Australian data, Durack, Durand and Maller found that the explanatory power of the CAPM was poor with a coefficient of determination of only 7.25 per cent.[20] This was, they noted, in keeping with the coefficient of determination of 1.35% reported by Jagannathan and Wang in a (then) recent (1996) study which used US data.[21]

There is, in these circumstances, no basis for the conclusion that the CAPM is "fit for purpose" in the ERA's sense of being able to perform well in estimating the rate of return on equity over the regulatory years in an access arrangement period.

This diminishes the significance of the comment, in paragraph 606 of the Explanatory Statement, that the CAPM is empirically tractable in Australia. The necessary statistical estimates can be made using Australian data, but the "Australian CAPM", like the CAPM elsewhere, does not explain investor returns with precision.

All of this leads back to where the AEMC found itself in proposing to change the rules governing rate of return. Mandating use of the CAPM, or indeed any other asset pricing model, and mandating greater prescription around particular estimation methods and data, would not ensure better estimates of the rate of return on equity. Where the available models lacked precision, what was needed was less prescription – a step back from the mechanical application of the CAPM – and a more considered view taking into account the information provided by a range of relevant models, estimation methods, data sources and other evidence.

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[18] Merton H Miller and Myron Scholes (1972), "Rates of Return in Relation to Risk: A Re-examination of Some Recent Findings," in Michael C Jensen (ed.), *Studies in the Theory of Capital Markets*, New York: Praeger.

[19] Richard Roll (1988), "R^2", Journal of Finance, 43(3): pages 541-566.

[20] Nick Durack, Robert B Duncan, Ross A Maller (2004), "A best choice among asset pricing models? The Conditional Capital Asset Pricing Model in Australia", Accounting and Finance, 44(2), pages 139-162.

[21] Ravi Jagannathan and Zhenyu Wang (1996), "The Conditional CAPM and the Cross Section of Returns", Journal of Finance, 51(1), pages 3-53.

In respect of estimating the rate of return on equity, the Draft Guidelines are not in accordance with the AEMC's intentions, and do not meet the requirements of rule 87. The single model which is to be used for estimation of the rate of return on equity lacks precision, and there is no basis for presuming that it can be used to make estimates which contribute to achievement of the allowed rate of return objective.

7.2 Possible alternative approaches

An assessment of possible alternatives to the CAPM for estimation of the rate of return on equity is set out in section 10.2.4 of the Explanatory Statement.

Paragraph 588 notes that, in making this assessment, the ERA needs to have regard to relevant estimation methods, financial models, market data and other evidence as required by rule 87(5)(a). The question arises, the ERA advises, as to which of the possible alternative approaches set out in paragraphs 572 to 574 meet the requirement of "relevance" while also meeting the broader requirements of the NGL and the NGR.

In paragraph 589 of the Explanatory Statement, the ERA explains that, for any approach to estimation of the rate of return on equity to be considered relevant, it would need to be broadly consistent with the criteria set out in paragraph 35 of the Draft Guidelines. Paragraph 590 is explicit:

Overall, the threshold assessment is whether, on balance, the method is consistent with the criteria in Chapter 2. Beyond that the Authority will exercise judgement based on the criteria, recognising that it is desirable that the preferred approach to estimating the return on equity meets the criteria to the greatest extent possible (see Chapter 2).

In two short paragraphs the ERA's criteria have displaced the requirements of the NGL the NGR in the assessment of possible alternative approaches to estimation of the rate of return on equity. To require that "relevant" means "broadly consistent with the ERA's criteria" allows the ERA to dispense with any further consideration of the requirements of the NGL and the NGR because its criteria are not grounded in the requirements of the law and the rules.

We find this unsatisfactory. It leads the ERA to a single – deficient – model for estimation of the rate of return on equity, and without the means of understanding what the implications of use of a deficient model might be. The ERA has no means of ascertaining whether its estimates of the rate of return on equity contribute to achievement of the allowed rate of return objective, and no basis for adjusting those estimates should it decide that they do not contribute to achievement of that objective.

The possible alternative approaches to which the ERA gives at least some consideration are:

(a) Black's CAPM;

(b) the empirical CAPM;

(c) the consumption CAPM;

(d) the intertemporal capital asset pricing model;

(e) the Fama-French model;

(f) Arbitrage Pricing Theory;

(g) dividend discount models;

(h) residual income models;

(i) risk premium model;

(j) build-up method;

(k) comparable earnings approach; and

(l) the evidence from broker reports.

We understand that the time available for regulatory decision making under the NGL and the NGR would preclude the use of all of these approaches, and that some initial reduction in the number is highly desirable. We believe that this was AEMC's intention when it stated that the rate of return guidelines were not intended to lock-in any parameters or methodologies; their purpose was to "narrow the debate" at the times of particular regulatory decisions.[22]

In the paragraphs which follow, we examine the arguments used by the ERA to reject the use of some of these other models and this other evidence.

7.2.1 Black's CAPM

Black's CAPM was, as the ERA advises in paragraph 609 of the Explanatory Statement, developed in response to the poor empirical performance of the CAPM.

[22] 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, page 58.

Paragraph 10 of Appendix 11 notes that the derivation of Black's CAPM does not require the assumption of unlimited borrowing and lending at the risk free rate of return. This assumption was necessary for derivation of the CAPM.

Black's CAPM has the form:

$E(r_i) = E(r_{om}) + \beta_{im}[E(r_m) - E(r_{om})]$

where:

$E(r_i)$ is the expected rate of return on asset i;

$E(r_m)$ is the expected rate of return on the market portfolio m;

$E(r_{om})$ is the expected return on the zero beta portfolio associated with m; and

$\beta_{im} = \text{cov}(r_i, r_m)/\text{var}(r_m)$

Paragraph 609 of the Explanatory Statement notes that Black's CAPM belongs to a family of empirical capital asset pricing models. In the members of this family, adjustments are made to the parameters of the CAPM to achieve alignment with observed rate of return outcomes. The implication, although this is not explicit from paragraph 609, is that the ERA views Black's CAPM an empirical construct. Paragraph 615 of the Explanatory Statement makes this clear. It advises that the ERA is of the view that there is no basis for the existence of a zero-beta portfolio, a view which is supported by the fact that there is no underlying theory supporting Black's CAPM. Paragraph 616 advises that Black's CAPM, and other empirical capital asset pricing models, are not widely used in Australia and do not produce reliable estimates in the Australian context (paragraph 616).

We are puzzled by this assessment of Black's CAPM.

