Appendix 8.02

Return on equity – detailed proposal

1   Summary

The National Gas Rules (**NGR**) require the return on equity to be estimated such that it contributes to the achievement of the rate of return objective, having regard to prevailing conditions in the market for equity funds. The NGR also require that regard be had to relevant estimation methods, financial models, market data and other evidence.

The Rules relating to the return on equity have been recently amended to ensure that the AER takes relevant estimation methods, models, market data and other evidence into account when estimating the required return on equity.[1] In making these changes to the Rules, the Australian Energy Markets Commission (**AEMC**) considered that a high quality rate of return estimate would be one that uses all relevant evidence and methods, and that such an approach would be best placed to achieve the National Gas Objective (**NGO**) and the revenue and pricing principles.[2]

ActewAGL Distribution considers that what is now required under the NGR is an approach to estimating the return on equity that is not tied to a single model or estimation procedure, or does not depend upon the adoption of one model or estimation procedure (as was previously required under the NGR, being one well accepted financial model, of which the example given was the CAPM). There is no longer any requirement or predisposition to using the CAPM to estimating the return on equity. Not only do the amendments to the NER and NGR remove such a requirement or predisposition, the amendments and the reasons given for them indicate that there should not be continued exclusive reliance on the CAPM.[3]

The approach to estimating the return on equity must take into account all relevant evidence, and where that evidence is relevant and probative as to the required return on equity, give it a direct role in the estimation process. ActewAGL Distribution therefore proposes a multi-model approach to determining the return on equity (supported by independent expert advice) which uses Sharpe Lintner Capital Asset Pricing Model (**SL-CAPM**), Black CAPM, Fama French model (**FFM**) and Dividend Discount Model (**DDM**) to estimate the return on equity using input parameters estimated by SFG.[4] ActewAGL Distribution considers that equal weight should be given to the results of each of these return on equity models, given the relative strengths of these models. The proposed return on equity is shown in Table 1.

Table 1: Return on equity estimate

Model	Required return on equity	Weighting
SL-CAPM	9.32%	25%
Black CAPM	9.93%	25%
Fama French	9.93%	25%

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[1] AEMC, *Rule Determinations: 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, p. 57.

[2] AEMC, *Rule Determinations: 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, p. 56-57.

[3] See in particular: AEMC, *Rule Determinations: 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, p. 57.

[4] SFG, *The required return on equity for regulated gas and electricity network businesses*, 6 June 2014, section 4 and SFG, The required return on equity for the benchmark efficient entity, 13 February 2015, section 5.

Model	Required return on equity	Weighting
DDM	10.32%	25%
Weighted average	**9.87%**	**100%**

This is the interpretation that best achieves the NGO as it ensures that the return on equity properly reflects the return required to promote efficient investment in, and efficient operation and use of, natural gas services for the long term interests of consumers.

The Rate of Return Guideline and recent final decisions in April/June 2015 indicate that the AER's approach, which continues to give primary weight to the SL-CAPM, deviates from the requirements of the new rules that regard be had to a broader range of inputs in reaching a decision that is in line with the prevailing efficient return on equity. While the AER's documents record that a detailed process of examining the submissions put to it by interested parties had been undertaken, very little of this material is actually used to calculate the allowed rate of return. All the other information is either given no weight or is used in a highly constrained way so that it contributes very little to the final result.

ActewAGL Distribution does not consider that the Rate of Return Guideline method that the AER has adopted in its recent final decisions in April/June 2015 for the ACT/NSW electricity and gas networks will deliver a return on equity estimate that reflects prevailing market conditions and which contributes to the achievement of the rate of return objective and the NGO. The AER's Rate of Return Guideline approach is affected by critical errors of fact and errors of logic, including:

- the AER's foundation model approach appears to proceed on the incorrect assumption that one return on equity model will be superior to others (despite that even the AER acknowledges that the SL-CAPM has weaknesses[5]);

- the AER has erred in concluding that the SL-CAPM is superior to other relevant return on equity models;

- the AER has incorrectly concluded that its application of the SL-CAPM will deliver an unbiased return on equity estimate;

- the AER has failed to adequately have regard to all relevant estimation methods, financial models, market data and other evidence. Specifically, the AER has identified certain material as relevant but then failed to give it any meaningful role in its estimation of the return on equity. In several cases, the AER's method and reasons for rejecting this other evidence (or relegating it to an indirect role) are illogical and unreasonable. For example, the AER's concern that the DDM leads to "very high"[6] estimates (relative to the SL-CAPM) equating to an equity beta of 0.94 in the SL-CAPM, reflects an unreasonable treatment of this evidence;

- the AER has erred in its estimation of the SL-CAPM equity beta. Neither the AER's range nor its point estimate are supported by empirical evidence;

- an implicit or necessary finding made by the AER is that adopting the top of its range for the SL-CAPM equity beta will adequately correct for any bias or other deficiencies in the SL-CAPM. There is no evidentiary basis for this finding;

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[5] AER, Attachment 3, Rate of Return, ActewAGL final decision, April 2015, p. 240

[6] AER, Attachment 3, Rate of Return, ActewAGL final decision, April 2015, p. 266

- the AER has failed to take into account relevant and current evidence in relation to the market risk premium (**MRP**), and therefore its estimate of this parameter will not reflect prevailing market conditions;

- the AER has misinterpreted evidence from the Wright approach, by treating this as an alternative implementation of the CAPM to estimate the return on equity[7] rather than as evidence in relation to the MRP;

- the AER's method of adjusting for the value of imputation credits is incorrect. As a result, the AER's return on equity estimate is not consistent with the estimate of the value of imputation credits;

- the AER has erred in concluding that its return on equity estimate is consistent with other market evidence; and

- the ranges the AER has derived are from a small subset of all the relevant evidence. This means that other relevant evidence has little or no influence on the outcome. This leads to the allowed return on equity estimate being less than the prevailing cost of funds and it is therefore counter to the rate of return objective.

ActewAGL Distribution is further concerned that the AER's approach does not comply with its statutory obligations by:

- continuing to put the worst performing of the available models – the SL-CAPM – centre stage by employing it as the 'foundation model';

- having insufficient regard to much of the material presented by, in some cases expressly assigning zero weight to the material – FFM – or in other cases, adopting an approach that highly constrains the ability of relevant information to contribute to the 'bottom line' rate of return for equity – the limited and indirect role assigned to the DGM and Black CAPM;

- using the SL-CAPM as a filter through which all other information must first pass before it can have any bearing on the permitted rate of return, which significantly curtails the manner and degree to which the other information can contribute to the allowed rate of return; and

- making errors in applying the SL-CAPM.

The AER's specification of the return on equity in its recent April/June 2015 final decisions is very similar to the AER's approach adopted under the former Rules and disregards other sources of evidence. In particular, ActewAGL Distribution considers that the AER has ignored the intention behind the new rules as set out by the AEMC in its Rule determination[8]:

> There are a number of other financial models that have varying degrees of weaknesses. Some of the financial models that have gained some prominence include the Fama-French three-factor model, the Black CAPM, and the dividend growth model. Weaknesses in a model do not necessarily invalidate the usefulness of the model. Ultimately, it is important to keep in mind that all these financial models are based on certain theoretical assumptions and no one model can be said to provide the right answer.

> Given that there are other financial models and methods for estimating the cost of equity capital that vary in their acceptance academically and consequent usage by market practitioners, restricting consideration to the CAPM alone would preclude consideration of other relevant estimation methods.

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[7] AER, Attachment 3, Rate of Return, ActewAGL final decision, April 2015, p. 32

[8] AEMC, *Draft Rule Determinations: National Electricity Amendment (Economic Regulation of Network Service Providers*) Rule 2012*; National Gas Amendment (Price and Revenue Regulation of Gas Services) Rule 2012*, August 2012, p. 47.

The Commission is of the view that estimates are more robust and reliable if they are based on a range of estimation methods, financial models, market data and other evidence. A framework that eliminates any relevant evidence from consideration is unlikely to produce robust and reliable estimates, and consequently is unlikely to best meet the NEO, the NGO and the RPP.

In terms of the practical effect of its approach, the return on equity calculated under the AER's approach has fallen in recent years as a result of the decline yields on Commonwealth Government Securities (**CGS**), combined with a relatively inflexible MRP. The yield on 10 year CGS is now at historic lows. Information before the AER suggests that CGS yields have been driven down by a flight to quality and the recognition of Australian CGS as a safe haven investment. These matters are unlikely to be impacting on the required return on equity for a benchmark entity—and indeed are likely to be increasing the MRP. However, the effect of the AER's approach of using the SL-CAPM together with a largely historical and inflexible MRP is to drive down the overall return on equity on a step-by-step basis with the development of the CGS. ActewAGL Distribution further notes that between the AER's publication of its Rate of Return Guideline in December 2013 and May 2015, the CGS decreased by approximately 1.9 pts. Using the AER's foundation model, this means that the overall return on equity also has decreased by approximately 1.9 pts. This has happened during a period when there has been a:

- shrinking supply of AAA rated sovereign debt globally;

- high risk aversion and perceived risk, especially in the context of heightened concern over Greece leaving the Eurozone; and

- heightened demand for liquid assets, including demand produced by changes in banking regulations.

ActewAGL Distribution considers that there is no reason to think that the true return on equity for the benchmark entity has declined by 1.9 pts over this 1.5 year period. There is nothing in the wider economic or commercial environment to suggest that. Rather, the result is a particular and idiosyncratic consequence of demand for CGS.

What this means is that an approach of using a fixed MRP coupled with a prevailing risk free rate under the SL-CAPM cannot be said to be a reliable means of calculating the return on equity. This is in addition to the significant evidence that the SL-CAPM is downward biased for low beta stocks. It is imperative, in these circumstances, for the AER to consider and take into account other measures of the return on equity.

The AER's only "concession" to date is, in light of the considerable body of evidence suggesting that its approach will understate the return on equity, to take a figure for equity beta from the top of the AER's equity beta range while continuing to place most reliance on historical excess returns in relation to the MRP.[9] However:

- as analysed by SFG, the AER's equity beta range is itself erroneous and the product of artificial and contrived filters of relevant information;[10] and

- the AER has undertaken no analysis of whether its selection of an equity beta at the top of its range makes up for the low beta bias of the SL-CAPM via estimating the return on equity using other equity models.

ActewAGL Distribution considers that the correct approach to estimating the return on equity is as set out in this proposal. This approach has regard to all relevant models and evidence, and uses this material transparently for its proper purpose. Each of the relevant return on equity models is

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[9] AER, Attachment 3, Rate of Return, ActewAGL final decision, April 2015, p. 313

[10] SFG, *Beta and the Black Capital Asset Pricing Model*, 13 February 2015.

independently used to derive an estimate of the required return on equity, while other relevant evidence is used to determine the best estimate of each parameter within these models.

ActewAGL Distribution considers that its proposed approach provides for a return on equity estimate that reflects prevailing market conditions and which contributes to the achievement of the rate of return objective. In contrast to the AER's approach, ActewAGL Distribution's approach provides for a return on equity that is sufficient to promote efficient investment in, and efficient operation and use of, natural gas services for the long term interests of consumers.

Accordingly, ActewAGL Distribution considers that its proposed approach to estimating the return on equity is preferable in terms of making a contribution to the achievement of the NGO.

2 Requirements of the Rules and Law

2.1 Law and Rule Requirements

Rule 76 provides that the total revenue for each regulatory year of the 2016-21 access arrangement period is to be determined using a building block approach pursuant to which the building blocks include (amongst others) a return on the projected capital base and the estimated cost of corporate income tax for the year.

The return on the projected capital base for each regulatory year must, in turn, be calculated by applying the allowed rate of return to the projected capital base (Rule 87(1)). The allowed rate of return is a weighted average of the return on equity for the period in which the regulatory year occurs and the return on debt for that year and determined on a nominal vanilla basis (Rule 87(4)).

The corporate income tax building block has implications for the overall return required by equity shareholders to attract equity investment. This is because a deduction is made from the building block allowance for corporate income tax to recognise that part of the value that domestic shareholders receive from equity investment takes the form of imputation credits that may be issued by the provider and the value that shareholders are assumed to place on imputation credits impacts the return on equity required to attract equity investors.

The NGL requires the AER, in making its decision on the rate of return (and therefore the return on equity), to do so in a manner will or is likely to contribute to the achievement of the NGO and, if there are two or more decisions that will or are likely to contribute to the achievement of the NGO to make the decision the AER is satisfied will or is likely to do so to the greatest degree (section 28(1)(a) and (b)(iii)(A)). The NGO is to promote the efficient investment in, and efficient operation and use of, natural gas services for the long term interests of consumers of natural gas with respect to price, quality, safety, reliability and security of supply of natural gas (section 23).

Further, in exercising any discretion in the making of its decision on the rate of return (and therefore the return on equity), the NGL requires the AER to take into account the revenue and pricing principles (section 28(2)(a)). The revenue and pricing principles relevantly include that:

- a service provider should be provided with a reasonable opportunity to recover at least the efficient costs the provider incurs in providing reference services and complying with a regulatory obligation or requirement or making a regulatory payment (section 24(2));
- a service provider should be provided with effective incentives in order to promote economic efficiency with respect to the reference services it provides, including with respect to efficient investment in the pipeline used to provide those services, the efficient provision of pipeline services and the efficient use of the pipeline (section 24(3));
- a reference tariff should allow for a return commensurate with the regulatory and commercial risks involved in providing the reference service to which that tariff relates (section 24(5)); and
- regard should be had to the economic costs and risks of the potential for under and over investment by a service provider in a pipeline (section 24(6)).

It follows that the rate of return (and therefore the return on equity) must be set so as to promote efficient investment in pipeline infrastructure for the long term interests of consumers. As the AER has acknowledged, if the rate of return is set too low, a provider may not be able to attract sufficient funds to make the required investments in that infrastructure and reliability may decline.[11] If the rate of return is set too high, this may result in inefficient over-investment by the provider and inefficiently high prices.

The rate of return is to be determined in accordance with Rule 87. It must be commensurate with the efficient financing costs of the benchmark efficient entity with a similar degree of risk to that of the service provider, here ActewAGL Distribution, in respect of the provision of reference services (Rule 87(2) and (3)).

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[11] AER, *Overview of the Better Regulation Reform Package*, April 2014, p. 14

Rule 87(6) provides that 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.

Rule 87(7) provides that in estimating the return on equity, regard must be had to the prevailing conditions in the market for equity funds. In this way, the NGR disclose that the focal point of the determination of the return on equity is the conditions that are expected to prevail in the market for equity funds over the 2016-21 access arrangement period.

Rule 87(5) provides that in determining the rate of return (and therefore the return on equity) regard must also be had to:

- relevant estimation methods, financial models, market data and other evidence;
- the desirability of using an approach that leads to the consistent application of any estimates of financial parameters that are relevant to the estimates of, and that are common to, the return on equity and the return on debt; and
- any interrelationships between estimates of financial parameters that are relevant to the estimates of the return on equity and the return on debt.

Rule 74, concerning forecasts and estimates, is also relevant to estimation of the return on equity. Rule 74(2) provides that a forecast or estimate must be arrived at on a reasonable basis, and must represent the best forecast or estimate possible in the circumstances.

2.2 AEMC Guidance

In the AER's recent April/June 2015 decisions, it states that the AEMC intended its 2012 Rule changes to confer on the AER greater discretion to take account of a broad range of information in estimating the rate of return.[12] It further states that the AEMC intentionally did not specify any preferred method for determining the rate of return, instead conferring on the AER discretion to exercise its judgment as to what the AER considered to be the best approach.

ActewAGL Distribution considers that, in so stating, the AER overstates the degree of discretion the AEMC intended (and which is in fact conferred by the NGR as amended) to the AER. The passages of the AEMC's 2012 Rule determination relied on by the AER in support of its view in fact read as follows:

> *As part of the framework, the Commission has not included any preferred methods for estimating components of the rate of return consistent with the overall objective.* ***Instead the Commission has provided high-level principles to guide the estimation*** *and left the judgement as to the best approach to the regulator to make, consistent with achieving the overall allowed rate of return objective. This involves the regulator making judgments about methodologies, analytical techniques and evidence to use to make the estimate of the rate of return.*[13] [Bold emphasis added]

and:

> *Estimating the rate of return ultimately requires a regulator to exercise judgement about the analytical techniques and evidence to use to make an estimate that is commensurate with efficient financing costs. The new framework does not prescribe methodologies or lock-in specific benchmark characteristics* ***other than providing high-level principles that should be taken into account when estimating various components, such as return on equity and debt.*** *While the judgement as to the best approach is left to the regulator, the preferred methods must be developed to meet the overall allowed rate of [return] objective.*[14] [Bold emphasis added]

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[12] AER, Attachment 3, Rate of Return, ActewAGL final decision, April 2015, p. 15

[13] AEMC, *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*, November 2012, p. iv.

[14] AEMC, *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*, November 2012, p. 38.

The AER's conclusions regarding the AEMC's intent omit mention of the high-level principles established by the AEMC's 2012 Rule changes to limit the AER's exercise of judgement in, and determination of the best approach to, determination of the rate of return, notwithstanding that these are expressly referred to by the AEMC in the passages of its Rule determination on which the AER relies.

In any event, the AER is not at large in exercising its judgement and determining the best approach to estimation of the rate of return and nor did the AEMC express any view that it should be. The AER must act reasonably, including in determining the weight to accord to competing evidence, and its findings must be supported by the balance of the evidence before it so weighted. This follows from the AER's administrative law obligations and also Rule 74(2) (discussed above).

The high-level principles established by the AEMC to govern the AER's exercise of judgement and discretion in determining the return on equity include that the return on equity should reflect the prevailing conditions in the market for equity funds, and be based on all relevant estimation methods, financial models, market data and other evidence.

