



APGA
50 YEARS 1968-2018

Submission to the AER

Review of rate of return guideline

04/05/2018

1. INTRODUCTION

The Australian Pipelines and Gas Association (APGA) welcomes the opportunity to comment on the Australian Energy Regulator's (AER) review of the Rate of Return Guidelines.

APGA is the peak body representing Australasia's pipeline infrastructure, with a focus on gas transmission, but also including transportation of other products. Our members include owners, operators, constructors, advisers, engineering companies and suppliers of pipeline products and services. APGA's members build, own and operate the gas transmission infrastructure connecting the disparate gas supply basins and demand centres of Australia, offering a wide range of services to gas producers, retailers and users. The replacement value of Australia's gas transmission infrastructure is estimated to be \$50 billion.

A stable, predictable regulatory framework is vital to maintaining the attractiveness of the Australian energy sector as a destination for investment. It is in the context of this recent history that we make this submission in respect of the current Guideline process, which we hope can contribute to a future improved investment environment.

In this submission, we respond to the various AER issues papers and in particular to the concurrent expert sessions held in March and April. We believe that the expert concurrent sessions have been highly valuable to the overall Guidelines process. These sessions helped in bringing together the various views of the experts and to see areas of agreement and disagreement. Given the technical nature of the issue at hand we did not anticipate unanimous agreement amongst experts, however the expert sessions provided key insights on the areas which require higher priority than others to determine a guideline that balances the need to maintain investor confidence and customer affordability.

Additionally, we consider that the expert sessions were a much more efficient and effective way of capturing relevant information than the status quo of expert reports at 100 paces, which has a tendency on focussing on opposing expert errors rather than on a constructive way forward in helping the AER in its core task of determining an appropriate rate of return allowance. We also think that having the sessions before a well-engaged AER Board was an excellent way to give stakeholders confidence in the process. We hope the AER will continue to make use of sessions like these rather than reverting to expert reports.

Throughout this process, we have supported the notion of incremental change. To us it means that we start from the current position on estimation approaches and outcomes and identify the need to move away from these. For example, in the case of the current cost of debt approach or current foundation model approach (to measure the cost of equity), the AER should consider any material changes in risks or market conditions that require changes to the current method. If the risks and markets conditions have changed materially, only then consider looking at alternative approaches, but if they have not, do not make substantive changes to the status quo.

From the expert concurrent sessions we understood that there was general agreement amongst most experts that the transition approach on the cost of debt approach should be maintained and that the foundation model approach for the cost of equity would be maintained. The key areas of concern that resulted in disagreement amongst experts were limited to issues associated with the estimation of parameters and we do not consider that these should preclude the AER from finding a way forwards based on the broad areas of agreement from the expert sessions. We discuss particular examples of this in the chapters below.

Even though we support an incremental approach for the current rate of return guideline review we are extremely concerned with the legislative changes in relation to rate of return determination, the removal of the limited merits review framework and continuous political interference that is generally not part of a workably competitive framework. These have materially increased investment risks for us. We note that our investors consider investing across various markets and are not limited in scope to Australia, and would rationally choose to invest offshore if those markets were offering a more stable framework than offered in Australia. It is important to bear in mind that were investors to shift their capital to other markets it would become extremely difficult to raise capital in the short run which would result in deterioration in service standards and higher costs of financing.

2. RETURN ON EQUITY

Perhaps the area requiring the most effort to deliver an overall rate of return capable of acceptance by stakeholders is the return on equity. Here, we have two issues:

- Some evidence has clearly changed, meaning the 2013 values for some parameters are likely too low given current market data; no evidence points to a parameter estimate decrease unless the AER significantly changes the way it calculates the relevant parameters.
- The AER’s 2013 approach to determining the return on equity is not particularly transparent. In particular, it is difficult to trace through how the AER gets from its favoured inputs to the particular output it chooses for a given parameter. This causes confusion amongst stakeholders.

We divide our discussion below into the risk-free rate, beta (including low-beta bias) and the MRP.

The risk-free rate

The risk-free rate is an area where only minor changes have been proposed, and experts appear to have no issue with these changes. The change proposed is to allow businesses to nominate between 20 and 60 days for their risk-free rate averaging period for the return on equity, rather than 20 days as at present.

For consumers and investors the benefit is greater stability with less exposure to short-term movement in risk-free rates. This stability is not at the cost of a significant loss in the degree to which the allowance matches the current risk-free rate. This is apparent in the AER’s work, which suggests that there are very few differences when one moves from 20 to 60-day averages.¹ The AER issues paper suggests an appropriate approach whereby the averaging period can be between 20 and 60 days, so long as it is nominated ahead of time and as close as is practicable to the start of the next AA period; with the caveat that choice of a longer time period that is not in the future triggers a move to a 20-day period that is.²

APGA supports extending the averaging period from 20 to 60 business days and the AER’s proposed implementation process. We also appreciate that businesses would like to have the option of selecting the actual length of the period (between 20 to 60 business days) due to different hedging practices. We consider this as non-controversial.