Black's CAPM was developed in response to the fact that early empirical work showed that the CAPM did not provide a good fit to observed rate of return data. It was not, however, an empirical model, and is not a member of the family of empirical asset pricing models to which the ERA refers. A number of the assumptions which must be made to derive the CAPM – to give it its "strong theoretical foundation" – were questionable, and were quickly identified as being possible causes of the empirical failure of that model. Fischer Black identified the assumption of unrestricted borrowing and lending at the risk free rate of return as being problematic, and derived an asset pricing model within the mean-variance framework within which the CAPM was derived, without assuming the existence of a risk free asset, and without assuming unrestricted borrowing and lending.

The theoretical foundations of Black's CAPM are at least as "strong" as, if not "stronger" than, those of the CAPM: questionable assumptions have been

removed. These foundations, which the ERA seems to think are missing, can be found in Black's paper "Capital Market Equilibrium with Restricted Borrowing".[23]

Although it may not be widely used by financial market practitioners, Black's CAPM is routinely applied in asset pricing studies. The model, and its econometric estimation, are discussed at length by Campbell, Lo and MacKinlay.[24]

7.2.2 Intertemporal capital asset pricing and the Consumption CAPM

As the ERA notes in paragraph 14 of Appendix 11 to the Explanatory Statement, the CAPM explains asset prices in terms of the covariance of the return on the asset with the return on the market portfolio of assets at a point in time. Many economists are of the view that "explaining" asset prices in terms of asset prices does not constitute much of an explanation: if they are to be explained, asset prices should be explained in terms of economic fundamentals (in neoclassical economics, preferences, technologies, endowments and states).[25]

Merton's approach to intertemporal capital asset pricing does this by assuming the a representative consumer-investor maximises lifetime expected utility of consumption:

$$\mathrm{E}\sum_{t=0}^{\infty}\delta^{t}u(c_{t})$$

where δ is the consumer-investor's subjective discount factor, u is a von Neumann-Morgenstern utility function, and c_t is consumption in period t.[26]

Let k_t be the consumer-investor's consumption in period t if no investment is made in financial assets. Then, if the consumer-investor were to buys n units of the asset, consumption in period t would be:

$c_t = k_t - p_t n$.

On selling the n units of the asset at time t + 1, the consumer-investor's consumption is:

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[23] Fischer Black (1972), "Capital Market Equilibrium with Restricted Borrowing", Journal of Business, 45(3): 444-455.

[24] John Y Campbell, Andrew W Lo and A Craig MacKinlay (1997), *The Econometrics of Financial Markets*, Princeton, New Jersey: Princeton University Press.

[25] A sharp statement of this view is provided by Lawrence Summers (1985), "On Economics and Finance", Journal of Finance, 60(3), pages 633-635.

[26] This "structure" is discussed at length in chapter 5 of Daron Acemoglu (2008), *Introduction to Modern Economic Growth*, Princeton: Princeton University Press. For ease of presentation, we adopt a simple discrete time formulation of the problem, rather than the continuous time formulation of Merton.

$c_{t+1} = k_{t+1} + x_{t+1}n$,

where x_{t+1} is the payoff from the investment at time t + 1.

Subject to these constraints, the consumer-investor's utility is maximised when:

$p_t u'(c_t) = E_t[\delta u'(c_{t+1})x_t + 1]$.

When markets are in equilibrium, the price of the financial asset at time t is obtained from the condition for expected utility maximisation:

$p_t = E_t[\delta(u'(c_{t+1})/u'(c_t))x_{t+1}] = E_t[m_{t+1}x_{t+1}]$,

where $m_{t+1} = \delta u'(c_{t+1})/u'(c_t)$ is the stochastic discount factor.

The rate of return on an asset is $r_{t+1} = x_{t+1}/p_t - 1$, so that the asset pricing equation can be written in terms of rate of return:

$E_t[m_{t+1}(1 + r_{t+1})] = 1$.

m_{t+1}, the stochastic discount factor, is the product of:

(a) investor "impatience" (δ) – a measure of preference for consuming "today", rather than postponing consumption until "tomorrow"; and

(b) the ratio of the marginal utility from consumption "tomorrow" to the marginal utility of consumption "today" ($u'(c_{t+1})/u'(c_t)$).

m_{t+1} is, therefore, a measure of the rate at which investors are willing to substitute consumption "tomorrow" for consumption "today". This intertemporal rate of substitution in consumption is, in turn, determined by the rate of growth in consumption between "today" and "tomorrow". Hence, rates of return are determined by expectations about consumption growth. This is the Consumption CAPM. Through this explicit link to consumption, macroeconomic factors become fundamental determinants of asset prices.

The Consumption CAPM can be implemented in a number of ways. Its implementation should be broadly consistent with the facts that the market price of risk is (relatively) high, it is time varying, and it is correlated with the state of the economy. This has been achieved, with varying degrees of success, using models which incorporate consumption habit formation, and using utility functions which separate intertemporal substitution from risk aversion. However, those models continue to be an important area of asset pricing research, rather than a practical means of estimation of rates of return on financial assets.

Much of the on-going empirical investigation into asset prices continues to use linearized versions of the basic asset pricing equation, $E_t[m_{t+1}(1 + r_{t+1})] = 1$, the explicitly linear models of Arbitrage Pricing Theory, or the linear (but somewhat ad hoc) Fama-French three factor model.

7.2.3 Arbitrage Pricing Theory

We noted above that the CAPM does not explain a large proportion of the variation in the data on equity returns. This indicates that additional factors are required to explain asset prices.

Merton's intertemporal capital asset pricing model represents one approach to this issue.

A second approach to the issue of additional factors being required to explain asset prices is the Arbitrage Pricing Theory (APT) advanced by Ross in 1976.[27]

In paragraph 650 of the Explanatory Statement, APT is rejected for three reasons:

(a) APT has not been used to estimate expected returns in Australia;

(b) there are concerns about the robustness of the model because it is not based on strong theoretical foundations; and

(c) without further development in the regulatory context, APT cannot be regarded as being 'fit for purpose' and could not be 'implemented in accordance with best practice'.

That APT has not been used to estimate expected returns in Australia, and that it cannot be regarded as fit for purpose and capable of being implemented in accordance with best practice are largely irrelevant considerations. APT is clearly relevant to the estimation of equity returns. The key question is whether an estimate made using APT might assist in establishing a rate of return on equity which contributes to the allowed rate of return objective.