ActewAGL Distribution considers that the NGR as amended in 2012 disclose that the focal point of the determination of the return on equity is the prevailing conditions in the market for equity funds. This is confirmed by the relevant secondary materials. In the explanatory material which accompanied the drafting of the current rate of return provisions in the NGR, the AEMC states:

> [T]he return on equity must reflect the prevailing conditions in the market as it is a forward-looking financial concept.[15]

It is also clear that the AEMC intended that a range of methods, models and other evidence are considered, so as to ensure the best estimate of the rate of return is arrived at. The AEMC's Final Determination states:

> The final rule provides the regulator with sufficient discretion on the methodology for estimating the required return on equity and debt components but also requires the consideration of a range of estimation methods, financial models, market data and other information so that the best estimate of the rate of return can be obtained overall that achieves the allowed rate of return objective.[16]

The AEMC recognised the concern expressed by many stakeholders in relation to previous versions of the NER, which prescribed using the SL CAPM to determine the return on equity and did not provide sufficient scope to consider all relevant models, market data and other evidence. The AEMC considered that rate of return estimation should not be formulaic, and should not be driven by a single model or estimation method, such as the SL CAPM.[17]

The AEMC further observed that all financial models (including the SL CAPM) are based on certain theoretical assumptions and all have varying degrees of weaknesses, and as such, no one model can be said to provide the *right* answer.[18] The AEMC therefore considered that estimates are likely to be more robust and reliable if they are based on a range of estimation methods, financial models, market data and other evidence.[19]

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[15] AEMC, *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*, November 2012, p. 64.

[16] AEMC, *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*, November 2012, p. 8.

[17] AEMC, *Draft Rule Determinations: National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012; National Gas Amendment (Price and Revenue Regulation of Gas Services) Rule 2012*, August 2012, p. 47.

[18] AEMC, *Draft Rule Determinations: National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012; National Gas Amendment (Price and Revenue Regulation of Gas Services) Rule 2012*, August 2012, p. 48.

[19] AEMC, *Draft Rule Determinations: National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012; National Gas Amendment (Price and Revenue Regulation of Gas Services) Rule 2012*, August 2012, p. 48.

Moreover, the AEMC went even further to say that 'no one method can be relied upon in isolation to estimate an allowed return on capital that best reflects benchmark efficient financing costs',[20] and that:[21]

> *Achieving the NEO, the NGO, and the RPP requires the best possible estimate of the benchmark efficient financing costs. The Commission stated that this can only be achieved when the estimation process is of the highest possible quality. The draft rule determination stated that this meant that a range of estimation methods, financial models, market data and other evidence must be considered.*

The changes made by the AEMC to the rate of return frameworks in the NER and NGR were specifically directed at broadening the range of models and evidence that must be taken into account, and avoiding a narrow focus on a single model and its component parameters.[22]

(a) Evolve return on equity estimation over time

The AEMC also recognised that the approach to estimating the return on equity may need to change over time, to adapt to changing market conditions and/or developments in finance theory.[23] The new rules framework was therefore designed to be flexible enough to allow for changes in approach between determinations, by requiring the rate of return to be determined at the time of each determination based on the best evidence available at that time.[24]

The AEMC was careful to avoid locking in any particular approach, either through the rules themselves or through the guideline process.

(b) Guideline is a guide and should not lock in a particular approach

In relation to the rate of return guideline, the AEMC was clear that the guideline should not provide for 'locking in' of any particular approach to the return on equity, and that there should be flexibility to depart from the guideline where there are good reasons for doing so (e.g., changes in market conditions, or developments in finance theory).

The AEMC stated in its Final Determination:[25]

> *The intention of the rate of return guidelines is not to be binding on either the regulator or the service provider. The role of the guidelines is to be distinctly different to how the existing Statement of Regulatory Intent (SORI) on WACC operates under the current Chapter 6 and 6A rate of return frameworks of the NER. The rate of return guidelines are not intended to explicitly lock-in any parameters or methodologies from which departure would not be permitted. In order for the guidelines to have some purpose and value at the time of the regulatory determination or access arrangement process, they must have some weight to narrow the debate. However, there should not be any "inertia principle" or "persuasive evidence test" applying to the application of the guidelines. Requirements on the regulator (and service providers) of this nature to justify departures from the guidelines would undermine the purpose of them.*

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[20] AEMC, *Draft Rule Determinations: National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012; National Gas Amendment (Price and Revenue Regulation of Gas Services) Rule 2012*, August 2012, p. 49.

[21] AEMC, *Draft Rule Determinations: National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012; National Gas Amendment (Price and Revenue Regulation of Gas Services) Rule 2012*, August 2012, p. 43.

[22] In particular, rule 87(5) sets out the range of matters to which regard must be had. This includes "all relevant models, market data and other evidence".

[23] AEMC, *Draft Rule Determinations: National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012; National Gas Amendment (Price and Revenue Regulation of Gas Services) Rule 2012*, August 2012, pp. 49–50.

[24] AEMC, *Draft Rule Determinations: National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012; National Gas Amendment (Price and Revenue Regulation of Gas Services) Rule 2012*, August 2012, pp. 49–50.

[25] AEMC, *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*, November 2012, p. 58.

(c)   Set return on equity during determination, not in the guideline

The AEMC established a role and process for the rate of return guideline that is separate and distinct from the process for estimating the return on equity (and overall rate of return) in each individual determination.

While the guideline process provides an opportunity for the AER to identify the range of relevant models, data and other evidence, this process clearly does not obviate the need for a proper assessment of the appropriate approach to the return on equity at each determination. The AEMC clearly intended that the rate of return be determined at the time of each determination, based on prevailing market conditions and the best evidence available at that time.[26]

(d)   Fundamental overhaul of return on equity setting

It is clear from the above discussion that the AEMC intended there to be a fundamental overhaul of the way that the return on equity is determined for regulatory purposes. The AEMC sought to design rules that both avoided formulaic application of a single return on equity model and promoted using a range of models, data and other evidence.

(e)   Context for estimating the return on equity

The role of the return on equity in the building block framework is to provide businesses with an allowance that is sufficient to provide equity-holders with a return commensurate with prevailing market conditions and the businesses' exposure to risk. Providing this allowance is necessary to ensure that the business can:

-   attract necessary capital to undertake efficient investment – consistent with the NGO, and
-   recover at least efficient costs – consistent with the RPP.

As noted by the AER, if the rate of return is set too low, a network business may be unable to attract sufficient funds to make the required investments in the network and reliability may decline.[27] Conversely, if the rate of return is set too high, this may provide a regulated entity with an incentive to invest "too much" in the network, which may result in inefficiently high prices.

SFG Consulting has similarly observed that an allowed return on equity that is materially above (below) the efficient financing costs of the benchmark efficient entity will create incentives for over (under) investment, neither of which are in the long-term interests of consumers.[28]

2.3   Conclusion

In determining the return on equity, the focal point is the prevailing conditions in the market for equity funds. It is through this lens that the exercise required by rule 87(5) is to be undertaken—that is, identifying the relevant estimation methods, financial models, market data and other evidence.

The question to answer is:

> *what estimation methods, financial models, market data and other evidence contain information that is relevant to estimating the required return on equity, which best reflects prevailing conditions in the market for equity funds and the degree of risk faced by ActewAGL Distribution when providing reference services?*

The NGR require an approach that has regard to all relevant methods, models and evidence, and determines an estimate of the return on equity based on those methods that are most likely to promote the rate of return objective and reflect prevailing market conditions. This implies that if one method or model is clearly superior to others or a combination of others in terms of contributing to the rate of

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[26] AEMC, *Draft Rule Determinations: National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012; National Gas Amendment (Price and Revenue Regulation of Gas Services) Rule 2012*, August 2012, pp. 49–50.

[27] AER, *Overview of the Better Regulation Reform Package*, April 2014, p. 14.

[28] SFG, *The required return on equity for regulated gas and electricity network businesses*, June 2014, [37], appendix

return objective, and no other model (or combination) provides any relevant information, then that method or model may be used alone to estimate the return on equity.

However, if there are multiple methods or models that each provide information that is relevant to estimating the return on equity, it is appropriate to apply positive weight to more than one model and it may be appropriate to weight all methods or models equally or similarly.

3   Relevant models and other evidence

As noted by the AEMC, there is no single model that is preferable as being free of weaknesses or that captures all of the strengths of others. ActewAGL Distribution agrees with the AER that the following four models are the relevant financial models today:

- SL-CAPM;
- Black-CAPM;
- FFM; and
- DDM.

Together with other businesses, ActewAGL Distribution has engaged a number of leading experts to assist with developing ActewAGL Distribution's rate of return proposal. In relation to the relevant models and other evidence SFG Consulting (SFG) provides a good summary as to why these four models constitute the relevant field of techniques for estimating a market based return on equity:[29]

> In our view, these four models all provide evidence that is relevant to the estimation of the required return on equity for the benchmark efficient entity. We reach this conclusion for the following reasons:
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> a) **All four models have a sound theoretical basis**. The Sharpe-Lintner CAPM, Black CAPM and Fama-French model are all based on the notion that the expected return on any asset is equal to a linear combination of the returns on an efficient portfolio and its zero covariance portfolio. This basic theoretical framework is the same for all three models, which differ only according to the way the efficient portfolio and the zero-covariance portfolio are determined. For example, under the Fama-French model the efficient portfolio is formed by combining three factor portfolios, whereas under the Sharpe-Lintner CAPM and Black CAPM the market portfolio (proxied by a stock market index) is assumed to be efficient. The Sharpe-Lintner CAPM further assumes that investors can borrow and lend as much as they like at the risk-free rate. The dividend discount model is based on the notion that the current stock price is equal to the present value of expected future cash flows (dividends).
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> b) **All four models have the purpose of estimating the required return on equity as part of the estimation of the cost of capital**. This point is not weakened by the fact that the models can be used to inform other decisions as well. For example, the Sharpe-Lintner CAPM and the Fama-French model can also be used to compute "alpha" for the purpose of mutual fund performance evaluation.
>
> c) **All four models can be implemented in practice**. For all four models, there is a long history and rich literature concerning the estimation of model parameters. This literature has developed empirical techniques, constructed relevant data sets, and considered issues such as the trade-off between comparability and statistical reliability.
>
> d) **All four models are commonly used in practice**. Some form of CAPM is commonly used in corporate practice and by independent expert valuation practitioners. The Black CAPM is commonly used in rate of return regulation cases in other jurisdictions (where it is known as the "empirical CAPM"). The dividend discount model is also commonly used in rate of return regulation cases in other jurisdictions (where it is known as the "discounted cash flow" approach). The Fama-French model has become the standard method for estimating the required return on equity in peer-reviewed academic papers and its use to estimate the required return on equity is required knowledge in professional accreditation programs. [Emphasis in original]

Other information, such as expert reports prepared in the context of assessing whether corporate takeover offers are 'fair' and surveys of practitioners, could be used if the quality is dependable and the context for why that material was prepared is considered. To the extent that these other sources

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[29] SFG, *The required return on equity for regulated gas and electricity network business*, A report for Jemena Gas Networks, ActewAGL, Distribution, Ergon, Transend and SA Power Networks, 6 June 2014.

are of any use, their value is to illustrate how the above models are implemented and combined in practice to deliver timely estimates of value or return.

The key characteristics of the models are discussed below.

3.1 SL-CAPM

The SL-CAPM is the model with which Australian economic regulators are most familiar and it has been required since the beginning of the NEM. This model estimates a return on equity by adding a margin for risk to the risk free rate. For the investment in question – in this case the benchmark efficient firm – the risk margin is the product of:

- a generalised estimate of the average reward for risk that investors expect on a fully diversified portfolio – that is, the MRP; and
- the 'beta' – which is a measure of the extent to which the investment in question carries non-diversifiable risk.

The model has theoretical weaknesses – most notably the unrealistic assumption that investors can borrow and lend at the risk free rate in the quantities they wish. Further, empirical studies have consistently found the performance of this model to be poor. As SFG explains:[30]

In particular, stocks with low beta estimates earn higher returns than predicted by the Sharpe-Lintner CAPM, and stocks with high beta estimates earn lower returns than predicted by the Sharpe-Lintner CAPM. This empirical result has been documented in literature over 50 years … The poor empirical performance of the Sharpe-Lintner CAPM likely occurs for two reasons. First, risks other than systematic risk are incorporated into share prices (in particular, stocks with a high book-to-market ratio persistently earn higher returns than stocks with a low book- to-market ratio). Second, the common measurement of systematic risk – the regression coefficient of excess stock returns on market returns – is an imprecise measure of risk.

NERA also notes:[31]

The model tends to underestimate the mean returns to low-beta assets, value stocks and, in the US and some other countries, low-cap stocks. A value stock is a stock that has a high book value relative to its market value or, identically, a low market value relative to its book value. A growth stock is a stock that has a low book value relative to its market value or, identically, a high market value relative to its book value.

NERA investigated this issue in detail comparing the empirical performance of the SL-CAPM and the Black CAPM, and produced results consistent with those of SFG. NERA used two types of tests; in relation to in-sample tests, the findings were:[32]

The data indicate that there is a negative rather than a positive relation between returns and estimates of beta. As a result, the evidence indicates that the SL CAPM significantly underestimates the returns generated by low-beta portfolios and overestimates the returns generated by high-beta portfolios. In other words, the model has a low-beta bias. The extent to which the SL CAPM underestimates returns to low-beta portfolios is both statistically and economically significant.

[30] SFG, *Cost of equity in the Black Capital Asset Pricing Model*, A report for Jemena Gas Networks, ActewAGL, Networks NSW, Transend, Ergon and SA Power Networks, 22 May 2014, p. 2;

[31] NERA, *Review of the Literature in Support of the Sharpe-Lintner CAPM, the Black CAPM and the Fama-French Three-Factor Model*, A report for Jemena Gas Networks, Jemena Electricity Networks, AusNet Services, Australian Gas Networks, CitiPower, Ergon Energy, Powercor, SA PowerNetworks, and United Energy, March 2015, p. 9.

[32] NERA, *Empirical Performance of the Sharpe-Lintner and Black CAPM*, A Report Jemena Gasworks, Jemena Electricity Networks, ActewAGL, AusNet Services, Citipower, Energex, Ergon Energy, Powercor, SAPower Networks and United Energy, February 2015, p. 54.

As an example, we estimate that the lowest-beta portfolio of the 10 portfolios that we construct to have a beta of 0.54 – marginally below the midpoint of the AER's range for the equity beta of a regulated energy utility of 0.4 to 0.7. Our in-sample results suggest that the SL CAPM underestimates the return to the portfolio by **4.90 per cent per annum**. [Emphasis added]

Similar findings arise from NERA's out-of-sample tests.

A further estimation problem arises during periods of particularly high, or low, official interest rates when this model is implemented using the AER's methodology – by using a current Commonwealth Government Bond yield to estimate the risk free rate in combination with a very long run average of historical excess returns to estimate the MRP[33]. The AER's approach (whose MRP is inspired by Ibbotson) behaves as if investors' expectations moved in perfect parallel with yields on the Commonwealth Government Bonds; there is no solid basis for this assumption. [34]

There are alternatives to the Ibbotson inspired approach adopted by the AER for establishing the MRP for use in the SL-CAPM. One is known as the Wright approach in which the historical average is used in conjunction with a current expectation of inflation (discussed further below). This approach is not a panacea for the flaws in the Ibbotson approach and does nothing to address the downward biased returns for low beta stocks that arise due to the unrealistic assumption concerning the ability of investors to borrow and lend at the risk free rate. These alternative approaches are discussed further below in section 4.

3.2   The Black CAPM

The Black CAPM is a 'next generation' model in that it builds on the SL-CAPM by incorporating additional flexibility. It is related to the SL-CAPM in the following way:[35]

[T]he Sharpe-Lintner CAPM remains a specific application of the more general model, the Black CAPM.

Further:[36]

The Black CAPM does not rely upon the assumption that all investors can borrow at the risk-free rate of interest.

The Black CAPM has been demonstrated to provide a significantly better empirical fit to the data than the SL-CAPM:[37]

Using the 10 portfolios formed on the basis of past estimates of beta and monthly data from January 1979 to December 2013, we find … little evidence of bias in the Black CAPM.

Although the AER has accepted that the Black CAPM's theoretical insights are relevant to its determinations, it does not directly use the Black CAPM to estimate the required rate of return on equity.[38] Rather, this model's theoretical insights are used by the AER via the 'back door' as one of the rationales for adopting a beta estimate at the high end of the AER's beta range.

The AER's approach is not the way in which the Black CAPM is typically used for regulatory purposes. Despite the AER's protestations that the model is unusable because a zero beta portfolio is allegedly

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[33] AER, *Rate of Return Guideline Explanatory Statement*, December 2013, pp 10-11

[34] AER, *Rate of Return Guideline Explanatory Statement Appendices*, December 2013, pp. 24-25

[35] SFG, *Cost of Equity in the Black Capital Asset Pricing Model*, 22 May 2014, A report for Jemena Gas Networks, ActewAGL, Networks NSW, Transend, Ergon and SA Power Networks, p. 15.

[36] SFG, *Cost of Equity in the Black Capital Asset Pricing Model*, A report for Jemena Gas Networks, ActewAGL, Networks NSW, Transend, Ergon and SA Power Networks, 22 May 2014, p. 2.

[37] NERA, *Empirical Performance of the Sharpe-Lintner and Black CAPM*, A report Jemena Gasworks, Jemena Electricity Networks, ActewAGL, AusNet Services, Citipower, Energex, Ergon Energy, Powercor, SAPower Networks and United Energy, February 2015, p. 56.