Beta

The estimation of beta is a key concern in this Guideline process, not only because the evidence and the sample set has changed quite substantially since the last Guidelines in 2013, but also because the approach to the estimation of beta in 2013 required significant discretion which was neither transparent nor clearly explained to stakeholders. There is an obvious need to do better this time to articulate clearly how an estimate is determined and whether the current approach can be replicated for future periods to avoid getting into lengthy debates at each guideline review.

In respect of the market data on beta, as Table 1 below makes clear, beta estimates have increased.

Table 1: Changing estimates of beta

	APA	DUE	ENV	SKI	AST
Henry 2014	0.56	0.28	0.30	0.33	0.29
AER 2017	0.72	0.34	0.37	0.39	0.40

Source: Frontier Economics for the ENA

The simple lesson from Table 1 is that, were Henry to repeat his analysis of 2014, he would not, could not reach the same conclusions he reached in 2014 but would come to a higher range. Table 1 does not, we

¹ AER, 2018, Market Risk Premium, Risk Free Rate Averaging Period and Automatic Application of the Rate of Return: Discussion paper, March 2018, p36
² Ibid, p37.

acknowledge, contain any standard errors. Were these to be included, it may well be that one could show no statistically significant difference between the two sets of estimates. From there, one may argue that, since the true beta is likely to change only slowly (something which may not be true),³ there is no need to change from the previous values. This is a logical fallacy, because the “true” beta, even if it is stable, is represented by neither set of numbers; both are imperfect empirical estimates. To argue, based upon supposed stable “true” betas that one should only move away from an existing estimate if new data show a statistically significant difference from that estimate is to pre-suppose that the existing estimate accurately represents the “true” beta. In fact, neither estimate is “true”, and treating past evidence differently compared to current evidence leads to unbalanced analysis (see Section 5), which the AER should avoid.

The current sample used by the AER has only one still-existing firm that represents, approximately, the risk faced by the gas businesses (APA). The mean beta estimate for APA is 0.72 – above the current benchmark estimate of 0.7 which incorporate the AER’s assessment of the “theory of the Black CAPM” and evidence from international firms.

As a starting point the current estimate only tells us that the systematic risk faced by APA is well above that for which the benchmark is compensated. However, APGA does not wish to contend that, based on this sample of one firm, the benchmark level for gas businesses should be set above 0.7; instead as a starting point there is nothing in the beta estimate of APA that tells us that the current estimate of 0.7 over-compensates gas businesses in particular.

In the expert sessions, experts agreed that there was no reason to believe that the betas, of electricity and gas firms should be the same, but noted that testing for a difference might be challenging.⁴ They nevertheless suggested that it should be open to stakeholders to present arguments about potential differences, and we do so in Box 1 below.

³ *We acknowledge that the risk levels of a benchmark efficient entity are not likely to change much year to year. However, systematic risk, and beta is a covariance divided by a variance and not a level. Thus, even though the risk of a regulated energy company may not change much, if market risk changes rapidly (which it does from time to time; witness the GFC as but one very extreme example), then systematic risk can and does change quickly, and so too does the “true” beta. From this perspective the argument about “stability” in beta is misguided.*

⁴ *CEPA, 2018, Expert Joint Report: Rate of Return Guideline Review – Facilitation of Concurrent Expert Evidence, April 2018, available from <https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/review-of-rate-of-return-guideline/initiation>, p49.*

Box 1: Differences in systematic risk exposure – electricity and gas

There are three pieces of evidence which suggest that gas businesses might have different systematic risk exposure to electricity businesses which have been considered recently by the New Zealand Commerce Commission, but which have not been considered previously by the AER. We note that the NZCC did ultimately decide to continue with its practice of providing a different beta for electricity and gas on the basis of this evidence.⁵ The key issues are:

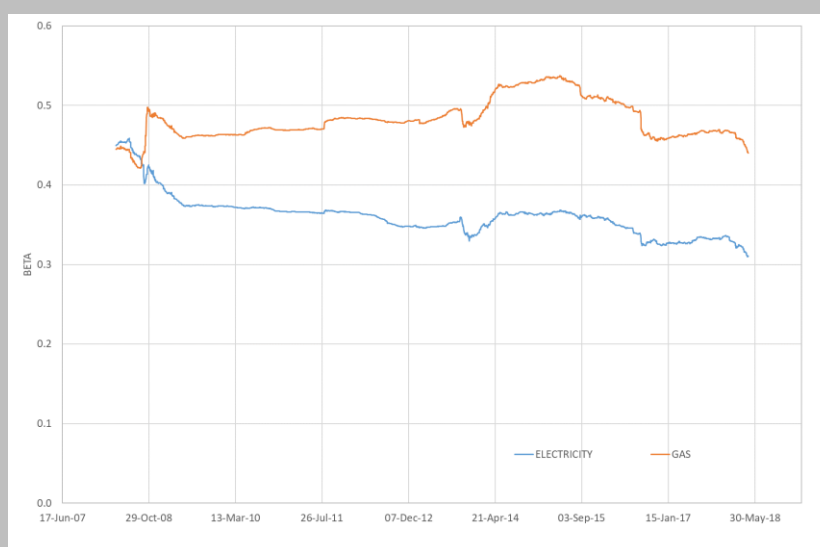
- Differences in the elasticity of demand for gas and electricity.
- Different markets served.
- Evidence of different betas overseas.