An extensive theoretical literature, beginning with the paper by Ross, attests to the fact that APT is based on theoretical foundations at least as strong as those of the CAPM. We note, in particular, the paper by Conner, which demonstrates that the linear factor model of APT has an equivalent equilibrium representation when the market portfolio is a well-diversified portfolio, and the factors are pervasive in the economy. That the factors are pervasive permits investor

[27] Stephen A Ross (1976), "The Arbitrage Theory of Capital Asset Pricing", Journal of Economic Theory, 13(3), pages 341-360.

diversification away from idiosyncratic risk with the implication that only systematic risk is priced.[28]

We fully appreciate the argument that, because economic theory does not provide strong guidance on the factors to be used when implementing the APT, there are risks of "data-mining" and an estimated model which may not predict future asset returns.

Nevertheless, APT is a well-developed and well-recognised approach to asset pricing theory. The issue with APT is not that it has limitations per se; all asset pricing models have limitations. The issue is whether, with careful implementation, those limitations can be dealt with to the extent that the model is at least as good as, if not superior to, the CAPM with its acknowledged limitations, for the purpose of establishing the rate of return on equity of the benchmark efficient entity of rule 87.

Neither the Draft Guidelines nor the Explanatory Statement address this issue because the CAPM is assumed to yield estimates of the rate of return on equity which contribute to the allowed rate of return objective. The bases for this assumption are what has happened in the past, and the prior practices of other regulators. As we noted above, these are not sufficient to infer that use of the CAPM can produce an estimate of the rate of return on equity required by the objective. The CAPM, like APT, must be assessed for whether it can produce the required rate of return on equity. In the scheme of rule 87 (and in economic theory), the CAPM is not a standard against which other asset pricing models are to be assessed.

7.2.4 Fama-French three factor model

Theory – be it based on arbitrage arguments, or on equilibrium considerations - supports a multiple linear factor explanation of asset prices. However, if these linear factor models are to be tested and applied, the factors must be specified. There are three main approaches to factor specification in the asset pricing literature. They are:

(a) use of statistical factor analysis, or principal components analysis, for factor extraction;

(b) identification of the factors as obvious economic variables chosen based on economic intuition; and

(c) the use of cross section empirical relationships between asset returns and firm attributes for factor identification.

[28] Gregory Connor (1984), "A Unified Beta Pricing Theory", Journal of Economic Theory, 34(1): pages 13-31.

Connor and Korajczyk have implemented APT using factors extracted using principal components analysis.[29] Chen, Roll and Ross choose five key economic variables – the spread between long term and short term interest rates, expected inflation, unexpected inflation, industrial production and the spread between high grade and low grade corporate bonds – for implementation of APT.[30]

However, by far the best known implementation of a multiple linear factor model is the three factor model of Fama and French. From empirical analysis using cross sectional data, Fama and French identify the excess returns of small stocks relative to large stocks, and the excess returns of high book-to-market stocks over low book-to-market stocks, as key factors driving rates of return. They combine these two factors with a third factor, excess return on the market portfolio, in a model which, they argue, represents a significant improvement on the CAPM.[31]

In paragraph 637 of the Explanatory Statement, the ERA expresses concern about inconsistent results reported from tests of the Fama-French model. Paragraph 639 notes that recent Australian research, by Brailsford, Gaunt and O'Brien, supports the Fama-French model, particularly with respect to its book to market factor, but reports a statistically insignificant size factor. A similar result had been obtained in an earlier (Australian) study by Faff. These results, the ERA concludes, gave rise to concern about models which use data to derive estimates without underlying theoretical support.

We do not disagree with this conclusion, but consider that it must be viewed in context. Work by NERA for DBP (Dampier Bunbury Pipeline), and for Jemena Gas Networks, has demonstrated that the Fama-French model can inform estimation of the rate of return on equity for Australian businesses. The model has limitations but, as with APT, these must be assessed against the fact that the CAPM does not provide an adequate explanation of asset prices and, on its own, cannot provide an estimate of a rate of return on equity which might contribute to the allowed rate of return objective.

7.2.5 Dividend discount models

Dividend discount models may lack the sophistication of asset pricing models which have an explicit basis in economic theory. Nevertheless, the intuition

[29] Gregory Connor and Robert A Korajczyk (1986), "Performance Measurement with Arbitrage Pricing Theory" Journal of Financial Economics, 15: pages 373-394; and Gregory Connor and Robert A Korajczyk (1988), "Risk and Return in an Equilibrium APT", Journal of Financial Economics, 21: pages 255-289.

[30] Nai-Fu Chen, Richard Roll and Stephen A Ross (1986), "Economic Forces and the Stock Market", Journal of Business, 59(3): pages 383-403.

[31] Eugene F Fama and Kenneth R French (1993), "Common Risk Factors in the Returns on Stocks and Bonds", Journal of Financial Economics, 33: pages 3-56; and Eugene F Fama and Kenneth R French (1996), "Multifactor Explanations of Asset Pricing Anomalies", Journal of Finance, 51(1): pages 55-84.

behind them is sound and they have, for many decades, been used to estimate rates of return on equity, especially for regulatory purposes, in North America.

That these models have not been used by Australian regulators, as the ERA notes in paragraph 659 of the Explanatory Statement, is largely irrelevant to whether they might now inform rate of return determination under rule 87.

Their continued use in North America (despite some 50 years of the promotion of the CAPM in finance textbooks), clearly indicates that dividend discount models are relevant for the purposes of rule 87(5)(a).

The ERA's rejection of the use of dividend discount models (in paragraph 660 of the Explanatory Statement) seems to be for reasons of:

(a) their use not being in accordance with best practice; and

(b) the models not being fit for purpose in the Australian context.

These reasons are not explained. More specific reasons given for concern about dividend discount models are:

(a) they use estimates which are subjective, being based on broker reports which are subject to systematic bias (Explanatory Statement, paragraph 654);

(b) there is often controversy over the values used for the inputs (Explanatory Statement, paragraph 655); and

(c) there may be an element of circularity to the extent that future cash flows reflect regulatory settings (Explanatory Statement, paragraph 656).

Dividend discount models can be applied using estimates from broker reports, and may, in these circumstances, be subject to any systematic biases in the reports from which those estimates are taken. There is, however, no reason for this to be the case. The estimates drawn from broker reports could be prepared by independent advisors including the major accounting firms.

Controversy over the values used for inputs would not be unique to the use of dividend discount models. There have been, and will continue to be, controversy over the inputs to rate of return determination irrespective of the particular models which are used to estimate the rate of return on equity and the rate of return on debt.

And, certainly, there may be an element of circularity arising from future cash flows reflecting regulatory settings. But regulatory decisions feed into share prices, and these prices are used to estimate, for example, equity betas for use in

regulated rate of return determination. The methods proposed in the Draft Guidelines are not immune from "circularity".