[38] AER, *Rate of Return Guideline Explanatory Statement Appendices*, December 2013, Appendices A.3 and C.4; AER, Attachment 3, Rate of Return, ActewAGL final decision, April 2015, p. 36

hard to estimate,[39] the Black CAPM (also referred to as the 'empirical' or 'Zero Beta' CAPM) has been used extensively in US regulation cases particularly when adopting a beta materially less than one.[40]

While empirical studies have consistently found that this model performs better than the SL-CAPM, the Black CAPM is known to have a downward bias for value stocks:[41]

> [S]tocks with above-average book-to-market ratios would be expected to have returns above that predicted by the Black CAPM and a zero beta premium of 3.34%. If the risks associated with high book-to-market stocks are not incorporated elsewhere, and the Black CAPM alone is used to estimate the cost of equity with a zero beta premium of 3.34%, the cost of equity will be understated.

The same implementation problem arises as with the SL-CAPM when the current returns on central bank debt are used as the estimate of the risk-free rate, and this value is added to an essentially constant long run average estimate of the MRP.

3.3   The Fama French three factor model

This model provides separately for an additional return on value stocks, which empirical studies in the US and Australia have confirmed:[42]

> The Fama-French model has the advantage of providing an unambiguously better fit to the data than the Sharpe-Lintner CAPM.

This model is newer than the other two CAPM models. Despite being the newer model, since the turn of the century the FFM has been part of the evidence in a number of state regulatory proceedings in the United States.[43]

In his testimony before the Californian Public Utilities Commission, Gary Hayes notes:[44]

> [T]he California Public Utilities Commissioner Bohn stated after the January 2007 cost-of-capital workshop: The commission should remain open to receiving evidence from new additional models should parties wish to provide such. We should always welcome new and better tools and ways of tackling problems.

However, the Commissioner went on to exhort the participants:[45]

> First, the FF model is not a new, untested formula dropping in from academia. It has behind it a solid track record of research and has been the topic of extensive debate...Nowadays, the FF model is used routinely by financial economists as they research investments, returns, and relative performance, as it is a useful tool with which to interpret return data on a wide number of asset types… Use of the FF model is not limited to just the halls of the academy; it has expanded into the investing world as well. …. Other professional practitioners have begun to utilize the FF model. Valuation experts now add FF results to fairness opinions issued in mergers-and-acquisitions transactions. Noteworthy is the Delaware courts' acceptance – and in one case, utilization – of FF evidence in asset-valuation disputes…. From the perspective of the everyday ROE analyst, the FF model is very accessible….Aside from its three California appearances, the FF method has also made its debut in Massachusetts and Nevada....The

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[39] For example, AER, *Rate of Return Guideline Explanatory Statement*, December 2013, p 85

[40] SFG, *Beta and the Black Capital Asset Pricing Model*, February 2015, p. 21 (at [71])

[41] SFG, *Cost of Equity in the Black Capital Asset Pricing Model*, A report for Jemena Gas Networks, ActewAGL, Networks NSW, Transend, Ergon and SA Power Networks, 22 May 2014, p. 38.

[42] SFG, *The Required Rate of Return on Equity for Regulated Gas and Electricity Network Businesses*, A report for Jemena Gas Networks, ActewAGL, Networks NSW, Transend, Ergon and SA Power Networks, 6 June 2014, p. 9.

[43] For example, the California Public Utilities Commision, Delaware Public Service Commission, Nevada Public Utilities Commission and Massachusetts Department of Telecommunications.

[44] Testimony of Gary G Hayes on behalf of San Diego Gas and Electric before the California Public Utilities Commission, 2007, pp. 12–15.

[45] Testimony of Gary G Hayes on behalf of San Diego Gas and Electric before the California Public Utilities Commission, 2007, pp. 12– 15.

Commissioner asked [the witness] whether FF is more accurate or useful than old standards. Accuracy, when measured as an equation's ability to predict returns (called R2 by statisticians) is improved by the FF factors…Therein lies the model's usefulness as a cross check on its sibling, the CAPM.

The Rate of Return Guideline, however, takes the approach that although the FFM is 'relevant' it should play no part whatsoever in the establishment of the allowed rate of return. In our view this is wholly unacceptable.

If the FFM is wholly excluded from the analysis, there is no other model that specifically addresses the downward bias for value stocks. As SFG notes:[46]

Our view is that if the Fama-French model is not given any consideration by the AER, the estimated cost of equity will be understated. If we were to rely solely upon the Sharpe-Lintner CAPM, populated with a regression-based estimate of beta, we would adopt a second-best solution, because we would ignore the empirical evidence that the HML factor proxies for risk.

In section 4 ActewAGL Distribution discusses in more detail the concerns it has about the manner in which this evidence has been treated in the Rate of Return Guideline and the recent April/June 2015 final decisions.

3.4   The Dividend Discount Model

The DDM is also referred to as the discount cash flow (**DCF**) model. The Federal Energy Regulatory Commission of the United States of America noted that:[47]

The DCF model is a well established method of determining the equity cost of capital, (See Illinois Bell Telephone Co. v FCC, 988 F.2d 1254, 1259 n. 6 (D.C.Cir 1993).

and:[48]

'The DCF method 'has become the most popular technique of estimating the cost of equity, and it is generally accepted by most commissions. **Virtually all cost of capital witnesses use this method, and most of them consider it their primary technique***.' Quoting J. Bonbright et al., Principles of Public Utility Regulation and other methods such as the risk premium model have not been used by the Commission for almost two decades.* [Emphasis added]

The DDM approaches the task of estimating the required rate of return in a different way:[49]

The dividend discount model approach has the advantage of not requiring any assumptions about what factors drive required returns – it simply equates the present value of future dividends to the current stock price. It is also commonly used in industry and regulatory practice. Whereas the Guideline materials identify some concerns with the dividend discount approach, the specification adopted in this report addresses most of those concerns. Consequently, our view is that the dividend discount estimate of the required return is relevant evidence and some regard should be given to it.

This model performs well provided a robust method is used for forecasting future dividends. SFG has reviewed a range of ways that this model can be implemented, considering the techniques produced by, or for, the AER during the guideline consultation process, as well as methods described in other publications. The principal issues include the length of the period over which growth reverts to an assumed long run growth rate, whether that progression is linear or otherwise and how long term dividend growth is assumed to be related to assumptions about over-all economic growth.

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[46] SFG, *The Fama French Model*, A report for Jemena Gas Networks, ActewAGL, Ergon, Transend, TransGrid, and SA PowerNetworks, 13 May 2014, p. 3.

[47] *United States of America Federal Energy Regulatory Commission Composition of Proxy Groups for Determining Gas and Oil Pipeline Return on Equity* 123 FERC ¶ 61,048 at [53].

[48] *United States of America Federal Energy Regulatory Commission Composition of Proxy Groups for Determining Gas and Oil Pipeline Return on Equity* 123 FERC ¶ 61,048 at [53].

[49] SFG, *The required return on equity for regulated gas and electricity network business,* A report for Jemena Gas Networks, ActewAGL, Distribution, Ergon, Transend and SA Power Networks, 6 June 2014, p. 9.

The AER has rejected the DDM/DCF approach to estimating the required return on equity for the benchmark entity and instead uses it only to inform the estimate of the market-wide MRP. This is wholly inconsistent with the US approach, which relies primarily on DCF estimates directly in establishing the permitted returns of the firm being regulated.

3.5   Multi-model approach

As outlined in this section, and further detailed in attached expert material, there is significant evidence in support of relying on and applying positive weight to these four models when estimating the return on equity.

Due to this evidence, as noted in section 1 and further detailed in section 4, ActewAGL Distribution has significant reservations with the AER's approach to estimating the rate of return using a foundation model and considers that a multi-model approach should be used when estimating the return on equity. This is further detailed in section 5 and outlined in attached expert material.

4 Outline of the AER's estimation of the return on equity and ActewAGL Distribution's position

In its Rate of Return Guideline and in the final decisions in April/June 2015 for the ACT/NSW electricity and gas distribution businesses, the AER has reasoned as follows:

1 The AER considers that the SL-CAPM should be used as the foundation model to estimate the return on equity. ActewAGL Distribution understands that the AER's reasons for adopting this approach are as follows:

   (a) the SL-CAPM model is the current standard and 'dominant' asset pricing model of modern finance both in theory and in practice;[50]

   (b) the SL-CAPM is superior to all other models considered by the AER, in terms of estimating the return on equity of the benchmark efficient entity;[51]

   (c) use of the SL-CAPM as the foundation model will not result in a downward biased estimate of the cost of equity for capital;[52] and

   (d) use of alternative models will not lead to an outcome which better achieves the rate of return objective. The AER expresses a number of concerns in relation to these alternative models.[53]

2 An equity beta of 0.7, when applied in the SL-CAPM, will deliver a return on equity that contributes to achievement of the rate of return objective. The AER considers that:

   (a) empirical studies support an equity beta range of 0.4 to 0.7;[54] and

   (b) additional information taken into account by the AER – including empirical estimates for international energy networks and the theoretical principles underpinning the Black CAPM – indicate that an equity beta at the top of this range is appropriate.[55]

3 An MRP of 6.5% reasonably reflects prevailing market conditions and contributes to achievement of the rate of return objective.[56] The AER's approach differs from ActewAGL Distribution's in that:

   (a) the AER does not agree that the Wright approach should be used to estimate the MRP. This is because the AER considers that the Wright approach is an alternative implementation of the CAPM, designed to produce information at the overall return on equity level;[57]

   (b) the AER does not agree that independent valuation reports should inform MRP estimation (only the overall return on equity);[58]

   (c) the AER adopts a different interpretation of the historical excess returns data;[59]

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[50] AER, Attachment 3, Rate of Return, ActewAGL final decision, April 2015, p. 226

[51] AER, Attachment 3, Rate of Return, ActewAGL final decision, April 2015, pp. 240-241

[52] AER, Attachment 3, Rate of Return, ActewAGL final decision, April 2015, p. 240

[53] AER, Attachment 3, Rate of Return, ActewAGL final decision, April 2015, pp. 241-274

[54] AER, Attachment 3, Rate of Return, ActewAGL final decision, April 2015, p. 428

[55] AER, Attachment 3, Rate of Return, ActewAGL final decision, April 2015, p. 430

[56] AER, Attachment 3, Rate of Return, ActewAGL final decision, April 2015, p. 34

[57] AER, Attachment 3, Rate of Return, ActewAGL final decision, April 2015, p. 88

[58] AER, Attachment 3, Rate of Return, ActewAGL final decision, April 2015, p. 88

[59] AER, Attachment 3, Rate of Return, ActewAGL final decision, April 2015, pp. 317-324

(d)   the AER does not agree with SFG's construction of the DGM;[60] and

(e)   the AER takes into account survey evidence and conditioning variables.[61]

4   The AER's return on equity estimate from the SL-CAPM is broadly supported by:[62]

(a)   estimates using the Wright approach;

(b)   estimates from other market participants and independent valuers, including practitioners and regulators;

(c)   the fact that it is above the prevailing return on debt; and

(d)   the fact that the regulatory regime to date has been supportive of investment.

This reasoning is based on a number of errors of fact and logic, which are described in detail below.

Together with other businesses, ActewAGL Distribution engaged Frontier Economics to review the AER's approach to estimation of the return on equity. Fronter Economic's report is included in appendix 8.16. The report notes that the AER, ex ante, has divided the relevant evidence into primary and secondary subsets without proper basis. As a consequence, evidence that is not assigned to the primary subset will inevitably have almost no impact on the estimate of the parameter, with the result that the AER unreasonably constrains the resultant range of parameter estimates. For example the AER concludes that the 'primary' evidence established an equity beta range of 0.4 to 0.7. Other evidence is only used to inform the selection of a point estimate from within that range notwithstanding that that other evidence is relevant and, in most cases, supports an estimate from outside (above) that range. The expert report from Frontier Economics provides further examples of deficiencies in the AER's logic and approach and directly addresses two new reports by Partington/Satchell and Handley that the AER referred to as part of its final decision in June 2015 for Jemena.

As a consequence of these errors, the return on equity determined by the AER will not contribute to the achievement of the rate of return objective and does not reflect prevailing conditions in the market for equity funds. For reasons discussed below, the return on equity derived from the AER's approach will be below what is required to promote efficient investment in, and efficient operation and use of, natural gas services for the long term interests of consumers.

4.1   Choice of return on equity models

(a)   The foundation model approach

Although the AER acknowledges that there are limitations and weaknesses with the SL-CAPM, and therefore the 'foundation model' approach, it appears to proceed on the assumption that one return on equity model will be demonstrated to be clearly superior to others, such that it can be used as the 'foundation model'. This can be seen from the AER's Rate of Return Guideline, which, for the return on equity, provides that a model be used as the "foundation model".[63]

The assumption that there will be one model or estimation method that is clearly superior to all others, and the finding that in fact there is one such model (the SL-CAPM), is not supported by the evidence before the AER. On the contrary, a detailed examination and comparison of the sources of information reveals that each return on equity model has strengths and weaknesses, and that no single model can be said to be superior to the others. In such circumstances, where there is no basis upon which to

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[60] AER, Attachment 3, Rate of Return, ActewAGL final decision, April 2015, p. 88-89

[61] AER, Attachment 3, Rate of Return, ActewAGL final decision, April 2015, p. 86

[62] AER, Attachment 3, Rate of Return, ActewAGL final decision, April 2015, p. 134-136

[63] AER, *Rate of Return Guideline*, December 2013, pp 12-13.

distinguish between the sources of information, ActewAGL Distribution considers that it is incorrect and unreasonable to adopt a "foundation" model approach.

As part of this proposal, ActewAGL Distribution attaches a number of independent expert reports. In its report on how to estimate the overall return, SFG concludes: [64]

> *"Because all of the models have different strengths and weaknesses along different dimensions, it is impossible to identify one superior model that alone would out-perform the combined evidence of all of the relevant models."*

It is in line with this that ActewAGL Distribution proposes to assign equal weight to the different return on equity models that it proposes to use to estimate the return on equity.

As discussed in section 2 above the changes to Rule 87 of the NGR in 2012 were at least partly driven by a recognition that the NGR should not prescribe a particular model, because no one model can be said to be clearly superior. The AEMC explicitly recognised that all financial models, including the SL-CAPM, are based on certain theoretical assumptions and all have varying degrees of weaknesses, and as such, no one model can be said to provide the right answer.[65] The AEMC therefore considered that estimates of the return on equity are likely to be more robust and reliable if they are based on a range of estimation methods, financial models, market data and other evidence.[66]

The AER's foundation model approach appears to run contrary to the AEMC's intent. Through its foundation model approach the AER seeks to lock in one model, largely to the exclusion of others. While the AER states that it has taken into account information from two other models (the DGM and Black-CAPM), it has done so only to inform its estimation of foundation model parameters. Ultimately the AER has only had regard to the return on equity estimate from one model – its foundation model – while the return on equity estimates of all other relevant models have been disregarded.

In summary, ActewAGL Distribution considers that the AER's starting premise – that a superior model can be identified – is, at least at this stage given the existing models and their various stages of development, both factually incorrect and contrary to the stated intent of the Rule changes. There is no evidence to support this premise, and the evidence before the AER points to a contrary conclusion.

(b)   The AER errs in finding that the SL-CAPM is the clearly superior model

Despite recognising that the SL-CAPM has limitations,[67] the AER states that the SL-CAPM is the superior model to use as the foundation model.[68] However, no clear evidence is cited in support of this statement, and ActewAGL Distribution is not aware of any evidence that supports this view.

The evidence before the AER in fact shows that the SL-CAPM has known weaknesses. In particular, as discussed below, the SL-CAPM is known to produce downwardly biased estimates of the required return on equity for low-beta stocks.

ActewAGL Distribution notes that neither Handley nor Partington, in their reports for the AER, state that the SL-CAPM is superior to other models. Indeed Partington, in his advice to the AER in April 2015, observes that:[69]

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[64] SFG, *The required return on equity for regulated gas and electricity network businesses*, June 2014, [370].

[65] AEMC, *Draft Rule Determinations: National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012; National Gas Amendment (Price and Revenue Regulation of Gas Services) Rule 2012*, August 2012, p. 48.

[66] AEMC, *Draft Rule Determinations: National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012; National Gas Amendment (Price and Revenue Regulation of Gas Services) Rule 2012*, August 2012, p. 48.

[67] AER, Attachment 3, Rate of Return, ActewAGL final decision, April 2015, p. 225

[68] AER, Attachment 3, Rate of Return, ActewAGL final decision, April 2015, p. 32

[69] Graham Partington, *Report to the AER – Return on Equity (Updated)*, April 2015, p 29.

The AER's proposal for estimating the expected return on equity using the S–L CAPM as a 'foundation model' provides a starting point, which is firmly based in a mature and well accepted theoretical and empirical literature. As no framework is perfect, the foundation model has its weaknesses, but these are well-documented and in many cases can either be diagnosed or perhaps compensated for in empirical practice.

To the extent that the AER has sought to compensate for these weaknesses, by taking the upper bound of its equity beta range, it cannot reasonably be satisfied it has adequately compensated for their effect because it does not seek to analyse or quantify this effect. ActewAGL Distribution notes that Partington also states:[70]

The final estimate of the expected return on equity may have regard to a broad range of relevant material including a range of multifactor models such as the Fama and French (1993) and the APT of Ross (1976), inter alia. Many of these competing models nest this foundation model and so potentially make more use of available information. In that sense, they may prove to be useful in validating this foundation model estimate.