None of these seem, to us, to be particularly strong reasons for not including dividend discount models among the financial models to which regard is had when determining the allowed rate of return.

7.2.6 Dividend yields

Given the limitations of economic theoretical models, and of the dividend discount models, other evidence should be considered when estimating the rate of return on equity required by rule 87.

The dividend yields of companies which are efficient, and which have degrees of risk similar to the service provider in its provision of reference services, are an obvious basis for indicators of the rate of return on equity that might be provided by the benchmark efficient entity of rule 87. "Actual" (as distinct from "forecast") dividend yields do not have to be obtained from brokers' reports and do not have to have the limitations which are sometimes attributed to the figures reported by brokers.

The limitations of dividend yield data noted by the ERA, in paragraphs 688, 690, 691 and 692 of the Explanatory Statement, are limitations of brokers' forecasts of those yields rather than limitations of actual dividend yields.

There is, in our view, no strong reason for not using dividend yield data to inform estimation of the rate of return on equity.

7.3 Estimating the CAPM

If the CAPM is used to estimate the rate of return on equity, then consideration must be given to estimation of the model, and the ERA proposes that the methodology of its 2013 study of beta, reported in the Explanatory Statement, be the methodology for equity beta determination. Paragraph 80 of the Draft Guidelines advises:

(a) this study is transparent, and the outcomes can be reproduced by interested parties;

(b) the rationales for selecting the sample and data period are transparent and supported by previous studies; and

(c) the study has employed various econometric techniques to ensure that the estimates of the equity beta are robust.

Paragraph 81 concludes that the 2013 study satisfies its criteria for the choice of method for the equity beta.

Beta estimation is discussed at some length in chapter 14 of the Explanatory Statement, with the econometric methods used briefly described in Appendix 17, data sources noted in Appendix 18, and adjustment of the data noted in Appendix 19.

We do not disagree with the view in paragraph 855 of the Explanatory Statement that, when estimating beta, reliance should be placed on statistical estimates when the data are available.

In consequence, we reject unsubstantiated propositions like that those in paragraphs 852, 853 and 854. We certainly do not accept, without further careful examination, that the business activities of regulated businesses have less systematic risk than average.

We also note, in paragraph 877 of the Explanatory Statement, recognition of the fact that there is a high level of imprecision in the beta estimates obtained from empirical studies. We agree that the problem of such imprecision is best addressed via the use of multiple models and methods so that a wide range of estimates can be considered. Again, this is simply the requirement of rule 87(5)(a). Unfortunately, it is largely ignored.

Paragraphs 884 to 890 of the Explanatory Statement describe the data which have been used for beta estimation. No consideration appears to have been given to data selection beyond the companies selected being listed companies with reported share prices.

This is confirmed in paragraphs 924 to 926. There, the ERA indicates that the basis for its sample of companies is the sample selected by Associate Professor Henry in his work for the AER in 2009. That sample was for beta estimation under a different rule governing rate of return determination.

In consequence, there is no reason to expect that the beta estimates obtained are for the benchmark efficient entity of rule 87(3), and no reason to expect that a rate of return on equity estimated using those beta estimates can contribute to the achievement of the allowed rate of return objective.

We understand that, by forming portfolios, and using the returns on the portfolios (and not the returns to the individual firms which comprise those portfolios) for the estimation of betas, the effect of "noise" in the individual firm return series is reduced, leading to better defined beta estimates. If the benchmark efficient entity is considered as a composite, having characteristics derived from a set of efficient comparators with degree of risk similar to that of the service provider in

the provision of reference services, then a better estimate of the benchmark beta might be obtained from share price and dividend data for a portfolio of the relevant comparators rather than from the price and dividend data for the individual comparators.

Paragraphs 897 to 903 of the Explanatory Statement report the results of beta estimation for five portfolios. Paragraph 897 notes that:

The key purpose of a portfolio analysis is to allow a single portfolio to be created and, as such, a single corresponding equity beta for that portfolio can be estimated as an equity beta of the industry.

However, rule 87 does not call for a rate of return on equity for "the industry". It requires a rate of return on equity which contributes to achievement of the allowed rate of return objective. That is, it requires an estimate of the rate of return on equity which contributes to achieving a rate of return which 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.

None of the portfolios use by the ERA has been formed in such a way that would allow the conclusion that the estimated beta was for the benchmark efficient entity. There is, then, no reason to expect that any of the portfolio beta estimates reported in the Explanatory Statement could lead to an estimate of the rate of return on equity which can contribute to the achievement of the allowed rate of return objective.

The ERA's 2013 beta study employs multiple estimation methods to obtain a multiplicity of equity betas. The methods of that study may, as paragraph 81 of the Draft Guidelines and paragraph 937 of the Explanatory Statement assert, satisfy the ERA's criteria (although there is no demonstration of this being the case). However, there is no reason to expect that they can lead to the rate of return required by rule 87.

7.4 Conclusions: rate of return on equity and the equity beta

In respect of estimation of the rate of return on equity, the Draft Guidelines advise:

(a) the CAPM is the only model to be used; and

(b) the equity beta used in applying the CAPM is to be estimated using the methods of the ERA's 2013 study of beta estimation reported in the Explanatory Statement.

We do not see this as meeting the requirements of rule 87, or as being an adequate response to the AEMC's November 2012 rule change.

The CAPM is a relatively simple and widely used model. It is likely to have a role in estimating the rate of return on equity. However, as the Explanatory Statement explicitly acknowledges, the CAPM does not explain investor returns with precision.

If, then, the methods of the ERA's 2013 study of beta estimation are used to estimate the equity beta, this imprecision is magnified. There is, as paragraph 877 of the Explanatory Statement notes, a high level of imprecision in the beta estimates obtained from empirical studies. Furthermore, the method of estimation which the ERA proposes does not provide an estimate of the equity beta of the benchmark efficient entity of rule 87.

If a financial model cannot explain equity returns with precision, and if estimates made of the parameters of that model are also imprecise, then there is no reason to expect that rate of return estimates made using that model and that estimation method can contribute to achieving the allowed rate of return objective.

Comparative analysis is required. The results obtained using the CAPM and the ERA's beta estimation methods must be compared with estimates of the rate of return on equity made using other financial models, other estimation methods and other data. This comparative analysis will be a carefully reasoned assessment of the results from alternative financial models, alternative estimation methods and different data sources, made in the context of the specific circumstances of the each service provider and its provision of reference services.

This is no more than the requirement of rule 87(5)(a).