These statements by Partington (which are very similar to what McKenzie and Partington stated in their October 2014 report to the AER) do not appear to view the SL-CAPM as superior to all other models. Rather they acknowledge the weaknesses of the model and recommend that any estimate of the return on equity may take into account a wider range of models, including the FFM. In advice to the AER, associate Professor Handley has also acknowledged the critical weakness of the SL-CAPM, noting that:[71]

An apparent weakness of the Sharpe-CAPM is the empirical finding, for example by Black, Jensen and Scholes (1972) and Fama and French (2004), that the relation between beta and average stock returns is too flat compared to what would otherwise be predicted by the Sharpe-CAPM – a result often referred to as the low beta bias.

In his advice in April 2015, commenting on the FFM it continues to be clear that Professor Handley acknowledges weaknesses with the SL-CAPM (and the FFM)[72]:

So whilst Lewellen, Shanken and Nagel (2010) do indeed show that the Fama-French model outperforms the Sharpe-CAPM (with a 6% explanatory power compared to a 0% explanatory power), the key point is that the empirical performance of both models and not just the Sharpe-CAPM, is extremely poor.

In his report in May 2015, Handley goes on to acknowledge the "well known weaknesses" of the SL-CAPM, observing[73]:

It is well known that an apparent weakness of the Sharpe-CAPM is the empirical finding that the average return on value stocks and small stocks is higher than what would otherwise be predicted by the Sharpe-CAPM – a result which motivated Fama and French to propose their three-factor model in the early 1990s.

Handley then observes that empirical referencing is not sufficient to justify a claim for additional compensation relative to the rate of return derived using the SL-CAPM and that there is no clear understanding of the effect of value. ActewAGL Distribution disagrees with this. Knowingly using a single model with significant recognised deficiencies to estimate the return on equity, as demonstrated

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[70] Graham Partington, *Report to the AER – Return on Equity (Updated)*, April 2015, p 29.

[71] John C Handley, *Advice on the Return on Equity: Report prepared for the Australian Energy Regulator*, 16 October 2014, p 5.

[72] John C Handley, *Further Advice on the Return on Equity: Report prepared for the Australian Energy Regulator*, 16 April 2015, p 4.

[73] John C Handley, Advice on the Rate of Return for the 2015 AER Energy Network Determination for Jemena Gas Networks, 20 May 2015, p 6.

in NERA's February 2015 report, is inconsistent with Rule 74 (2) (as this approach will not deliver the best forecast possible in the circumstances).

Further, together with other businesses, ActewAGL Distribution engaged NERA to prepare a report that in detail responds to the AER's April/June 2015 final decisions, including reviewing what the AER, Handley, Parting and Satchell have stated in relation to NERA's February 2015 report relating to the performance of the SL-CAPM model as well as their referencing to work undertaken by Ray, Savin, Tiwari (2009) and Da, Guo and Jagannathan (2012). The report is included in appendix 8.20. NERA's June 2015 report notes that:[74]

> The SL CAPM and the AER CAPM perform so badly that even a naïve model that states that the mean returns to all equities are identical performs better.

This is not new. The weaknesses and limitations of the SL-CAPM were identified by ActewAGL Distribution in its electricity distribution network proposal to the AER in June 2014 as well as in its revised submissions in January 2015 and February 2015 and in supporting expert reports. In particular, SFG has referred to the large body of empirical evidence which shows that the SL-CAPM will tend to produce biased estimates of the required return on a low-beta or value stock, and may not fully capture all factors affecting stock returns.[75] SFG also explains how other models such as the Black CAPM and FFM were developed specifically to overcome these known weaknesses in the SL-CAPM design. ActewAGL Distribution attaches these expert reports to this proposal.

Some of the key empirical evidence demonstrating weakness in the SL-CAPM is summarised in Table 2 below.

Table 2: Summary of key empirical evidence in relation to SL-CAPM performance

Study	Key conclusions
Black, Jensen and Scholes (1972)[76]	Black, Jensen and Scholes (1972) tested the SL-CAPM theory against empirical data. Their results indicated that the empirical relationship between systematic risk exposure and returns was not consistent with SL-CAPM theory. The relationship in the empirical data indicated a higher intercept and flatter slope than that indicated by the SL-CAPM. The authors conclude that their results appeared to be strong evidence favouring rejection of the traditional form of the asset pricing model (i.e. the SL-CAPM).
Friend and Blume (1970)[77]	The empirical analysis by Friend and Blume (1970) indicates that low-beta stocks generate higher returns than the SL-CAPM would suggest and high-beta stocks tend to generate lower returns than the SL-CAPM predicts.
Fama and Macbeth (1973)[78]	Fama and Macbeth (1973) empirically test the assumption of the SL-CAPM that the return on a zero-beta asset will be equal to the risk-free rate. Consistent with the earlier findings of Black, Jensen and Scholes (1972), they conclude that this assumption is not supported by the empirical data.

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[74] NERA, The Cost of Equity: A Critical Review of the Analysis of the AER and its Advisors, June 2015, p 6

[75] SFG, *The required return on equity for regulated gas and electricity network businesses*, June 2014, [46]–[60].

[76] Black, F., M.C. Jensen, and M. Scholes, 1972, "The Capital Asset Pricing Model: Some empirical tests," in *Studies in the Theory of Capital Markets*, Michael C. Jensen, ed., New York: Praeger, 79–121.

[77] Friend, I., M. Blume, 1970, "Measurement of Portfolio Performance under Uncertainty," *American Economic Review*, 60, 561–75.

[78] Fama, E.F., J.D. MacBeth, 1973, "Risk, return, and equilibrium: Empirical tests," *Journal of Political Economy*, 81, 607–636.

Study	Key conclusions
Rosenberg, Reid and Landstein (1985)[79]	The study by Rosenberg, Reid and Landstein, as well as other studies identified a number of SL-CAPM anomalies, where stock-specific characteristics seemed related to differences in returns. In particular, the book equity value divided by the market equity value (book-to-market ratio) appeared to be related to variation in returns.
Fama and French (1992)[80]	Fama and French (1992) demonstrated relationships between returns and book-to-market and size factors which are not accounted for in the SL-CAPM.
Brealey, Myers and Allen (2011)[81]	A recent study by Brealey, Myers and Allen confirms the findings of earlier studies, such as the study by Black, Jensen and Scholes (1972), that the pattern of empirical data is not consistent with what the SL-CAPM would predict.
NERA (2015)[82]	Based on Australian data, and using both in-sample and out-of-sample tests, NERA concludes that there is evidence of bias in the SL-CAPM. NERA states that the evidence indicates that the SL-CAPM significantly underestimates the returns generated by low-beta portfolios and overestimates the returns generated by high-beta portfolios. In other words, the model has a low-beta bias. The extent to which the SL-CAPM underestimates the returns to low-beta portfolios is both statistically and economically significant.

The body of empirical literature relating to identified weaknesses in the SL-CAPM, and the development of alternative models to overcome the well-recognised deficiencies in this model, is discussed at some length by the Nobel Prize Committee, in the explanatory material accompanying the award of the Nobel Prize for contributions to this field in 2013.[83] The Committee observes that by the end of the 1970s, the empirical support for the SL-CAPM was increasingly being questioned in a number of studies, including those referred to above.

In light of the above evidence, the AER cannot rationally conclude that the SL-CAPM is superior to all other models and that a foundation model approach, with the SL-CAPM as the foundation model, should be adopted. The evidence clearly shows that the SL-CAPM has weaknesses and that there are alternative models available, some of which have been designed to address such weaknesses.

(c)   The AER errs in finding that the SL-CAPM will produce unbiased estimates

The AER has considered the issue of potential bias in the SL-CAPM, but concludes:[84]

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[79] Rosenberg, B., K. Reid, and R. Lanstein (1985), "Persuasive evidence of market inefficiency," *Journal of Portfolio Management* 11, 9-17.

[80] Fama, E.F. and K.R. French (1992), "The cross-section of expected stock returns," *Journal of Finance* 47, 427-466.

[81] Brealey, R.A., S.C. Myers, and F. Allen, 2011, *Principles of Corporate Finance*, 10th ed., McGraw-Hill Irwin, New York, NY, USA.

[82] NERA, *Empirical Performance of Relevant Models for Estimating the Return on Equity*, February 2015.

[83] Economic Sciences Prize Committee of the Royal Swedish Academy of Sciences, *Understanding Asset Prices: Scientific Background on the Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel 2013*, 14 October 2013, section 7.

[84] AER, Attachment 3, Rate of Return, ActewAGL final decision, April 2015, p. 60

Contrary to what some submissions indicated, there is no compelling evidence that the return on equity estimate from the SLCAPM will be downward biased given our selection of input parameters.

This indicates that the AER has found that:

1   in general, the SL-CAPM will produce unbiased estimates of the required return on equity (**Finding 1**); <u>or</u>

2   to the extent that the SL-CAPM may produce biased estimates, the AER's selection of input parameters adequately corrects for any bias (**Finding 2**).

The AER must have either made Finding 1 or Finding 2 in order for it to be satisfied that its approach will deliver a return on equity which contributes to achievement of the rate of return objective.

ActewAGL Distribution considers that Finding 1 would involve a critical error of fact. Empirical evidence demonstrates that the SL-CAPM will lead to downward biased estimates of the return on equity for low-beta stocks. This empirical evidence, referred to in Table 2 as well as by ActewAGL Distribution in its electricity distribution review 2014/15, includes the work of Black, Jensen and Scholes (1972), Friend and Blume (1970) and Fama and Macbeth (1973).[85]

Further evidence of bias in SL-CAPM estimates of the return on equity is provided with this proposal. The accompanying expert report by NERA included in appendices 8.18 and 8.20, using Australian data, demonstrates that that there is evidence of bias in the SL-CAPM.[86] NERA concludes that the evidence indicates that the SL-CAPM significantly underestimates the returns generated by low-beta portfolios and overestimates the returns generated by high-beta portfolios. In other words, the model has a low-beta bias. The extent to which the SL-CAPM underestimates the returns to low-beta portfolios is both statistically and economically significant.[87]

If the AER has made Finding 2 – i.e. if the AER acknowledges that there is bias in the SL-CAPM but believes that it has corrected for this bias – ActewAGL Distribution considers that there can be no reasonable basis for such a finding. The AER does not seek to quantify the effect of such bias, nor does it make any transparent adjustment to its SL-CAPM parameter estimates to correct for this bias.

The AER does make an adjustment to its equity beta estimate, from what it refers to as the "best empirical equity beta estimate"[88] of this parameter for (i) empirical estimates of international energy networks and (ii) the theoretical principles underpinning the Black CAPM.[89] It is not clear whether this adjustment is intended to correct for bias in the SL-CAPM. In any event, given that the AER does not seek to quantify the effect of SL-CAPM bias, it cannot reasonably be satisfied that this adjustment adequately corrects for such bias.

Indeed, in its ACT/NSW final decision in April 2015, the AER appears to acknowledge that its equity beta estimate should be adjusted upwards to correct for bias in the SL-CAPM, but states it cannot ascertain by how much it needs to adjust its estimate (see the following quote). The AER does not calculate a specific uplift to its beta to correct for SL-CAPM bias, but instead makes an arbitrary upward adjustment in the hope that this will adequately account for the issue that it has identified. The AER states:[90]

"We consider the theoretical principles underpinning the Black CAPM demonstrate that market imperfections could cause the true (unobservable) expected return on equity to vary from the

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[85] SFG, *The required return on equity for regulated gas and electricity network businesses*, June 2014, [46]–[60].

[86] NERA, *Empirical Performance of Sharpe-Lintner and Black CAPMs*, February 2015.

[87] NERA, *Empirical Performance of Sharpe-Lintner and Black CAPMs*, February 2015, p 54

[88] AER, Attachment 3, Rate of Return, ActewAGL final decision, April 2015, p. 430

[89] AER, Attachment 3, Rate of Return, ActewAGL final decision, April 2015, p. 430

[90] AER, Attachment 3, Rate of Return, ActewAGL final decision, April 2015, p. 425

SLCAPM estimate. For firms with an equity beta below 1.0, the Black CAPM may predict a higher expected return on equity than the SLCAPM. We use this theory to inform our equity beta point estimate, and consider it supports an equity beta above the best empirical estimate implied from Henry's 2014 report. However, while the direction of this effect may be known, the magnitude is much more difficult to ascertain. We do not consider this theory can be used to calculate a specific uplift to the equity beta estimate to be used in the SLCAPM."

Ultimately, the AER adopts the top of its selected range for the SL-CAPM equity beta – in effect, the AER makes an upward adjustment to the equity beta, from what it refers to as the "best empirical equity beta estimate"[91] to the upper limit of its range using its "judgement". However, given that the AER has not sought to quantify the effect of SL-CAPM bias, it cannot reasonably be satisfied that choosing the top of its equity beta range will adequately correct for such bias. ActewAGL Distribution continues to note that the AER's top of the range estimate sits below what its own advisor, Professor Henry, considers to be the range (0.3 to 0.8).[92]

ActewAGL Distribution considers that selecting the top of the AER's equity beta range will not adequately correct for the bias in the SL-CAPM indicated by Black CAPM theory. If the AER's parameter estimates are used in the Black CAPM along with the best available estimate of the zero-beta premium, the return on equity estimated by the Black CAPM is above the return on equity estimated by the AER using the SL-CAPM (and adopting the upper limit of the AER's equity beta range).

ActewAGL Distribution also does not consider that providing "a balance between the views of service providers and other stakeholders"[93] when determining an equity beta of 0.7 is relevant given that the decision on the equity beta should rely on the available evidence in front of the AER. It is ActewAGL Distribution's view that the evidence shows that the AER errs and relies too heavily on a very small data sample of Australian firms (which is not robust) and disregards strong international evidence that the equity beta is higher than 0.7. ActewAGL Distribution refers the AER to the proposed approach by SFG which very transparently calculates the equity beta where the Australian data has been given a weight of 24 per cent and the international observations a weight of 76 per cent.

Table 3 shows that even if the AER's lower bound beta value is used in the Black CAPM, the resulting return on equity estimate is still above the AER's SL-CAPM estimate using the upper bound beta value of 0.7. If the AER's "best empirical estimate" of beta is used in the Black CAPM, the resulting return on equity estimate is significantly above the AER's SL-CAPM estimate using the upper bound beta value. This indicates that if the AER were to properly adjust its SL-CAPM beta estimate to account for the bias in the SL-CAPM indicated by Black CAPM theory, the resulting beta would need to be higher than 0.7.

Table 3: Comparison of SLCAPM and Black CAPM return on equity estimates[94]

Model	Return on equity estimate
SL-CAPM – equity beta 0.7; MRP 6.5%	7.19%
Black CAPM – equity beta 0.4 (AER lower bound); MRP 6.5%	7.24%
Black CAPM – equity beta 0.5 (AER "best estimate"); MRP 6.5%	7.56%

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[91] AER, Attachment 3, Rate of Return, ActewAGL final decision, April 2015, p. 430

[92] Olan T Henry, *Estimating β: An update*, April 2014, p. 63.

[93] AER, Attachment 3, Rate of Return, ActewAGL final decision, April 2015, p. 430

[94] All calculations are based on a risk-free rate of 2.64% and a Black CAPM zero-beta premium of 3.34% (as estimated by SFG).

Model	Return on equity estimate
Black CAPM – equity beta 0.7 (AER upper bound); MRP 6.5%	8.19%

ActewAGL Distribution notes two alternative methods for estimating the return on equity, both of which would take into account the effect of bias in the SL-CAPM, have been submitted to the AER in the last year:[95]

·   The SL-CAPM should be used in combination with other models, some of which have been developed to overcome this issue. This approach appropriately accounts for the fact that each of the models (including the SL-CAPM) has strengths and weaknesses. While this approach may not fully correct for the effect of bias in the SL-CAPM (because the biased SL-CAPM estimate is still one input), this issue is at least recognised in the way that evidence from various models is taken into account.

·   An alternative position is that the SL-CAPM should be used with an equity beta that is properly adjusted to account for the limitations of the SL-CAPM. This method effectively adjusts the equity beta so that the limitations of the SL-CAPM are accounted for in the same way as in the other relevant models.

ActewAGL Distribution considers that either of these methods would be preferable to the AER's approach. ActewAGL Distribution's preference is the first approach that combines the return on equity from other models with the SL-CAPM.

(d)   Matters considered by the AER in assessing SL-CAPM bias

The AER does not undertake any empirical testing for bias in the SL-CAPM, nor does it appear to properly consider the available research on this issue (i.e. the research referred to above and in the expert reports supporting this proposal).

Rather, the AER states that, in considering the issue of potential bias in its SL-CAPM estimate, it has in its April 2015 final decision for ActewAGL Distribution's electricity distribution network taken into account:[96]

·   that the regulatory regime to date has been utilising the SL-CAPM to set the return on equity and has been supportive of investment;

·   that its foundation model return on equity estimate is approximately 260 basis points above the prevailing yield-to-maturity on BBB-rated debt with 10 year term to maturity and the appropriateness of the equity risk premium. The AER in particular compares its estimate with Wright's approach; and

·   other relevant information such as independent valuers, brokers and other regulators' considerations.

The first of these considerations – whether previously determined rates of return have discouraged investment – is irrelevant and does not provide any basis for finding that the SL-CAPM is unbiased. This is not an approach that is used in academic studies or market practice to test for model bias. Rates of return in previous periods have been estimated with different input parameters (including a higher equity beta) and in different market conditions (with higher prevailing risk-free rates). Therefore,

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[95] See for example, ActewAGL Distribution's June 2014 submission and January 2015 revised submission for its electricity distribution network.

[96] AER, Attachment 3, Rate of Return, ActewAGL final decision, April 2015, p. 131-138

levels of investment in past periods under different rate of return settings does not provide a rational basis for concluding that the SL-CAPM will produce unbiased estimates of the return on equity for the forthcoming period.

The appropriateness of the equity risk premium and consistency with common practice (the second consideration) is discussed in section 4.4. In short, ActewAGL Distribution does not consider the evidence that the AER has relied upon supports the AER's view that its allowed equity risk premium is reasonable and consistent with market practice.