Given the imprecision of the model as a theoretical proposition, ranges of values which might be obtained when applying the CAPM should not be regarded as being any more than indicative. That, for example, the dividend discount model produces an estimate of the rate of return on equity outside the range of estimates obtained using the CAPM should not be taken to mean that the result from the dividend discount model is invalid. It is an indication that further investigation is required before a particular rate of return on equity is found to contribute to achievement of the allowed rate of return objective.

The imprecision of the CAPM as a theoretical proposition, and the imprecision in beta estimation, mean that this comparative analysis cannot be construed, as some have suggested, as providing a cross-check on the results obtained using the CAPM. There are no a priori reasons for expecting that application of the CAPM, and the ERA's beta estimation methods, can lead to estimates of the rate

of the rate of return on equity which are "about right", and all that is required is that the estimates be "checked".

The "reasonableness checks" which have been applied in the past, particularly by the AER, have been vague and do not specifically inform estimation of the rate of return on equity. Paragraph 711 of the Explanatory Statement advises that the ERA does not consider them to be of value. We concur.

Paragraph 15 of the Explanatory Statement, we noted, advises that:

(a) the CAPM is based on the assumption of costless diversification; and

(b) as a result of this diversification, the rate of return obtained from the CAPM compensates investors only for bearing systematic risk, and since this risk is market risk, investors will only earn a return for bearing macroeconomic risks.

If diversification is not costless, then there is no reason for assuming that the CAPM explains asset prices, or explains those prices with any degree of precision. Diversification costs are one class of transaction costs and, as we noted above, derivation of the CAPM requires the assumption of no transaction costs. Once transaction costs are introduced, the CAPM no longer applies. Where those costs are information-related, portfolio diversification may no longer be an "optimal strategy", and asset prices may reward risks other than systematic risks.[32]

Even if we retain the assumption of no transactions costs, paragraph 15 exposes the inadequacy of the CAPM as a means of explaining asset prices, and one of the key reasons why we, and others, are of the view that the model does not a have a "strong theoretical foundation". The model "explains" asset prices in terms of asset prices. To give any meaning or sense to the results obtained, appeal must be made to factors outside the model. The ERA labels these unknown factors "macroeconomic risks". If macroeconomic risks are considered necessary to "explain" asset prices (and we believe they have an important role to play), then those risks should be integral to the model. Once this link to macroeconomic risks is made, some sense can be made of how some of the risks discussed in paragraphs 225 to 249 of the Explanatory Statement affect the rate of return on equity. Without an explicit link to these risks, the discussion in those paragraphs is speculative.

By explicitly rejecting the consumption CAPM, the Fama-French model, and Arbitrage Pricing Theory, and by implicitly rejecting – through its adherence to the CAPM – other asset pricing models, the ERA is rejecting the ways in which

[32] We have not explored the extensive literature on the role of transaction costs and information asymmetries influence asset prices.

financial economists have sought to recognise the role that macroeconomic risks play in the determination of asset prices. Instead, the ERA has continued with a simplistic model of asset pricing, a model, which inadequately explains asset prices, and which cannot, therefore, be relied upon as the sole means estimating a rate of return on equity.

8 Market risk premium

Although we do not agree with the ERA's view that the CAPM is the only model for determining the return on equity that meets the criteria for acceptability in the Australian context at the current time, we nevertheless expect that the model will have a role to play in estimating the rate of return on equity to be used in determining the allowed rate of return. Consideration must therefore be given to the way in which it is to be used.

8.1 MRP as a parameter of the CAPM

We noted earlier (in section 7.4) that the CAPM is, according to paragraph 16 of Appendix 12 of the Explanatory Statement, the relationship:

$E(r_i) = r_f + \beta_i \times [E(r_m) - r_f]$.

The ERA treats the MRP, $E(r_m) - r_f$, as a parameter in its own right.

When estimating the value of that parameter, the ERA may refer to surveys of market risk practice, qualitative information from Australian financial markets, and the practices of other regulators estimating the MRP (Draft Guidelines, paragraph 79). However, application of the CAPM requires a quantitative estimate, and for this, the ERA (like other Australian regulators) has previously relied heavily on long term averages of observed market risk premiums. Paragraph 719 of the Explanatory Statement notes: the first consideration for the appropriate estimate of the MRP is historical data on equity risk premium.

Paragraph 720 advises that the most recent of a series of studies by Dimson, Marsh and Staunton (in 2012) concluded that the historical average approach remains the most relevant approach for estimating the MRP as there are no better forecasting methods available.

Reliance on long term averages of observed market risk premiums implies that $E(r_m) - r_f$ is estimated as

$$\frac{1}{n}\sum_{t=1}^{n}(r_{mt} - r_{ft}) = \bar{r}_m - \bar{r}_f$$

where $\bar{r}_m$ is the average return on the market over the n years of the averaging period, and $\bar{r}_f$ is the average risk free rate over the same historical period.

This raises a number of issues.

On the ERA's own construction of the CAPM, if the MRP is estimated as a long term average of observed market risk premiums, the conceptually correct current

risk free rate of return in the model is replaced – incorrectly – by an average of the risk free rate over some prior period. The result is an estimate of the rate of return on equity which might, only by chance, be an estimate which contributes to the allowed rate of return objective.

The use of this long term average of past risk free rates is not only incorrect. It is also unnecessary: an credible and reliable estimate of the current risk free rate is available.

Determining the MRP in accordance with the ERA's construction of the CAPM is a simple task: take the expected rate of return on the market portfolio at a date close to the commencement of the access arrangement period, and subtract the estimate of the risk free rate of return made (as an average, over 20 trading days, of yields on Commonwealth Government bonds with terms to maturity of 10 years) at that date.

8.2 Alternative views

We note that, when considering the CAPM for estimation of the rate of return on equity for the access arrangement revisions to apply during the period 2013 to 2017, the Victorian gas distribution businesses proposed that consistent use of the model required that it be cast as:

$$\hat{r}_i = \bar{r}_f + \beta_i(\bar{r}_m - \bar{r}_f)$$

where $\hat{r}_i$ was the estimated rate of return on equity.

We agree with the gas distributors that proper application of the CAPM requires consistent use of the risk free rate of return throughout the model. However, we agree with the AER which, in its final decisions on the revisions, concluded that the model required use of an estimate of the risk free rate which was the current estimate, and not the long term average $\bar{r}_f$.