Finally, the reasonableness of the information from independent valuers, brokers and regulators used by the AER is discussed in section 4.3 and in the expert reports from SFG included in appendices 8.13-8.14. For the reasons set out below, ActewAGL Distribution does not consider that the AER's choice of parameter evidence is supported by the empirical evidence. However, even if these parameter estimates were reasonably based, this would not alleviate the issue of bias in the SL-CAPM. The empirical evidence shows that the SL-CAPM will produce biased estimates of the return on equity even with the best estimates of each parameter.

In short, ActewAGL Distribution considers that none of the considerations referred to by the AER support a finding that its SL-CAPM estimate of the return on equity will be unbiased.

(e)   The AER errs in its findings in relation to other available models

In its Rate of Return Guideline and in the April/June 2015 final decisions, the AER raises a number of concerns with the other available return on equity models. Given these concerns, the AER decides to give these alternative models either no role in its determination of the return on equity, or a very limited role.

The key concerns raised by the AER are:[97]

·   alternative models are complex and sensitive to input assumptions and choices around estimation periods and methodologies;

·   some alternative models are not empirically reliable;

·   some alternative models are not designed to estimate ex ante returns;

·   some alternative models (particularly the FFM) lack theoretical foundation;

·   some alternative models (particularly the Black CAPM) are not widely used by market practitioners, academics or regulators; and

·   some alternative models produce return on equity estimates that appear "very high" (in particular the DGM).

For reasons discussed below, ActewAGL Distribution considers that these concerns are unfounded. In several cases, the AER's method and reasons for rejecting this other evidence (or relegating it to an indirect role) are illogical and unreasonable and/or apply equally to the SL-CAPM.

(i)   Complexity and sensitivity of models to assumptions

A key concern raised by the AER in relation to alternative return on equity models is that they are complex and sensitive to inputs assumptions and methodological choices. For example, the AER considers that the DGM is highly sensitive to the data, model specification, computations and assumptions employed including the risk free interest rate and growth rate of dividends.[98] In relation

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[97] AER, Attachment 3, Rate of Return, ActewAGL final decision, April 2015, p. 241-261
[98] AER, Attachment 3, Rate of Return, ActewAGL final decision, April 2015, p. 275, 299-302

to the FFM, the AER identifies a range of different methodological choices which might lead to different results.[99]

Simply observing that a return on equity model is complex and sensitive to input assumptions and methodological choices does not provide a basis for rejecting that model or giving it a very limited role. All return on equity models – including the SL-CAPM – are sensitive to input assumptions. This is why it is important to estimate all model parameters as accurately as possible. It is also a reason for using multiple models so that any residual estimation error is likely to offset across different models.

The same concern could be expressed in relation to the SL-CAPM. The results produced by the SL-CAPM could vary widely depending on one's choice of input parameters and the methodologies used to estimate those parameters. Based on the AER's ranges for the equity beta and MRP used in its recent April/June 2015 final decisions (and holding the risk-free rate constant), the return on equity produced by the SL-CAPM could range from 4.64% to 8.66%.[100] This wide range of values arises due to different approaches that could be taken when estimating the MRP, and different methodological and data choices which could be made when estimating the MRP or beta.

(ii)   Reliability of empirical estimates

A particular concern raised by the AER in relation to the Black CAPM is that estimates of the return on equity will be unreliable because there is no reliable method to obtain an estimate of the zero-beta premium.

The AER's concern appears to be that, because different estimation techniques have produced varying estimates of the zero-beta premium, it cannot rely on any empirical estimates of this parameter. The AER states:[101]

> We consider SFG's latest estimate of the zero beta premium appears more plausible. However, we remain of the view that the large range of zero beta estimates by consultants indicates that the model is unsuitable for estimating the return on equity for the benchmark efficient entity.

Besides noting that it is 'plausible', the AER has still not, in its recent April/June 2015 final decisions, sought to test the robustness or reliability of SFG's proposed value for the zero-beta premium, included in appendix 8.11. Instead, the AER has dismissed SFG's estimate on the basis that there are other differing estimates, some of which are 'implausible'.

ActewAGL Distribution considers that this is an illogical and unreasonable approach to assessing the proposed Black CAPM parameter values and the return on equity estimate. The AER cannot reasonably conclude that *all* estimates of the zero-beta premium are unreliable, just because *some* estimates of this parameter appear implausible. The same logic could be used to dismiss just about any return on equity model, including the SL-CAPM, to the extent that some estimates of the MRP or equity beta are considered unreliable.

ActewAGL Distribution proposes to use SFG's estimate of the zero-beta premium and required return on equity from the Black CAPM in estimating the return on equity.

Instead of seeking a reliable estimate of the Black CAPM zero-beta premium, the AER has in its recent April/June 2015 final decisions, effectively assumed this to be zero by relying solely on the SL-CAPM to estimate the return on equity. ActewAGL Distribution considers that this is an unreasonable approach, in circumstances where the AER has identified the Black CAPM to be a relevant model. Given that the Black CAPM is a relevant model, a proper examination should be undertaken into what the best estimate for the zero-beta premium is, and this value should be used unless it can be

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[99] AER, Attachment 3, Rate of Return, ActewAGL final decision, April 2015, p. 242

[100] That is, adopting a range for the MRP of 5.0% - 8.6% and a range for the equity beta of 0.4 – 0.7 with a constant risk free rate of 2.64%.

[101] AER, Attachment 3, Rate of Return, ActewAGL final decision, April 2015, p. 259

demonstrated that it is so unreliable that assuming a value known to be incorrect (a zero value) is a preferable outcome.

(iii)   Lack of theoretical foundation

The AER has raised a concern in relation to the theoretical foundation for the FFM. However, this does not fit with the evidence before it, including recent discussion by the Nobel Prize Committee in 2013 as noted above. ActewAGL Distribution considers that the AER is using 'concern' to filter out relevant evidence when estimating the return on equity, which goes against the AEMC's intent behind the new Rules.

This issue has also been addressed by SFG in appendices 8.06-8.07.[102] As explained by SFG, the general theoretical foundation for the FFM is the same as for the SL-CAPM, in that both models posit that there is a linear relationship between the expected return of a particular stock and the expected return of a mean-variance efficient portfolio. The only difference is that the CAPM (as implemented in practice) assumes that the relevant stock market index is mean-variance efficient, whereas the FFM posits that the stock market index needs to be supplemented by two additional factor portfolios to produce a mean-variance efficient benchmark.

The basis for development of the FFM was in studies documenting the empirical failings of the SL-CAPM. These studies documented that when the stock market index is used as the only factor the model does not fit the data; when the additional FFM factors are included the model fit improves.

The theoretical and empirical foundation for the FFM is discussed at some length by the Nobel Prize Committee in the explanatory material accompanying the award of the Nobel Prize to Eugene Fama in 2013 for contributions to this field.[103]

SFG provides a good summary in relation to the theoretical basis for all four models that ActewAGL Distribution proposes to use to estimate the return on equity.[104] This summary is provided in section3.

(iv)   Models not designed to estimate ex ante returns

The AER has expressed concern in relation to the FFM that the model "*is not clearly estimating ex ante required returns*".[105]

ActewAGL Distribution finds it curious that this criticism is only levelled at the FFM, given that the theoretical foundation for the FFM is the same as for other asset pricing models, including the SL-CAPM and Black CAPM. The key objective of all asset pricing models is to explain the cross section of stock returns. The basis for development of the FFM (and also the Black CAPM) was in studies documenting the failure of the SL-CAPM to adequately explain variations in returns.

The reason for using any asset pricing model is that the historically observed relationships between returns, risk and other factors may be expected to continue in future. In this regard, the rationale for using the FFM is no different to the rationale for the SL-CAPM or Black CAPM.

ActewAGL Distribution considers that the AER's application of the SL-CAPM, to a significant degree, builds on ex-post observations when estimating the MRP and the equity beta,[106] which is no different than when estimating the input parameters for the FFM.

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[102] SFG, *The Fama-French model*, 13 May 2014, pp 27-30; SFG, *Using the Fama-French model to estimate the required return on equity,* February 2015.

[103] Economic Sciences Prize Committee of the Royal Swedish Academy of Sciences, *Understanding Asset Prices: Scientific Background on the Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel 2013*, 14 October 2013, section 7.

[104] SFG, *The required return on equity for regulated gas and electricity network businesses*, Report for Jemena Gas Networks, ActewAGL Distribution, Ergon and Transend, 27 May 2014, p. 3

[105] AER, Attachment 3, Rate of Return, ActewAGL final decision, April 2015, p. 68

(v)   Models not widely used

The AER has raised a concern that the alternative models are not widely used. ActewAGL Distribution addresses this in SFG's independent expert report in appendices 8.06-8.14 an expert report by NERA included in appendix 8.20 and by Dr J. Robert Malko in appendix 8.22 of this submission.

For example, SFG notes that the FFM has gained acceptance among corporate finance practitioners and courts, as well as academics.[107] SFG also observes that both the Black CAPM and DDM are commonly used in rate of return regulation cases in other jurisdictions.[108] In relation to the FFM, the Nobel Prize Committee recently observed that:[109]

"Empirically, the Fama-French approach has provided an effective way to simplify and unify the vast literature on the cross section of stock returns, and their method has been widely used both as a reference model for academic research and as a practical guide for professional investors."

In relation to the use of alternative models, Dr J. Robert Malko notes that in the United States[110]:

The DGM or DCF continues to be a popular model for estimating the cost of common equity before regulators in the United States. Certain state regulatory commissions, such as Utah and Wisconsin, have placed substantial weight on the DGM or DCF model for determining the cost of common equity for energy utilities.

In relation to the Black CAPM and Fama French models, he states[111]:

"…although there is little explicit reference to the Black CAPM, in practice the use in the United States of the ECAPM [Empirical CAPM] *by financial analysts both within and outside energy regulatory processes is essentially to the same effect."*

"…I am aware that the FFM has been applied by energy regulators including Massachusetts, California and Nevada and that more generally adjustments are commonly made to the Sharpe CAPM results by finance practitioners that reflect the additional factors that the FFM explicitly uses."

While it is true that these alternative models are yet to gain acceptance among Australian regulators, it is clear that they are widely used by academics, market practitioners and overseas regulators and that they are respected in the market.

In ignoring the FFM because it considers it not 'widely used', the AER would essentially apply the 'well accepted' criterion that formed part of the NGR before the recent Rule change. However, the AEMC explicitly removed that criterion to ensure that all relevant evidence, including other models, are used to estimate the return on equity. It appears biased for the AER to use a 'well used' criterion to circumvent the AEMC's intent.

(i)   "Very high" return on equity estimates

A further concern raised by the AER in relation to the DDM is that:[112]

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[106] ActewAGL Distribution acknowledges that the AER does cross check its MRP estimate against prevailing estimates of the MRP from the DGM. However, the value it finally has used is, as stated by the AER, mostly weighted (unclear how much exactly) by the historical excess return observations. In relation to the equity beta, all observations are ex-post.

[107] SFG, *The Fama-French model*, 13 May 2014, pp 17-22.

[108] SFG, *The required return on equity for regulated gas and electricity network businesses*, 6 June 2014, p 40.

[109] Economic Sciences Prize Committee of the Royal Swedish Academy of Sciences, *Understanding Asset Prices: Scientific Background on the Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel* 2013, 14 October 2013, p. 40.

[110] Malko Energy Consulting, *Statement of Dr J. Robert Malko*, June 2015, p.4

[111] Malko Energy Consulting, *Statement of Dr J. Robert Malko*, June 2015, pp. 8-9

[112] AER, Attachment 3, Rate of Return, ActewAGL final decision, April 2015, p. 266

*The very high return on equity estimates from SFG's DGM model, equating to an equity beta of
0.94 in the SLCAPM, appear inconsistent with the results in Professor Olan Henry's 2014
report.These also appear inconsistent with the low risk nature of regulated natural monopolies
with very low elasticity of demand for their services.*

As noted by SFG,[113] neither the AER nor McKenzie and Partington in its October 2014 report for the
AER, are able to explain how much impact low business risk has compared to high financial risk on
equity beta. They have not questioned that, if an energy network made a decision to borrow more
money, all else equal, the risk to equity holders would go up and so would the cost of equity. The AER
appears to be suggesting that because the return on equity estimates produced by the DDM are
higher than those produced by the SL-CAPM (with the AER's preferred parameter values), the DDM
estimates cannot be relied on.

This is an irrational and illogical approach to assessing the reliability of DDM estimates of the return on
equity. This approach assumes that the SL-CAPM estimates are accurate and reliable, and thus can
be used as the benchmark to test the plausibility or reliability of estimates from other models.
Adopting similar logic, one could conclude that the SL-CAPM is unreliable because it produces
estimates that are "very low" when compared to the DDM and other models.

Alternatively, it may be that the AER considers that an implied equity beta of 0.94 would be "too high",
because it is above its own estimate of that parameter. However there are problems with such
reasoning:

· First, this assumes that the AER's equity beta analysis is correct, and that any estimate which
  differs from its estimate of 0.7 must be incorrect. The AER appears to consider that its estimate
  is more likely to be correct because it accords with its assumption that energy businesses are in
  general "low risk".

  However simply asserting that energy businesses are generally "low risk" does not provide a
  basis for preferring one equity beta estimate over another, particularly where both of these
  estimates are less than one. If the AER believes that energy network businesses are "low risk",
  all this would indicate is that the equity beta is likely to be less than one.

  In any event, ActewAGL Distribution does not agree that low elasticity of demand for energy
  services indicates that network businesses are "low risk". It is well recognised that the relevant
  risks to a business include both operating and financial risks. Even if the AER considers the
  operating risk of energy networks to be relatively low (compared to the average firm), it must be
  recognised that financial risk is relatively high due to high leverage. Therefore, the AER cannot
  reasonably conclude that overall, energy network businesses are "low risk".[114] This is addressed
  for ActewAGL Distribution in an expert report by Frontier Economics included in appendix 8.15.

· Secondly, more fundamentally, there is an implicit assumption that the SL-CAPM will deliver
  unbiased estimates of the return on equity. If the SL-CAPM is in fact delivering downward
  biased estimates – as indicated by the empirical evidence referred to in this proposal – then the
  implied equity beta needed to deliver a DDM-equivalent result must include an uplift to account
  for this bias. In other words, if there is a bias in the SL-CAPM that is not accounted for in the
  AER's equity beta of 0.7, this will contribute to a higher equity beta being needed to deliver a
  DDM-equivalent result.

The AER is required to have regard to all relevant estimation methods, financial models, market data
and other evidence.[115] The AER cannot reject relevant financial models simply on the basis that the
results they produce are inconsistent with the results of the AER's preferred model. Where two or

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[113] SFG, *Share prices, the DDM and the cost of equity for the market and a benchmark energy network*, February 2015, p. 32

[114] This issue is discussed further in the ENA's submission to the AER equity beta issues paper (ENA, *Response to the Equity
Beta Issues Paper of the Australian Energy Regulator*, 28 October 2013, pp 14-20).

[115] NGR, rule 87(5)(a)

more relevant models produce conflicting results, it is incumbent on the AER to assess each of the models on their merits and on that basis decide how their results are to be taken into account in determining the return on equity.

When faced with two models which produce differing results there are three possible hypotheses:

1. The model producing the lower estimate is accurate and unbiased, while the other model is upwardly biased or has been incorrectly applied;

2. The model producing the higher estimate is accurate and unbiased, while the other model is downwardly biased or has been incorrectly applied; or

3. There is a degree of error or imperfection in both models, and the correct outcome lies somewhere between or outside the two.

In its April/June 2015 decision, the AER appears to have assumed that the first hypothesis is correct – i.e. that the SL-CAPM is reliable and the DDM (and FFM) is not. This is despite other evidence that suggests that either the second or third hypothesis is more likely to be correct. As noted above and in Table 2, there is empirical evidence that the SL-CAPM will produce downwardly biased estimates of the SL-CAPM for low-beta stocks.

In any event, it is not clear that the DDM return on equity estimate is "very high", when compared to the results of other relevant models. As shown in Figure 4.1, SFG's updated DDM estimate is only 0.6% above the FFM and Black CAPM estimates. It should be noted that the SL-CAPM estimate is below the FFM and Black CAPM estimates by the same margin (0.6%). Thus, it could similarly be said that the SL-CAPM estimate appears "very low" when compared to the results of the other three models, particular when the AER's proposed input parameters for the SL-CAPM are used.

Figure 4.1: Return on equity estimates from relevant models[116] compared with ActewAGL Distribution's and the AER's method

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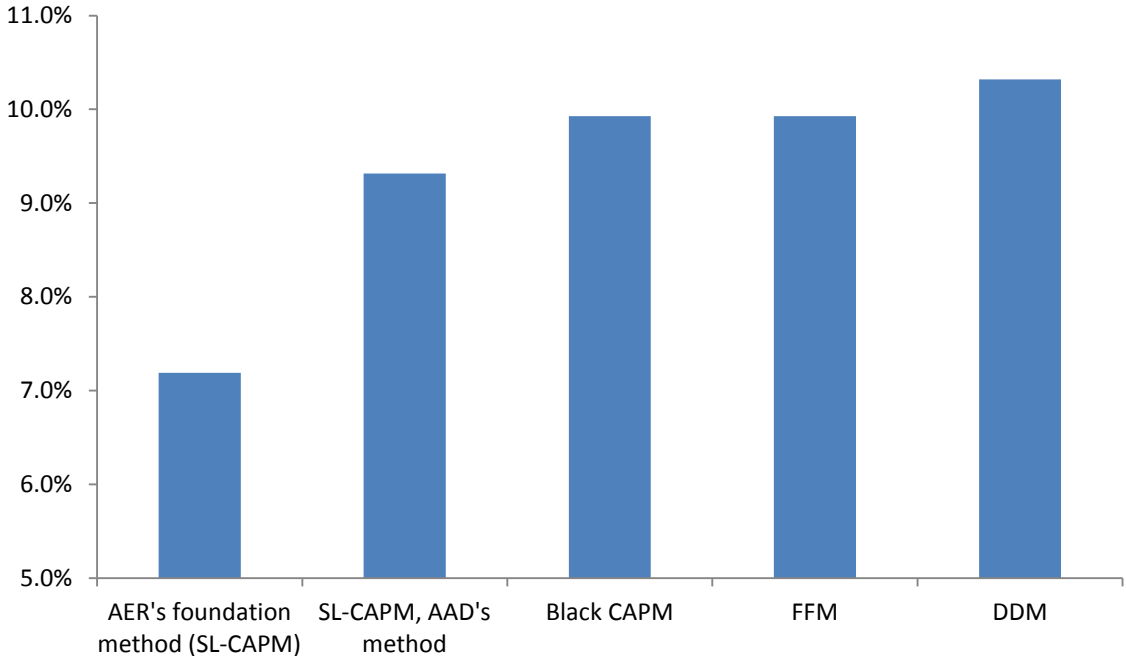
[116] SFG, *The required return on equity for the benchmark efficient entity*, February 2015, section 5.

4.2   Determination of the SL-CAPM equity beta

The AER has concluded that an equity beta of 0.7, when applied in the SL-CAPM, will deliver a return on equity that contributes to achievement of the rate of return objective. The AER finds that:

·   the risk faced by gas distribution is similar to that faced by gas transmission and electricity businesses;

·   conceptually, the equity beta for the benchmark firm must be less than 1;

·   a reasonable range for the equity beta is 0.4 to 0.7; and

·   additional information taken into account by the AER – specifically empirical estimates for international energy networks and the theoretical principles underpinning the Black CAPM – indicate that an equity beta at the top of this range is appropriate.

This section addresses these findings.

(a)   Gas distribution businesses are more risk exposed

The AER considers that the relevant risks between all energy network service provider are sufficiently similar for there to be a single benchmark efficient entity. Based on this, the AER uses the same equity beta for all energy network businesses.

ActewAGL Distribution considers that applying an equity beta based on a broad sample of energy networks businesses is likely to be highly conservative and would likely lead to an under-estimate of the required return on equity. This is because gas distribution businesses are more risk-exposed than electricity businesses to systematic risk such as:

- **Demand risk** – the AEMC has observed that businesses under a price cap will be more exposed to demand risk, compared to businesses operating under a revenue cap (such as most electricity distribution businesses). Secondly, gas is not an essential energy and the demand therefore tends to be more volatile.

- **Wholesale price risk** – gas wholesale prices are expected to rise over the near and medium term, raising demand uncertainty.

ActewAGL Distribution provides further reasons as to why gas distribution businesses are exposed to more systematic risk in appendix 8.01.

(b)   The AER's equity beta conceptual analysis is incorrect

In its April 2015 final decision, the AER stated:[117]

> *Our conceptual analysis indicates that the equity beta of a benchmark efficient entity will be less than 1.0. This implies that returns to a benchmark efficient entity vary less with economic conditions than returns for the market as a whole.*

ActewAGL Distribution notes that the AER has referred to a report by Frontier Economics to support its finding that the benchmark efficient entity has a lower business risk than the market average firm.[118] This report was prepared by Frontier Economics for the AER during the Rate of Return Guideline process in relation to the risks that would be faced by the benchmark efficient entity. It appears that the AER has interpreted that report as supporting the notion that, conceptually, the equity beta for the benchmark firm must be less than 1.

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[117] AER, Attachment 3, Rate of Return, ActewAGL final decision, April 2015, p. 370
[118] AER, Attachment 3, Rate of Return, ActewAGL final decision, April 2015, p. 370

However, the equity beta is a function of the asset beta (systematic risk of operations) and leverage. While the systematic risk of operations for a benchmark efficient entity is lower than for the average firm, the leverage of the benchmark efficient entity is materially higher than that of the average firm.

ActewAGL Distribution together with other businesses engaged Frontier Economics which clarifies aspects of its report relied upon by the AER in support of the proposition that the equity beta of the benchmark efficient entity is less than 1. The new report is included in appendix 8.15. In that report Frontier Economics concludes that:

- given that there is no precise relationship between leverage and equity beta does not mean that the effect of leverage on beta should be disregarded when making comparisons between estimated equity betas;
- the financial risks that Frontier considered in its 2013 report for the AER are not the same as financial leverage and do not substitute for the leverage component of the equity beta; and
- developments in relation to disruptive technologies since 2013 have resulted in more uncertainty about the future which is not likely to be captured in the AER's estimate of the equity beta.

ActewAGL Distribution considers that the report included in appendix 8.15 demonstrates that the AER's conceptual analysis of the equity beta is in error.

(c)   The AER errs in its determination of the equity beta range

The AER considers that the empirical studies show "*an extensive pattern of support*" for an equity beta within a range of 0.4 to 0.7.[119] This finding is inconsistent with the body of evidence before the AER.

Professor Henry, in his report for the AER, does not recommend a range for the equity beta of 0.4 to 0.7. Rather, Professor Henry concludes, based on his analysis of Australian data only (as instructed by the AER):[120]

> "*In the opinion of the consultant, the majority of the evidence presented in this report, across all estimators, firms and portfolios, and all sample periods considered, suggests that the point estimate for β lies in the range 0.3 to 0.8.*"

In fact, of the nine firms that Henry was instructed to consider (in Henry's Table 2), two of the beta estimates significantly exceed 0.8 (Alinta at 0.8795 and Hastings at 1.0305). The report states that:[121]

> *[T]aken together, the evidence from Table 2 suggests that the point estimates of equity beta lie in the range 0.21 to 1.04.*

The range reported by Henry is narrower than the 0.21 and 1.04 due to the instructions that the AER placed upon him as to how he was to establish a range. In other words, even using the AER's constrained set of instructions, its own consultant states that the range is 0.3 to 0.8. When unconstrained by the strictures imposed by the AER's instructions, the analysis delivers beta estimates that vary even further in both an upward and downward direction. However, in its April 2015 decision for ActewAGL Distribution electricity network, the AER has noted that:[122]

> "*while Henry appears to base his range on all his estimates (including individual firm estimates), we consider the most useful empirical estimates in our regulatory context are averages of individual firm estimates and fixed weight portfolio estimates.*"

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[119] AER, Attachment 3, Rate of Return, ActewAGL final decision, April 2015, p. 415

[120] Olan T Henry, *Estimating β: An update*, April 2014, p 63.

[121] Olan T Henry, *Estimating β: An update*, April 2014, p 17.

[122] AER, Attachment 3, Rate of Return, ActewAGL final decision, April 2015, p. 428

By referring to a table in its April 2015 final decision for ActewAGL Distribution (Table 3-53), the AER states that the empirical estimates presented gives it confidence that there is an "extensive pattern" of support for an empirical equity beta within a range of 0.4 to 0.7. ActewAGL Distribution does not agree with this for the following reasons:

- as noted above, the AER's own consultant (Henry) derives a range that is very wide with estimates above 1. This shows that estimating the equity beta is very complex and significant caution must be exercised;
- there are only nine businesses included in the AER's domestic reference group and only five businesses in the sample are currently listed; and
- the AER's empirical equity beta range excludes international observations (of more than 50 businesses) that indicate a wider equity beta range than the small domestic sample available in Australia, as discussed below.

The AER's finding as to the appropriate beta range is also inconsistent with estimates from SFG based on a larger sample of businesses. SFG estimates an equity beta of 0.82 based on a broader sample of businesses, including international businesses.[123]

ActewAGL Distribution considers that the dataset used for estimating the equity beta should include international businesses. As noted by the AER, there is a trade-off between increasing the sample size – improving the reliability of estimates – and ensuring that only businesses that are comparable to the benchmark entity are included. In this case, ActewAGL Distribution considers that it is preferable to broaden the sample to include international businesses. As noted by SFG:[124]

- A sample including domestic businesses only is too small, meaning that the resulting statistical estimates are likely to be unreliable. The set of Australian businesses that Professor Henry was instructed to use includes only nine businesses, of which only five are currently listed (and therefore can no longer be used to estimate beta). Professor Henry reports some evidence of instability in his study based on Australian data only, possibly due to the small sample size.[125] SFG states that the estimates based exclusively on the small sample of domestic comparators are statistically unreliable.[126]

- Due consideration has been given to the comparability of international businesses, and SFG has concluded that the businesses included in its sample are sufficiently comparable such that they can be appropriately used as part of the dataset to estimate the equity beta range.

ActewAGL Distribution further notes that simply confining the dataset to businesses operating in Australia may not lead to the most representative sample. A number of the businesses in the AER / Henry sample bear characteristics which do not align with the AER's conceptual definition of the benchmark efficient entity (e.g. Hastings Diversified Utilities Fund is not a 'pure play' energy network business). This makes it all the more important that the sample be broadened to ensure robust and reliable estimates of the equity beta.

The AER states that it has taken into account international evidence in its determination of a point estimate for beta. However it is clear from the recent April/June 2015 final decisions that international evidence has, at best, a marginal role in the AER's decisions. Rather than seeking to determine the best estimate from international evidence, or even a reasonable range, the AER derives a very wide range of estimates from a variety of international studies and then cross-checks its chosen point estimate – that is derived from the domestic equity beta range of 0.4 and 0.7 – against this wide range.

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[123] SFG, *Beta and the Black Capital Asset Pricing Model*, February 2015, section 4. In this report SFG provides updated estimates using the same methodology as in its previous report (SFG, *Equity beta*, 12 May 2014). These updated estimates are identical to SFG's original estimates.

[124] SFG, *Regression-based estimates of risk parameters for the benchmark firm*, 24 June 2013.

[125] Olan T Henry, *Estimating β: An update*, April 2014, p. 62

[126] SFG, *Beta and the Black Capital Asset Pricing Model*, February 2015, p. 10

Given the paucity of data for Australian businesses, international data should be given a direct role in estimation of the equity beta. This means that comparable international businesses should be included in the sample used to estimate beta, alongside domestic businesses.

ActewAGL Distribution considers that the best evidence of the SL-CAPM equity beta for the benchmark efficient entity is SFG's estimate based on a broader sample, including both Australian and international businesses. This evidence does not support the AER's range for the equity beta of 0.4 to 0.7.

(d)   The AER errs in its determination of the beta point estimate

In relation to the point estimate for the equity beta, in the recent April/May 2015 final decisions the AER concludes: [127]

·   "the best empirical estimate" of the SL-CAPM equity beta from Henry's report is 0.5;

·   given the theoretical principles underpinning the Black CAPM for firms with an equity beta below 1.0, the Black CAPM may predict a higher return on equity than the SL-CAPM; and

·   international empirical estimates also provide "limited support" for an equity beta point estimate towards the top of the AER's range.

This conclusion is affected by several errors of fact and logic, which are discussed below.

(i)   The AER's view as to the "best empirical estimate" is not supported by evidence

There does not appear to be any evidence for the AER's statement that "the best empirical estimate" of the SL-CAPM equity beta is 0.5.

Professor Henry does not recommend that a value of 0.5 be adopted, nor does his report refer to 0.5 as the "best empirical estimate". Rather, as noted above, Professor Henry recommends a range of 0.3 to 0.8, based on his analysis of Australian data only (as instructed by the AER).[128]

As discussed above, ActewAGL Distribution considers that the best empirical estimate of the SL-CAPM equity beta is SFG's estimate of 0.82, based on a broader sample including both Australian and international businesses. This is based on a 24 per cent weighting of Australian listed firms and 76 per cent weight on international listed firms.

(ii)   The AER's adjustment to the "best empirical estimate" is arbitrary

The AER states that the theory of the Black CAPM points to an estimate of the SL-CAPM beta that is above the best estimate indicated by Henry's analysis. This appears to be the reason for the AER's adjustment from the "best empirical estimate" of 0.5 to a final point estimate of 0.7.

It should be noted that the theory of the Black CAPM does not say anything about the equity beta to be used in the SL-CAPM, *per se*. What the theory of the Black CAPM indicates is that one of the key assumptions of the SL-CAPM – that all investors can borrow or lend as much as they like at the risk-free rate – may not hold. It is this constraining assumption of the SL-CAPM which leads to the empirical result that the SL-CAPM will tend to underestimate the required return on equity for low-beta stocks and overestimate the required return on equity for high-beta stocks.

The theory of the Black CAPM is illustrated in Figure 4.2. The Black CAPM line indicates the relationship between beta and the expected return where the constraining assumption of the SL-CAPM is relaxed.

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[127] AER, Attachment 3, Rate of Return, ActewAGL final decision, April 2015, p. 430
[128] Olan T Henry, *Estimating β: An update*, April 2014, p 63.

Figure 4.2: Illustration of SLCAPM and Black CAPM relationships[129]
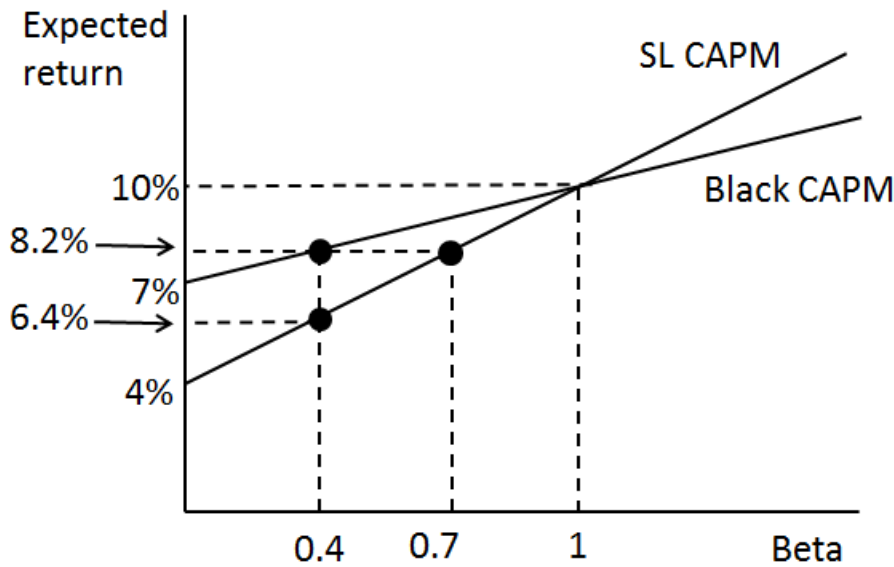
ActewAGL Distribution notes that Partington, in his advice underpinning the AER's April 2015 final decision, commented on this figure advising that[130]:

> *While the empirical evidence in tests of the CAPM generally gives a flatter relation between measured risk and realized return than that implied by realised values of the market return, testing realisations is not the same thing as testing an ex-ante relation. The S-L CAPM is an ex ante model with a linear and positively sloped relation in equilibrium expected returns. Conversely, the empirical relationship is an ex post model that predicts a linear relationship between actual returns. It is not necessary that the empirical CAPM be positively sloped and may, in fact, be horizontal or downward sloping.*

ActewAGL Distribution disagrees with this conclusion given that the AER's application of the SL-CAPM also mostly relies on ex-post observations (in relation to the MRP and equity beta) and it therefore can be argued that the AER's SL-CAPM (or foundation model) also is an ex-post model used to produce an ex-ante estimate of the return on equity.

Nevertheless, ActewAGL Distribution understands that what the AER is in fact doing is seeking to make an adjustment to the equity beta to account for the SL-CAPM bias that is indicated by Black CAPM theory. That is, while Black CAPM theory does not say anything about adjusting the equity beta to account for SL-CAPM bias, this parameter is being used by the AER as an adjustment tool to account for this bias.,

In Figure 4.2, if the best estimate of the equity beta was 0.4, the AER would use an equity beta of 0.7 in the SL-CAPM because this would deliver the return corresponding to and equity beta of 0.4 used in the Black CAPM.

In what has transpired, the adjustment made to the AER's "best empirical estimate" estimate of beta is arbitrary. The AER cannot reasonably be satisfied that adjusting the equity beta estimate from 0.5 to 0.7 will adequately account for bias in the SL-CAPM, because it has not sought to quantify the effect of this bias.

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[129] Source: SFG, *The required return on equity for regulated gas and electricity network businesses*, June 2014, Figure 27.

[130] Graham Partington, *Report to the AER – Return on Equity (Updated)*, April 2015, p 20.

As noted above, the AER acknowledges that it does not know by how much it needs to adjust its equity beta estimate to account for the issues indicated by Black CAPM theory. The AER notes that *"while the direction of this effect may be known, the magnitude is much more difficult to ascertain".*[131]

The magnitude of the AER's adjustment is limited by its definition of the equity beta range. Since the AER caps its range at 0.7, the adjustment to the equity beta can take the point estimate no higher than 0.7. Had the AER adopted the recommendation of its consultant for an equity beta range of 0.3 to 0.8, its adjustment to account for Black CAPM theory and international evidence may have taken the point estimate to 0.8. Thus, the problem of arbitrariness in the AER's adjustment is compounded by the error in its construction of the equity beta range.

In fact, the evidence shows that the AER's arbitrary adjustment to its equity beta estimate is not sufficient to address the issues it has identified. Choosing the top of the AER's equity beta range will not correct for the low-beta bias in the SL-CAPM indicated by Black CAPM theory – if the AER's parameter estimates are used in the Black CAPM along with the best available estimate of the zero-beta premium, the return on equity estimated by the Black CAPM is above the return on equity estimated by the AER using the SL-CAPM.