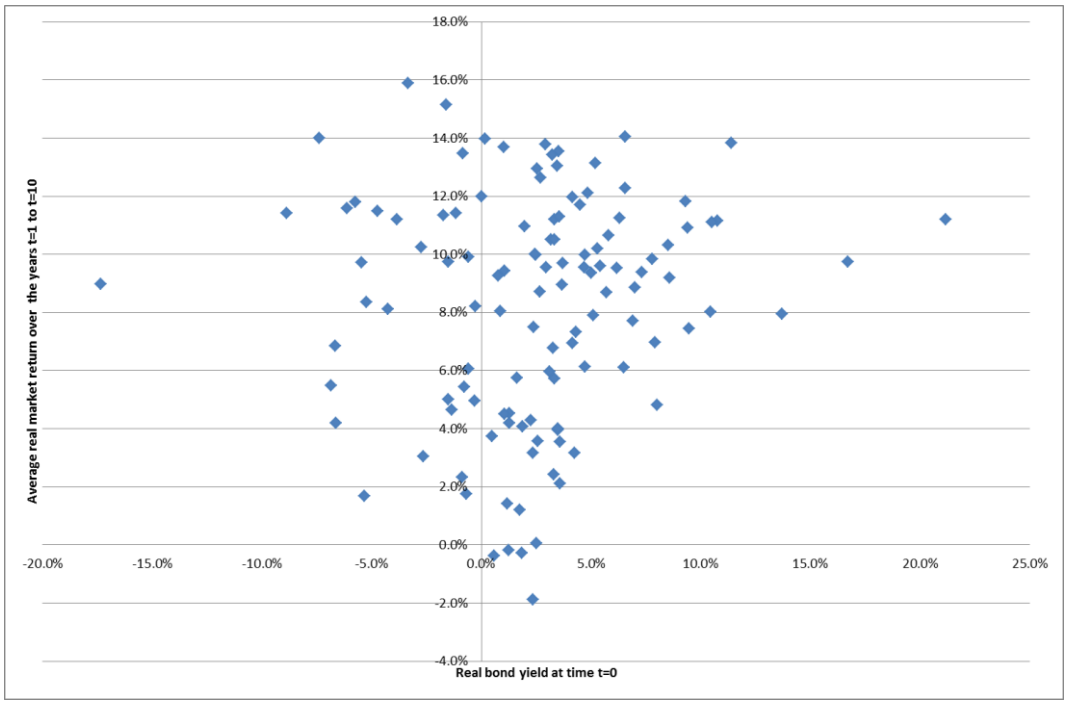
By treating the MRP as a parameter in its own right, estimated as a long term average of historical market risk premiums, the ERA is essentially asserting that it is estimating the rate of return on equity using a single factor model, and not the CAPM.

Competition Economists Group (CEG) examined this "single factor model" construction of the CAPM for APA Group and the Victorian gas distributors in 2012.

If it is the level of the "market risk premium" which drives equity returns, and if the market risk premium is stable at or near a particular value (the 6% as the ERA asserts) then one would expect to see a close positive correlation between

movements in the risk free rate and movements in the return on the market portfolio. However the data (reproduced in Figure 1) show no relationship whatsoever between the risk free rate and the rate of return on the market portfolio.

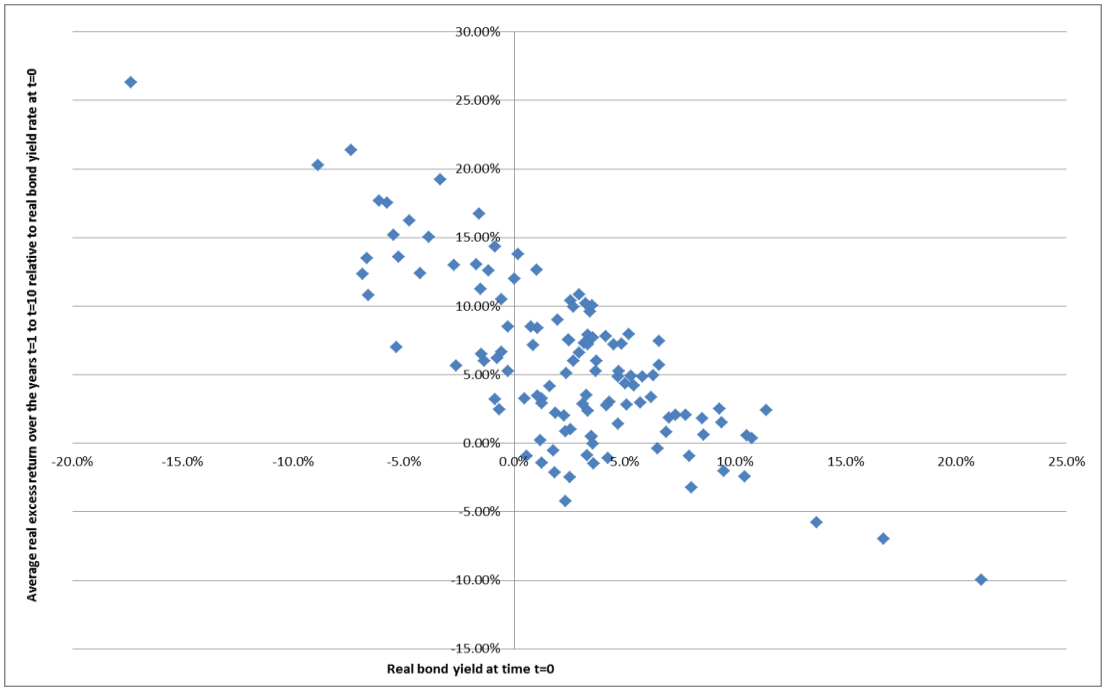
Figure 1: Rate of return on market vs risk free rate



Source: CEG

However, when the "market risk premium", $\bar{r}_m - r_f$, is plotted against the risk free rate of return (Figure 2) we see a relatively clear inverse relationship between the risk free rate and the "market risk premium".

Figure 2: Figure 1: Market risk premium vs risk free rate



Source: CEG Analysis

That relationship does not reflect perfect negative correlation, but it is sufficiently clear to not be ignored. It indicates that there would be a material bias if long term average of historical "market risk premiums" was used with a current estimate of the risk free rate.

New South Wales regulator, IPART, has recently considered these issues and has proposed a "compromise" approach. IPART proposes to estimate the rate of return on equity using both

$$\hat{r}_i = \bar{r}_f + \beta_i(\bar{r}_m - \bar{r}_f)$$

and

$$\hat{r}_i = r_f + \beta_i(\bar{r}_m - r_f)$$

with the results from each model equally weighted. $\bar{r}_m - \bar{r}_f$ would be the long term average of 6%.[33]

[33] Independent Pricing & Regulatory Tribunal, *WACC Methodology – Interim Report*, June 2013.