The AER cannot reasonably be satisfied that its equity beta estimate of 0.7, when used in the SL-CAPM, will lead to a return on equity that contributes to the allowed rate of return objective. The AER's determination of its point estimate is arbitrary and is affected by errors in the interpretation of key evidence. The evidence shows that the best estimate of the SL-CAPM equity beta is in fact higher than 0.7.

4.3   Determination of the MRP

The AER's approach to determining the MRP in its April/June 2015 decisions differs from that proposed by ActewAGL Distribution in this proposal and the evidence for it, in that:

·   the AER does not agree that the Wright approach should be used to estimate the MRP;

·   the AER does not agree that independent valuation reports should inform MRP estimation (only the overall return on equity);

·   the AER adopts different estimates of the MRP from historical data;

·   the AER does not agree with SFG's construction of the DGM;

·   the AER takes into account survey evidence and conditioning variables; and

·   the AER does not appear to adjust its MRP estimate for changes in market conditions since publication of the Rate of Return Guideline.

This section addresses each of these points in turn.

(a)   The AER incorrectly uses the Wright approach

The AER does not take into account the Wright approach when estimating the MRP, because it considers that the Wright approach should only inform the overall return on equity. The AER refers to the Wright approach as an alternative implementation of the SL-CAPM designed to provide information at the return on equity level.[132]

This is an incorrect interpretation of Wright's work. Wright did not develop an alternative implementation of the SL-CAPM. Wright proposed an alternative method of estimating the MRP for

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[131] AER, Attachment 3, Rate of Return, ActewAGL final decision, April 2015, p. 425.

[132] AER, Attachment 3, Rate of Return, ActewAGL final decision, April 2015, p. 32

use in the SL-CAPM – as the difference between the historical average market return and the current risk free rate – on the basis that market returns may be more stable over time than excess returns.[133]

Further, associate Professor Handley describes the Wright approach as an alternative method of estimating the MRP, rather than as an alternative return on equity model. Handley describes the Wright approach as follows:[134]

> "Wright adopts an alternative non-standard approach to estimating the MRP. Rather than treating the MRP as a distinct variable he suggests estimating the return on the market – by estimating the real return on equity and combining this with a current forecast of inflation to give an estimated nominal return on equity – and the risk free rate separately."

In the AER's recent April 2015 final decision for ActewAGL Distribution's electricity distribution network,[135] the AER sets out a formula, which it says represents the Wright approach to implementing the SL-CAPM (referred to as the 'Wright SL-CAPM'). However, the formula set out by the AER is simply the standard SL-CAPM, as originally specified by Sharpe and Lintner.[136] It is clear from this that the Wright approach does not involve an alternative model for estimating the overall return on equity. Rather, the Wright approach represents an alternative method for estimating the MRP parameter.

In fact, the Wright approach to estimating the MRP would appear to be more aligned with the conventional SL-CAPM specification, because it seeks to estimate the MRP as the difference between two distinct parameters (the market return and risk-free rate). This is in contrast to other methods which seek to estimate the MRP as a parameter in its own right.

It is therefore incorrect to reject the Wright approach on the basis that it is not a measure of the MRP. The Wright approach provides relevant information in relation to the required market return and the MRP, and it would be an error for the AER to disregard it when estimating the MRP.

(b)   Use of independent valuation reports

The AER considers independent valuation reports to be relevant, but only to assessing the overall return on equity. Further, due to perceived limitations, the AER considers that only "limited reliance" should be placed on this material, and that it should be used in a "directional role" only.[137]

Ultimately it is not clear what practical effect, if any, independent valuation reports have on the AER's decision on the return on equity. As a consequence of their relegation to an overall return on equity "directional" role to inform movements in the overall return on equity, they appear to have little or no practical impact on the final estimate. The AER retains its original parameter estimates and model choice once it completes its cross-check against the results of independent expert reports.

ActewAGL Distribution considers that independent valuation reports provide relevant evidence of the required market return and MRP applied by market practitioners. Therefore, evidence from these reports in relation to the MRP applied by market practitioners should be given a direct role in estimating the MRP.

Consistent with a recent report undertaken by Incenta,[138] SFG concludes that the best estimate of the required market return from independent expert reports is 9.57 per cent.[139] This is based on grossing

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[133] Wright, S., *Review of Risk Free Rate and Cost of Equity Estimates: A Comparison of U.K. Approaches with the AER*, 25 October 2012.

[134] John C Handley, *Advice on the Return on Equity*, 16 October 2014, p 17.

[135] AER, Attachment 3, Rate of Return, ActewAGL final decision, April 2015, p. 81

[136] Sharpe, W., 1964, "Capital asset prices: A theory of market equilibrium under conditions of risk," *Journal of Finance*, 19, 425–442.

[137] AER, Attachment 3, Rate of Return, ActewAGL final decision, April 2015, p. 92

[138] Incenta, Further u*pdate on the required return on equity from independent expert reports*, February 2015.

[139] SFG, *The required return on equity for regulated gas and electricity network businesses*, February 2015, 33

up an MRP value of 6 per cent (which SFG considers to be conservative) for imputation credits based on a theta of 0.35, and adding the prevailing risk-free rate.

In its February 2015 report, Incenta observes that the market rate of return estimated by independent experts has remained relatively constant in recent times, notwithstanding declines in the 'spot' risk free rate.[140] This implies that the MRP used in these reports, and/or the uplifts used by independent experts, has increased as the risk-free rate has declined. Incenta's report is included in appendix 8.21.

(c)   Historic excess return estimates

The AER does not accept the adjustment to the historical excess returns data proposed by NERA in its recent April/June 2015 final decisions.[141] Based on an analysis of the historical data without NERA's adjustments, the AER estimates an MRP of 6.2% for the period 1883 to 2014.[142]

NERA explains in detail why its adjustments to the historic data are necessary and addresses each of the AER's concerns with its proposed adjustments.[143] In its April/June 2015 final decisions the AER disputed NERA's report. In response to this, together with other businesses ActewAGL Distribution engaged NERA to respond directly to the AER's concerns. NERA's report (June 2015) is included in appendix 8.19. In this report, NERA updates its estimates of the MRP to the end of 2014 and makes a number of smaller changes to the data. The net impact of adding another year of data and of making a number of changes to the data is to lower the estimate of the MRP by one basis point to 6.55 per cent per annum based on data from 1883 to 2013.[144]

For the reasons set out in NERA's reports, ActewAGL Distribution considers that these adjustments are necessary. The report also responds to issues by Handley (2015) and the AER that suggest that the adjustments that NERA makes to Lamberton's data are unreliable because NERA.

(d)   Use of DDM estimates

In its April/June 2015 final decisions, the AER adopts a different construction of the DDM to that used by SFG, and as a result derives a wider range of estimates for the market return and MRP.

SFG explains each of the points of difference between its approach and the AER's, and explains why it has taken the approach that it has.[145] In particular, SFG explains the reasons for its choice of long term growth assumption, its estimation approach and dataset. For the reasons set out in SFG's reports included in appendices 8.08 and 8.09, ActewAGL Distribution considers that SFG's approach to implementing the DDM is preferable to the AER's.

However, even adopting the AER's preferred construction of the DDM, it is clear that both the market return estimated by the DDM and the MRP have increased significantly over the past 16 months. Table 4 shows the change in return on market estimates from the AER's DDM between the Rate of Return Guideline (December 2013) and the recent April 2015 final decisions.

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[140] Incenta, *Further update on the required return on equity from independent expert reports*, February 2015.

[141] AER, Attachment 3, Rate of Return, ActewAGL final decision, April 2015, p. 321

[142] AER, Attachment 3, Rate of Return, ActewAGL final decision, April 2015, p. 323

[143] NERA, *Historical Estimates of the Market Risk Premium*, February 2015.

[144] NERA, Further Assessment of the Historical MRP: Response to the AER's Final Decision for the NSW and ACT Electricity Distributors, June 2015

[145] SFG, *Share prices, the dividend discount model and the cost of equity for the market and a benchmark energy network*, February 2015.

Table 4: AER dividend discount model estimates of the required return on the market

	Growth rate (%)	Two stage model (%)	Three stage model (%)
Rate of Return Guideline	4.0	9.65	10.20
	4.6	10.21	10.65
	5.1	10.68	11.02
2015 April final decision for ActewAGL Distribution's ACT electricity network	4.0	9.95	10.35
	4.6	10.55	10.75
	5.1	10.95	11.15

Source: AER Better Regulation, Explanatory statement, Rate of Return guideline, December 2013 p. 87; and AER, Attachment 3, Rate of Return, ActewAGL final decision, April 2015, p. 325. Return on market estimates are derived by adding the AER's reported MRP estimates to the prevailing risk free rate (4.2% at the time of the Guideline and 2.55% at the time of the final decision in April 2015).

Using its preferred construction of the DDM, SFG reports that the best estimate of the expected market return that ActewAGL Distribution has relied upon for this proposal is 11.37%.[146] ActewAGL Distribution notes that this is close to the estimate produced by the AER's three-stage model using a growth rate of 5.1% as shown in Table 4.

Based on a risk-free rate of 2.64%,[147] this implies a current MRP of 8.73% using the DDM.

(e)   Use of survey evidence and conditioning variables

The AER appears to give 'some reliance' to surveys,[148] despite evidence as to the limitations of such sources (and concerns previously expressed by the Tribunal in this regard[149]).

SFG considers that survey responses do not provide relevant evidence for the purpose of estimating the MRP. SFG observes that the surveys on which the AER relies do not satisfy the criteria previously set out by the Tribunal[150] (e.g. some are two-page magazine surveys that were completed by audiences that had been "primed" by the author) and that the evidence suggests that participants are simply regurgitating the historical excess return estimates.[151]

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[146] SFG, *Share prices, the dividend discount model and the cost of equity for the market and a benchmark energy network*, February 2015,8.

[147] Risk-free rate is a placeholder estimate, based on ActewAGL Distribution's January 2015 averaging period.

[148] AER, Attachment 3, Rate of Return, ActewAGL final decision, April 2015, p. 86

[149] *Application by Envestra Limited (No 2)* [2012] ACompT 3, [159]-[163]; *Application by Envestra Limited (No 2)* [2012] ACompT 4, [162]-[166].

[150] *Application by Envestra Limited (No 2)* [2012] ACompT 3, [162]-[163]; *Application by Envestra Limited (No 2)* [2012] ACompT 4, [165]-[166], where the Tribunal relevantly observed:

Surveys must be treated with great caution when being used in this context. Consideration must be given at least to the types of questions asked, the wording of those questions, the sample of respondents, the number of respondents, the number of non-respondents and the timing of the survey. Problems in any of these can lead to the survey results being largely valueless or potentially inaccurate.

When presented with survey evidence that contains a high number of non-respondents as well as a small number of respondents in the desired categories of expertise, it is dangerous for the AER to place any determinative weight on the results.

[151] SFG, *The required return on equity for the benchmark efficient entity*, February 2015, [118].

In relation to conditioning variables, SFG notes that in aggregate these do not provide a clear signal as to the prevailing market return or MRP.[152] The government bond yield and credit spreads would indicate elevated risk premiums, whereas the dividend yield and implied volatility do not.

Therefore, ActewAGL Distribution does not propose to give any role to either survey evidence or conditioning variables in estimating the prevailing market return or MRP.

(f)   Impact of changes in market conditions on the MRP estimate

ActewAGL Distribution notes that the AER's estimate of the MRP has not changed as between publication of its Rate of Return Guideline in December 2013 and the recent April/June 2015 final decisions, despite apparent changes in prevailing market conditions.

The risk-free rate has fallen significantly from 4.1% at the time the Guideline was published to 2.55% used as part of the AER's April 2015 final decisions for the ACT/NSW businesses. This in itself indicates that market conditions may have changed and that the MRP now is higher than it was at the time the Rate of Return Guideline was published.

As noted above, forward-looking estimates from the DDM indicate that the market return and MRP have increased significantly since the Rate of Return Guideline was published. This is clear even from the AER's DDM estimates, as noted above.

The fundamental problem with the AER's approach is that there is no reason to suppose that investors' required rates of return have dropped in line with CGS yields and the AER allowed return on equity. To ensure that the allowed rate of return is commensurate with market returns, the AER must broaden the estimation methods it takes into account and give them real weight.

The approach taken in ActewAGL Distribution's proposal to estimating the MRP takes into account changes in prevailing market conditions. Each of the estimation methodologies can be updated for recent data in order to derive a current estimate of the MRP. However, ActewAGL Distribution is concerned that the AER's methodology is not similarly responsive to changes in market conditions. This is likely be due to the fact that the AER's approach fails to take into account a number of relevant estimation methodologies which will provide an indication of current market conditions, such as the Wright approach and evidence from independent expert reports.

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[152] SFG, *The required return on equity for the benchmark efficient entity*, February 2015, [123].

Figure 4.3, copied from Jemena's submission in April 2015, shows how the AER's current approach to setting the allowed return on equity is directly related to CGS yields, which is due to the AER keeping the MRP fixed. This is contrary to the material in front of the AER.

Figure 4.3 Historical CGS yields and the AER's application of the SL-CAPM
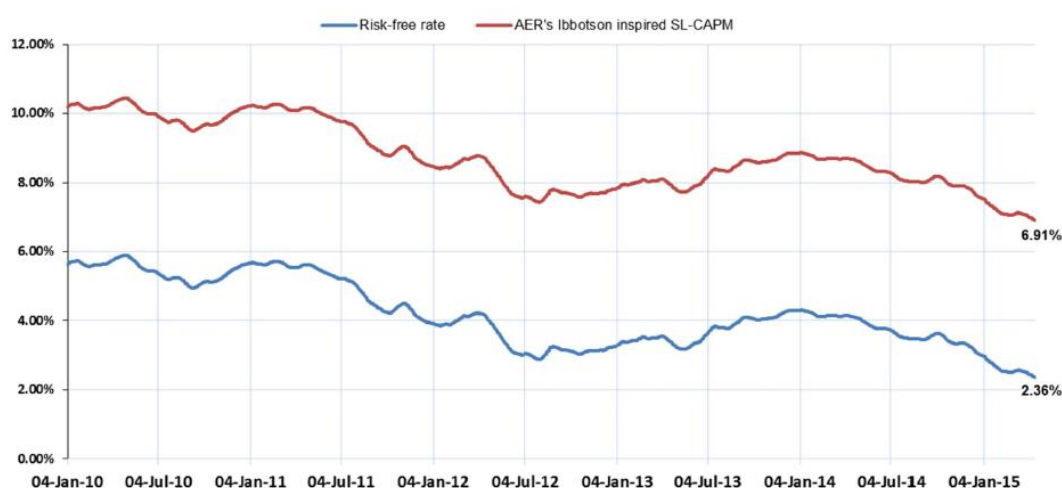
ActewAGL Distribution also notes that this approach is inconsistent with the Industry Panel's review of the ICRC's decision in the ACT in April 2015. In that decision the Industry Panel allowed a MRP that to a greater degree reflected prevailing market conditions by using a 40-day average of Bloomberg's daily implied MRPs:[153]

> "..MRP of 7.23%, which was estimated using the implied MRP methodology:[140] the Panel decided to use the implied MRP methodology because, in its view, it provides a more accurate estimate of the MRP than other methodologies and also ensures internal consistency in the measurement of the WACC,"

(g)   Conclusion on the MRP

ActewAGL Distribution does not agree with the AER's estimate for the MRP of 6.5%. This estimate does not reflect prevailing conditions in the market for equity funds and will not contribute to the achievement of the allowed rate of return objective. The AER's decision on the MRP is affected by a number of errors of fact, as discussed above.

ActewAGL Distribution considers that a preferable approach is that set out by SFG in appendix 8.14. This approach takes into account all relevant evidence on the MRP and applies a transparent weighting to each estimate based on the relative strengths and weaknesses of each estimation approach. The reasons for SFG's weighting approach are set out in a second expert report included in appendix 8.13.[154]

Table 5: SFG estimates of market risk premium[155]

Estimation method	Market return	MRP	Weighting
Historical excess returns (Ibbotson)	9.20%	6.56%	20%
Historical real market returns (Wright)	11.64%	9.00%	20%

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[153] Industry Panel Review of the 2013 Price Direction for Water and Sewerage Services: Final Report, April 2015, p. 78

[154] SFG, *The required return on equity for regulated gas and electricity network businesses*, June 2014.

[155] SFG, *The required return on equity for the benchmark efficient entity*, February 2015, Table 5. The risk-free rate assumed in these calculations is a placeholder estimate, based on a January 2015 averaging period.

Estimation method	Market return	MRP	Weighting
Dividend discount model	11.37%	8.73%	50%
Independent expert reports	9.57%	6.93%	10%
Weighted average	10.81%	8.17%	100%

4.4   Assessment of the overall return on equity and ERP

The AER considers that its allowed equity risk premium (**ERP**)[156] and return on equity is broadly supported by comparing the ERP estimates, where appropriate. The comparative evidence referred to by the AER includes:[157]

·   estimates using the Wright approach;

·   ERP estimates from 'other market participants', including practitioners and regulators; and

·   that the foundation model return on equity estimate is sufficiently above the prevailing return on debt.

This section addresses each of the AER's 'cross-checks'.

(a)   Use of the Wright approach to support the AER's ERP estimate

ActewAGL Distribution considers that the AER has misinterpreted and misapplied the work of Professor Wright – this was discussed above. Wright did not develop an alternative implementation of the SL-CAPM for checking of the overall return on equity. Rather, Wright developed an alternative method for estimating the MRP.

The way in which the AER has developed its ERP range from the Wright approach means that this comparison will almost certainly support the AER's ERP estimate. The AER derives a wide range of estimates from the Wright approach by using an equity beta range of 0.4 to 0.7 and a market return range of 10.0% to 12.7%[158] in what it refers to as the 'Wright CAPM'. The AER then checks the reasonableness of its ERP estimate by confirming that it falls within the broad range of estimates derived from the 'Wright CAPM'.