8.3 Estimating the expected rate of return on the market

If, as we believe, the proper construction of the CAPM is:

$E(r_i) = r_f + \beta_i \times [E(r_m) - r_f]$,

then we are faced with the issue of estimating the current expected rate of return on the market. This, we believe, should be no more difficult than estimating the "market risk premium".

The ERA could apply essentially the same approach to the issue of estimating the expected return on the market as it takes to estimating the MRP. The rate of return on the market is measured by a range of market indexes, and these show considerable volatility short term. A longer, rather than a shorter, term average of the rate derived from one or more of these indexes is likely to be appropriate, provided the length of the period was not so long that it was clearly spanning significant "structural breaks" in the economy.

Given that it is an expectation of market returns that is to be estimated, any quantitative estimate made using historical data might be adjusted (as the ERA proposes for estimation of the MRP) using appropriate survey information and other qualitative information from financial markets.

9 Return on debt and the benchmark credit rating

Paragraph 60 of the Draft Guidelines advises that the ERA will estimate the return on debt as the sum of a risk free rate of return and a debt risk premium. The ERA has previously referred to this as the "on the day" approach.

As we have indicated above, we generally agree with the ERA's approach to estimating the risk free rate of return close to commencement of the access arrangement period (although not with the proposed restriction of the estimation to use of the yields on Commonwealth Government bonds with terms to maturity of five years).

The debt risk premium, we are advised in paragraph 63, is to be derived from a sample of comparable firms with credit ratings similar to the credit rating of the benchmark efficient entity. For each regulatory decision, the premium is to be estimated close to the commencement of the relevant regulatory period.

Paragraph 66 of the Draft Guidelines indicates that the ERA is of the view that the risk free rate of return should be updated annually, but an updating formula of the type required by rule 87(12) is still to be prepared.

9.1 On the day approach

The on the day approach which the ERA proposes can, in our view, provide estimates of the rate of return on debt. Whether any of those estimates can contribute to achievement of the allowed rate of return objective (as required by rule 87(8) is another matter.

We are concerned, in the same way we are concerned with the ERA's proposals to estimate the rate of return on equity, that excessive reliance is placed on the use of a single model for estimating the rate of return on debt.

The model the ERA proposes to use is:

$r_d = r_f + DRP$

where:

r_d is the rate of return on debt;

r_f is the nominal risk free rate of return; and

DRP is the debt risk premium.

Curiously, the ERA does not provide "strong theoretical foundations" for this model, although theoretical foundations were considered necessary in the context of estimating the rate of return on equity.

However, the need for such foundations should not be lightly dismissed. If the estimation of the rate of return on debt is to be consistent with the estimation of a forward looking rate of return on equity, then the estimate of the rate of return on debt should be forward looking. However, the ERA's approach is not. The ERA estimates the debt risk premium as the difference between the observed rates of return on a sample of comparable entities and the risk free rate of return. In consequence:

$r_d = r_f + DRP = r_f + (r_d - r_f) = r_d$;

absent differences due to different timings, the method is a tautology.

The method might cease to be an uninteresting tautology if it were reinterpreted as:

$E(r_d) = r_f + DRP$,

but then an explicit theoretical foundation would be highly desirable.

Paragraph 309 of the Explanatory Statement advises that the model the ERA proposes to use is the "accepted model", and the following paragraph notes that use of the model has been the regulator's approach to date. In paragraph 311 the ERA states that the debt risk premium method provides the best approach to estimating the return on debt in a way that is consistent with the risks for the benchmark efficient entity.

We accept that the proposed approach of the Draft Guidelines has been the ERA's approach to date, but do not agree that it provides the best approach to estimating the rate of return on debt in a way that is consistent with the risks for the benchmark efficient entity.. The ERA offers no reasons for why the method which it proposes to use might deliver estimates of the rate of return on debt which can contribute to achievement of the allowed rate of return objective. Our assessment is that that method cannot deliver the required rate of return.

By proposing a single method of estimation, the ERA precludes any comparative assessment which might assist in reaching a conclusion that a particular estimate of the rate of return on debt contributes to achievement of the allowed rate of return objective.

We said, in our response to the ERA's working paper *On the benchmark cost of debt*, that multiple methods were necessary if the right rate of return outcome was to be achieved, and that those multiple methods should include a trailing

average portfolio approach to estimation of the rate of return on debt. Such an approach was clearly contemplated under rule 87, and we found its rejection by the ERA, for reasons of its inconsistency with economic efficiency, to be puzzling. Why would the AEMC have included in rule 87 an option for estimation of the rate of return on debt which was inconsistent with the broader requirements of the NGL and the NGR? We found the ERA's economic efficiency arguments inadequate. The ERA has now elaborated on those arguments in paragraphs 318 to 320 of the Explanatory Statement. We remain to be convinced, and we do not accept the conclusion which the ERA draws in paragraph 358 of the Explanatory Statement.

Paragraph 321 of the Explanatory Statement reinforces our views. For an economy to be efficient, all consumers and producers must have perfect knowledge: they must know the prices at which all transactions will occur. This is an extremely demanding assumption but one which we do not, at present, contest. The theory of the second best, to which we referred earlier in section 2.2.1, applies here. That the on the day approach is a better forward predictor of the prevailing interest rate than the trailing average approach might, or might not be the case. Irrespective, nothing can be said about the efficiency implications of one approach against the other.

Nothing in paragraphs 329 and 330 of the Explanatory Statement leads us away from our earlier conclusions that the ERA's application of the Diebold Mariano test simply confirmed what was clear from inspection of the data, and that the application of the test to a series of yields on Commonwealth Government bonds said nothing about the rate of return on corporate debt. We understand that the most recent observation from a random walk provides the best predictor for the near future, but there is no evidence that the ERA's government bond yield series is a random walk.

9.2 Bond yield approach does not properly compensate for the costs of debt

Paragraph 74 of the Draft Guidelines advises that the ERA's bond yield approach should be used to estimate the debt risk premium. Paragraph 75 further explains that the bond yield approach is to be applied using the observed yields of relevant Australian corporate bonds that qualify for inclusion in the benchmark sample.

We accept that the bond yield approach can be used to make an estimate of the debt risk premium which can, in turn, be used in estimating the rate of return on debt. We are, however, uncertain about the quality of the resulting rate of return.

We are unclear, from the Draft Guidelines and the Explanatory Statement, about the terms to maturity of the debt issues to be taken into account in applying the bond yield approach.