Had the AER instead chosen its reference point estimate of beta using the 'Wright CAPM', this comparison would not support the AER's ERP estimate (as illustrated in

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[156] The ERP refers to the difference between the estimated cost of equity and the risk-free rate.

[157] AER, Attachment 3, Rate of Return, ActewAGL final decision, April 2015, p. 38-39.

[158] AER, Attachment 3, Rate of Return, ActewAGL final decision, April 2015, p. 443.

Table 6). Even if the AER's lower bound value for the market return from the Wright approach were to be adopted, the resulting ERP would be above the ERP allowed by the AER (5.22%, compared to 4.55% allowed by the AER). If a midpoint or upper bound value for the market return were to be taken from the Wright approach, the resulting ERP would be significantly higher than the AER-allowed ERP.

Table 6: Estimates of the ERP using the Wright approach[159]

Approach to estimating the ERP	ERP estimate
AER approach (equity beta 0.7; MRP 6.5%)	4.55%
Wright approach with lower bound R_e estimate (equity beta 0.7; R_e 10.0%)	5.22%
Wright approach with midpoint R_e estimate (equity beta 0.7; R_e 11.35%)	6.16%
Wright approach with upper bound R_e estimate (equity beta 0.7; R_e 12.7%)	7.11%

(b)   ERP estimates from 'other market participants', including practitioners and regulators

The AER refers to an ERP range from market practitioners and other regulators in its April/June 2015 final decisions of 2.6 to 12.3 per cent[160]. As it reflects a combination of regulatory decisions and practitioner views over a long timeframe, it is a very wide range. This wide range of values drawn from various sources over a number of years, provides little information or guidance of the prevailing required return on equity.

ActewAGL Distribution considers that past decisions of the AER and other regulators should not be used as direct evidence of the required return on equity. These decisions are at best secondary evidence of the prevailing return on equity at previous points in time. However the return on equity in these decisions:

·   will not reflect prevailing market conditions (rather, they will reflect market conditions at the time the decision was made); and

·   may not be consistent with the rate of return objective, to the extent that they have been determined under different regulatory frameworks with different objectives.

Use of such decisions will also be circular where it is based on previous decisions the same regulator has made in relation to the return on equity where it has only relied on one model (SL-CAPM).

These past regulatory decisions should not be mixed with practitioner evidence under the banner of 'market evidence'. Decisions of regulators do not reflect the views of market practitioners as to the current prevailing required return on equity.

In relation to the reports referred to by the AER in its recent April 2015 final decision,[161] it is not possible to review the individual reports considered by the AER as the AER only provides a range of the ERP estimates. However, ActewAGL Distribution notes that the AER in November 2014 referred to evidence in relation to independent valuation reports that does not support the AER's ERP estimate.[162]

ActewAGL Distribution instead refers to an expert report prepared by Incenta in February 2015 that shows an examination of 53 independent expert reports indicating that independent experts on average have assumed a required market-wide return of approximately 10.52 per cent between August 2012 and November 2014. This is 46 basis points higher than the AER's method (6.5 per cent

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[159] Estimates of the market return are the AER's estimates from its April 2015 final decision for ActewAGL Distribution's electricity network in the ACT as set out in Attachment 3, page 443. All calculations are based on a risk-free rate of 2.55%.

[160] AER, Attachment 3, Rate of Return, ActewAGL final decision, April 2015, p. 38.

[161] AER, Attachment 3, Rate of Return, ActewAGL final decision, April 2015, p. 447

[162] For example, the imputation adjusted EPR was higher than 5 per cent in all but two reports.

MRP plus the spot risk free rate) before accounting for dividend imputation. The report by Incenta also notes that the AER has misunderstood Grant Samuel's report on Envestra and notes that a correct interpretation of Grant Samuel's report shows an implied premium for equity risk range of 5.27 to 5.37 per cent.[163] Based on the above, ActewAGL Distribution considers that evidence from independent expert reports supports an ERP above the AER's value of 4.55 per cent.

(c)   The foundation model return on equity estimate is sufficiently above the prevailing return on debt.

In its final decision in April 2015, the AER noted that its foundation model return on equity estimate is about 260 basis points above the prevailing return on debt, and that it does not consider that this difference to be too low on the basis of:

- the low risk nature of the benchmark efficient entity;

- the current stabilising of debt risk premiums after a recent downward trend; and

- the gap between the ERP and debt risk premium is likely to be wider than stated above, since it compares a promised, pre-tax return on debt to an expected, post-tax return on equity.

ActewAGL Distribution agrees that investors expected return on equity will exceed the expected return on debt. However, as noted above, ActewAGL Distribution does not consider the low risk nature of the benchmark efficient entity is particularly relevant in this situation given that the comparison should be based on a an entity that is 60 per cent geared with a credit rating of BBB or BBB+.

In relation to more stable market conditions, ActewAGL Distribution does not consider that the AER provides any supporting evidence that 260 basis points is a sufficient margin. Noting that the debt risk premium for a long time has been between 2 and 4 per cent indicates that the ERP of 4.55 per cent is low when compared with the last 8 years. ActweAGL Distribution also considers that the 'flight to safety' in relation to the decreasing CGS values are very likely to have influenced the return on debt.

In relation to the gap between the ERP and debt risk premium being understated as it is a product of a post-tax return on equity and a pre-tax return on the debt, ActewAGL Distribution refers to the other evidence provided in this proposal which clearly supports that the overall return on equity is higher than that derived by the AER. The matter, whether the ERP and the debt risk premium are measured on a pre respective pos-tax basis, is in that context immaterial.

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[163] Incenta, *Further update on the required return on equity from independent expert reports*, February 2015, p 1.

5   ActewAGL Distribution's return on equity proposal

ActewAGL Distribution proposes a multi-model approach to determining the return on equity. This reflects the view that there is no one superior return on equity model, and accordingly each relevant model should be given a direct role in estimating the return on equity. The SL-CAPM cannot be said to be superior to other models, given its known weaknesses.

ActewAGL Distribution also proposes a different approach to estimating model parameters. For the reasons discussed above, ActewAGL Distribution's approach, supported by independent expert advice, differs from the AER's approach in respect of a number of key parameters. In particular, ActewAGL Distribution:

·   Estimates the required return on the market and the MRP by combining evidence from historical excess returns, the Wright approach, the DDM and independent expert reports. The best evidence from each of these sources is combined in a transparent way, as described in the expert report of SFG in appendix 8.13.[164]

·   Adopts an equity beta of 0.82, based on SFG's analysis included in appendices 8.11 and 8.12, using a wider sample of businesses than that used by the AER's expert.[165]

·   Uses Black CAPM, FFM and DDM parameter estimates, required to estimate the return on equity inputs into these models, as estimated by SFG in appendices 8.14.[166]

For completeness ActewAGL Distribution submits SFG's expert report from May 2014 in appendix 8.13, which details the approach. This approach has regard to all relevant models and evidence, and uses this material for its proper purpose. Each of the relevant return on equity models is independently used to derive an estimate of the required return on equity, while other relevant evidence is used to determine the best estimate of each parameter within these models.

ActewAGL Distribution considers that its proposed approach provides for a return on equity estimate that reflects prevailing market conditions and which contributes to the achievement of the rate of return objective. It does so by:

·   giving all relevant models a direct role in estimating the return on equity, in recognition of the fact that no one model is superior; and

·   relying on the best empirical evidence in estimating each model parameter.

The AER's approach, applied in its Rate of Return Guideline and recent April/June 2015 final decisions, will not deliver a return on equity estimate which reflects prevailing market conditions and which contributes to the achievement of the rate of return objective and the NGO. The AER's approach is affected by critical errors of fact and errors of logic. These errors lead to a return on equity estimate which is below what is required to promote efficient investment in, and efficient operation and use of, natural gas services for the long term interests of consumers.

Accordingly, ActewAGL Distribution considers that its proposed approach to estimating the return on equity is preferable in terms of it making a contribution to the achievement of the NGO.

5.1   Estimates of model parameters

ActewAGL Distribution has obtained estimates of model parameters in order to generate an estimate of the required return on equity. This has been done to ensure that the proposed return on equity

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[164] SFG, *The required return on equity for regulated gas and electricity network businesses*, May 2014, section 3.

[165] SFG, *Equity beta*, 12 May 2014.

[166] SFG, *The required return on equity for regulated gas and electricity network businesses*, 6 June 2014, section 4. and SFG, *The required return on equity for the benchmark efficient entity*, 13 February 2015, section 5.

reflects prevailing market conditions. The parameter estimates, as reported by SFG, are set out in Table 7.

Table 7: Parameter estimates[167]

Parameter	Updated estimate
Risk-free rate[168]	2.64%
Required return on the market	10.81%
MRP	8.17%
Equity beta	0.82
Zero-beta premium	3.34%
FFM market beta	0.78
FFM size factor (s x SMB)	-0.19%
FFM book-to-market factor (h x HML)	1.15%
DDM estimate of the required return	10.32%

Below, ActewAGL Distribution summarises the estimation of these input parameters.

5.2   Risk free rate

For illustrative purposes, the figures presented in this proposal are calculated using a 20 business day period ending on 30 January 2015. Section 6 sets out ActewAGL Distribution's proposed averaging period for estimating the risk-free rate in the final determination.

5.3   Required return on the market portfolio (or its corollary, the MRP)

ActewAGL Distribution's proposal adopts SFG's view as to the appropriate manner in which the AER should exercise judgment in establishing the MRP. To a significant extent SFG's estimate relies on similar information to that used by the AER – although certain information, such as inherently unreliable surveys, were not used. There are, however, other important differences in the details of how the other sources would be used to address flaws that SFG identify. SFG notes (updated using estimates from its later report) that it would have regard to the following evidence:[169]

> *a) First, we note that historical returns can be processed in two ways – by assuming that MRP*

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[167] SFG, *The required return on equity for the benchmark efficient entity*, February 2015; SFG, *Using the Fama-French model to estimate the required return on equity,* February 2015; SFG, *Share prices, the dividend discount model and the cost of equity for the market and a benchmark energy network*, February 2015; SFG, *Beta and the Black Capital Asset Pricing Model*, February 2015.

[168] Risk-free rate is a placeholder estimate, based on 20 business days averaging period finishing on 30 January 2015 (inclusive).

[169] SFG, *The required rate of return on equity for regulated gas and electricity network businesses*, A report for Jemena Gas Networks, ActewAGL Distribution, Ergon, Transend, and SA PowerNetworks, 6 June 2014, para. 340, p. 82.
SFG, *The required return on equity for the benchmark efficient entity*, A report for Jemena Gas Networks, ActewAGL Distribution, Ergon, Transend and SA Power Networks, 25 February 2015, p. 33.

is constant in all market conditions (Ibbotson approach) or by assuming that real required returns are constant in all market conditions (Wright approach). We apply equal weight to each of these approaches, producing an estimate of MRP from historical returns of [7.78%];
b) The estimate of MRP from dividend discount models of [8.73%]; and
c) The estimate of MRP from independent expert reports of [6.93]%.

The same report illustrates why the outcome is not sensitive to the weightings given to the three sources. The relevant evidence is discussed in detail in that report.

SFG's current estimate of the required return on the market comprises the following (each grossed up for a theta estimate of 0.35):[170]

- a historical average of excess returns above the contemporaneous risk free rate from 1883 to 2013 (of 6.56%) added to the current risk free rate (of 2.64%) to deliver an estimate of 9.20%;
- a historical average market return using the Wright approach to deliver an estimate of 11.64%;
- a DDM estimate to deliver an estimate of 11.37%; and
- independent expert valuation reports to deliver an estimate of 9.57%.

SFG synthesises this information to provide a single point estimate of 10.81% as the mid-point between the first two of the above historical estimates, which is also a figure that is very similar to the other two estimates.

The other inputs suggested in the Rate of Return Guideline are not used because there are no reliable surveys upon which to rely and recycling past regulatory decisions does not provide any additional insight to prevailing market conditions.

5.4   Equity beta

Based on SFG's expert opinion,[171] ActewAGL Distribution proposes that the most appropriate estimate for the equity beta is 0.82 on the following basis:[172]

One way of having regard to the range of relevant models and evidenced is to estimate the required return on equity under each of the relevant approaches and then to determine an allowed return on equity after having regard to the relative strengths and weaknesses of each approach. Under such a multi-model approach, we would adopt a Sharpe-Lintner CAPM beta of 0.82 – the raw estimate of beta that does not reflect any evidence other than the historical statistical relationship between stock returns and market returns for the relevant set of comparable firms.

ActewAGL Distribution refers to the expert report included in appendix 8.12 for further details.

5.5   Return on a zero beta asset

SFG has estimated the return on a zero beta asset by adding a 3.34% zero beta premium to the risk free rate of 2.64% to give an estimated return of 5.98% return on a zero beta asset.[173]

This is within the reasonable range in the Rate of Return Guideline and for that reason this issue does not warrant a detailed treatment in this identified document.

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[170] SFG, *The required return on equity for the benchmark efficient entity*, A report for Jemena Gas Networks, ActewAGL Distribution, Ergon, Transend and SA Power Networks, 25 February 2015, p. 33
[171] SFG, *Equity Beta*, Report for Jemena Gas Networks, ActewAGL and Networks NSW, 12 May 2014, para. 195, p. 42.
[172] SFG, *Equity Beta*, Report for Jemena Gas Networks, ActewAGL and Networks NSW, 12 May 2014, para. 195, p. 42.
[173] SFG, *Beta and the Black Capital Asset Pricing Model*, February 2015, p. 26

5.6   FFM market exposure, SMB and HML factors

Because the Rate of Return Guideline does not use the FFM, there is no relevant departure from the guideline in relation to these factors. Recent regressions conducted by SFG have concluded that the best estimates for the three relevant FFM factors are:[174]

- Market exposure: 6.33%—calculated as the product of an 8.17% MRP and a 0.78 beta estimated for the FFM (as opposed to the SL-CAPM);
- Size exposure: -0.19%; and
- Book to market exposure: 1.15%.

ActewAGL Distribution refers to the expert report included in appendix 8.06 and 8.07 for further details.

5.7   Risk premium for use in the DDM

SFG has estimated the risk premium for relevant comparable firms at 94% of the over-all market returns.

5.8   ActewAGL Distribution's proposed return on equity estimate

Using the above parameters, SFG has estimated the return on equity for the four relevant models as follows:[175]
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- SL-CAPM: 9.32%
- Black-CAPM: 9.93%
- FFM: 9.93%
- DDM: 10.32%.

Following a thorough examination and comparison of the merits of the different models and estimation methods, ActewAGL Distribution considers that equal weight should be given to the results of all four return on equity models.

ActewAGL Distribution notes that SFG has argued for greater weight to be given to more recently developed models, particularly the FFM. For example SFG applies 37.5% weight to the FFM, 25% each to the Black CAPM and DDM and 12.5% weight to the SL-CAPM.

As noted in this proposal, in the current circumstances there is no evidence to demonstrate that any one model is clearly superior to others, or that one model contains all relevant information. Given that there is no obvious basis to distinguish one method or model over others in terms of its likelihood of producing outcomes that contribute to the rate of return objective, ActewAGL Distribution considers that it would be appropriate to give equal weight to each model or method. ActewAGL Distribution notes that this is consistent with the approach previously taken by the Tribunal when deciding between alternative models or methods.[176] It is also consistent with SFG's 'default starting point'[177].

ActewAGL Distribution considers that either of these weighting approaches would be appropriate in light of the strengths and weaknesses of each model, but in this proposal has chosen to adopt an equal weighting approach. On the basis of the estimates set out in this proposal, the difference to the

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[174] SFG, *Using the Fama-French model to estimate the required return on equity*, February 2015, p. 29

[175] SFG, *The required return on equity for the benchmark efficient entity*, February 2015, p. 35

[176] *Application by ActewAGL Distribution* [2010] ACompT 4, [78]. In that case, the Tribunal was considering alternative methods for estimating the return on debt. The Tribunal noted that if there was no basis to distinguish the alternative methods, then taking an average would be appropriate.

[177] SFG, The required return on equity for regulated gas and electricity network businesses, May 2014, p 9

return on equity between the weighting recommended by SFG and the weighting proposal in this proposal is 0.08%.[178]

ActewAGL Distribution considers that the approach to estimating the return on equity, as set out in this proposal, gives effect to the requirements of the NGR that in determining the allowed rate of return regard must be had to relevant estimation methods, financial models, market data and other evidence. Having identified the material that is relevant to estimating the return on equity, and having examined and compared the merits of this material, all of the relevant material is given an appropriate role in the calculation of the return on equity. A return on equity estimate, based on equal weighting of the four models, is set out in Table 8.

Table 8: Equal weighted return on equity estimate

Model	Required return on equity	Weighting
SLCAPM	9.32%	25%
Black CAPM	9.93%	25%
FFM	9.93%	25%
DDM	10.32%	25%
Weighted average	**9.87%**	**100%**

6 ActewAGL Distribution's averaging period for the return on equity

Consistent with the AER's Rate of Return Guideline, ActewAGL Distribution proposes that the risk free rate be estimated using CGS with a maturity of 10 years. This is consistent with a letter provided to ActewAGL Distribution on 31 March 2015 in which the AER proposes an averaging period for the return on equity that intended to apply for its final decision in 2016. ActewAGL Distribution accepts the AER's proposed averaging period put forward in that letter.

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[178] SFG, *The required return on equity for the benchmark efficient entity*, February 2015, section 5. SFG calculates a return on equity based on its unequal weighting approach of 9.95%. Based on the equal weighting approach, the return on equity is 9.87%.