Paragraphs 527 to 532 of the Explanatory Statement report some comparisons of the debt risk premiums obtained using the bond yield approach with premiums estimated using the Nelson-Siegel approach to yield curve modelling. The results, we are advised, are similar. In paragraph 533, the ERA comments that the small benefit from the Nelson-Siegel approach does not outweigh the costs of implementing a much more complex method.

The Nelson-Siegel approach is a relatively recent innovation in financial economics. It has limitations. It is a multiple factor model of the type which the EAR has rejected in the context of estimation of the rate of return on equity. Nevertheless, the Nelson-Siegel approach has become widely accepted by central banks and financial practitioners concerned with yield curve forecasting.

We are perplexed by the ERA's assertion that it can achieve similar results using an approach without any theoretical foundation, and without any wide acceptance. The limited exposition in paragraphs 527 to 532 of the Explanatory Statement does little to allay our concerns.

The bond-yield approach is explained in some detail in subsequent paragraphs of the Explanatory Statement. However, that explanation omits any reference to how the bond yield approach is to be applied in a way which might lead to an estimate of the rate of return on debt which can contribute to achievement of the allowed rate of return objective.

The Explanatory Statement indicates that the bond yield approach is to be applied using observed yields on Australian corporate bonds, but there is no indication of the way in which those bonds are to be selected so as to provide an estimate of the debt risk premium which might lead to an estimate of the rate of return on debt which can contribute to the achievement of the allowed rate of return objective. The ERA's proposed approach to estimation of the rate of return on debt cannot lead to the estimates required by rule 87 unless the debt risk premium is the premium for the benchmark efficient entity, but this is overlooked in both the Draft Guidelines and the Explanatory Statement.

One reason why this might be the case is the limited amount of the data available from efficient entities with similar degrees of risk to the service provider with respect to its provision of reference services.

Paragraphs 540 and 541 reiterate the ERA's earlier comments (noted above) that there is a trade-off between the relevance of the data and the number of

observations, and that criteria for sample selection which are too restrictive will lead to small samples with decreased statistical reliability.

We are left with the impression that application of the bond yield approach is to proceed without any real systematic assessment of efficiency and risk to ensure that estimates made of the rate of return on debt are estimates for the benchmark efficient entity.

We understand the issues. However, they do not justify using data which are not those of the benchmark efficient entity of rule 87(3). Statistical reliability may have to be foregone, and limited data may have to be judiciously employed to obtain the estimates of the rate of return on debt required by rule 87.

9.3 Credit rating

A credit rating may be required for the purpose of estimating the rate of return on debt.

In paragraph 71 of the Draft Guidelines, the ERA advises that it proposes to use the median credit rating of a benchmark sample of Australian utilities. The companies in this sample would, in accordance with paragraph 72:

(a) be network service providers in the Australian gas or electricity sectors; and

(b) have publicly available credit ratings by a recognised rating agency such as Standard and Poor's or Moody's.

Paragraph 73 of the Draft Guidelines advises that the ERA's analysis has indicated a credit rating in the band BBB-/BBB/BBB+, but that further research is required to ensure that the benchmark rating is robust.

We agree that, if a credit rating is required, it might be determined as the median rating of an appropriately selected sample, where the companies in the sample have publicly available ratings by a recognised rating agency such as Standard and Poor's or Moody's.

We do not concur with the ERA's view that the credit rating be determined from a sample of network service providers in the Australian gas or electricity sectors.

If a credit rating is required for the purpose of estimation of the rate of return on debt, then that rating must be the credit rating of the benchmark efficient entity. If it is not, then there will be no reason to expect that any rate of return on debt determined using that rating will contribute to the achievement of the allowed rate of return objective.

Again, we are led back to the benchmark efficient entity being central to determination of the rate of return required by rule 87, and to proper construction of the benchmark entity before rate of return determination can proceed.

If each of a number of entities which have been shown to have a degree of risk similar to that of the service provider in the provision of reference services, and shown to be efficient, then the median credit rating of those entities might be the credit rating used estimating the rate of return on debt in accordance with rule 87.

In paragraph 548 of the Explanatory Statement, the ERA concludes that using the credit rating as the main measure of risk faced by holders of the debt securities of an efficient benchmark firm is appropriate. We do not agree.

By relying on the credit rating in the way proposed in the Draft Guidelines, the ERA is effectively assuming that the only risk to which the holders of debt securities are exposed is the default risk of the benchmark. This, of course, is not correct. Those security holders are also exposed to systematic risk.[34] Recently published research indicates that default risk accounts for only a small fraction of yield spreads for investment-grade bonds.[35]

We continue to be concerned about the reliance placed on the credit rating in estimating the rate of return on debt. We concurred, and continue to concur, with the view of The Brattle Group, noted in paragraph 544 of the Explanatory Statement, that the credit rating should not be considered in isolation.

9.4 Annual updating of the risk free rate of return

In the absence of a specific proposal for the annual updating of the risk free rate of return, we are unable to offer further comment on whether such a proposal is appropriate, and whether it meets the requirements of the NGL and the NGR.

Given the potential for annual updating to significantly vary the reference tariffs of an access arrangement, we would expect to be able to review and comment on any proposal for annual updating before final rate of return guidelines are made and published by the ERA.

[34] See, for example, Edwin J Elton, Martin J Gruber, Deepak Agrawal and Christopher Mann (2001), "Explaining the Rate Spread on Corporate Bonds", Journal of Finance, 56(1): pages 247-277; and 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.

[35] Jing-Zhi Huang and Ming Huang (2012), "How Much of the Corporate-Treasury Yield Spread is due to Credit Risk?", Review of Asset Pricing Studies, 2(2): pages 153-202.

10 Debt and equity raising costs

The Draft Guidelines advise that:

(a) debt raising costs are to be treated as financing expenses to be incorporated in the operating expenditures of the total revenue calculation (paragraph 82); and

(b) an allowance for the costs of raising equity is appropriate where an adjustment to the amount of equity assumed for regulatory purposes is required to maintain the benchmark gearing (paragraph 86).

We broadly agree.

For the purposes of total revenue determination, the financing of the regulated business is notional, rather than actual, ascertained by applying the benchmark gearing to the capital base.

Wherever the financial modelling of total revenues indicates an increase in the level of either equity or debt (consistent with maintenance of the benchmark gearing), an allowance should be made for the efficient costs of effecting the increase.

We are concerned with the way in which the Draft Guidelines have sought to prescribe these costs. Financing costs have varied very substantially over the last five years. The costs appropriate to total revenue determination are, we believe, the current market costs, and not obsolete past costs.