Evidence from Akmal and Stern⁶ suggests that gas has a higher elasticity of demand than electricity, due in part to its status as a fuel of choice. This leads to more risk, and thus a higher beta.

Data from the Australian Energy Statistics (AES) published by the Department of Industry, Innovation and Science⁷ shows industries where natural gas is used more prominently than electricity. Our analysis indicates that natural gas is a more prominent source of fuel in industries that are likely to be more susceptible to the economic cycle. For instance, natural gas is a more dominant source of fuel relative to electricity in the mining industry – 38 vs 20 per cent of energy consumption, in manufacturing (37.6 per cent versus 20 per cent) and in construction (12 per cent versus six per cent). By contrast electricity is the dominant fuel in the residential market, and less susceptible to economic shocks.

Finally, Figure 1 below shows the difference between asset betas of US electricity and gas firms, updated from evidence Oxera⁸ has previously provided and which was relied upon 'in part' for the Commerce Commission's December 2016 Input Methodologies decision. Our analysis confirms that estimates of the asset betas of US regulated gas businesses continue to lie, as they have done for some years now, above estimates of the asset betas of US regulated electricity businesses. Further, the existence of a differential between these two beta estimates is statistically significant at the usual, five per cent level.

Figure 1: Rolling five-year asset betas formed using daily data



Note - For each day and each firm we estimate the asset beta of the firm using the immediately preceding five years of daily data. We drop estimates that use less than 500 days of data. The figure plots the averages, against time, of the remaining beta estimates across firms within each industry.

There is strong evidence that gas and electricity firms have different systematic risk exposure, which we believe the AER should consider when forming its beta estimates. In a general sense, the issue of a small sample size has been raised, and the use of international data and other information (see below) has been discussed as a remedy. To our minds, the issue is even more acute for gas than it is for electricity because,

⁵ Commerce Commission, *Input Methodologies Review Decisions: Topic paper 4: Cost of capital Issues*, 20 December 2016

⁶ Akmal, M. and D.I. Stern, 2001, *Residential Energy Demand in Australia: A application of dynamic OLS*, ANU. We recognise this evidence is a little dated, but inquiries with the ABS suggest the particular data series the authors used has been discontinued, meaning more data are needed. However, more recent New Zealand evidence considered by the Commerce Commission following a similar methodology does show evidence of differences still.

⁷ Forthcoming AES publications are now the responsibility of the Department of Environment and Energy.

⁸ Oxera, 2016, *Asset Beta for Gas Pipelines in New Zealand: Prepared for First Gas*, 3 August 2016.

as noted above, there is only one gas firm in the AER's sample set. To this end the AER could take a similar approach to the New Zealand Commerce Commission and use an international sample for estimating beta. Considering this data (and other information similar to Box 1 above), the Commerce Commission estimated an asset beta of 0.4 for the gas business (0.05 above the electricity businesses).

We now turn to the estimation of beta itself; the method that would be applied in said estimation whether the sample set is gas and electricity together or separated. We outline our views in respect of beta estimation below under two broad headings; the estimation itself, and then adjustments to beta to reflect issues with the CAPM, particularly the issue of the low-beta bias associated with the model. Our view in respect of the beta allowance is that there is no evidence at all that beta has decreased. The AER's own evidence, outlined above clearly shows that beta has increased, and if one is to add in other factors such as the low-beta bias issue below (which the AER has arguably underestimated in the past), there is no reason to suggest that the AER should reduce its beta allowance in the forthcoming period.

The estimation of beta

In respect of the estimation of beta, there was at least some degree of agreement from experts about how the AER ought to go about the estimation process. For example:

- There is general agreement (with some dissent) that it is appropriate for the AER to de-lever and re-lever in the way that it does, and to continue to assume that debt betas are zero because their likely values are too small to make a substantial difference.⁹
- Market data are the appropriate data to use to estimate beta.¹⁰
- That the remaining set of firms is small and the small number of comparators is a problem, but that recently de-listed firms, international energy firms and other domestic infrastructure firms (in that order of preference) can provide relevant information. By contrast, beta estimates from other regulators and industry portfolios (such as those in the recent AER study) are of limited relevance.¹¹
- Where international energy firms or other domestic infrastructure firms are considered, considerable care needs to be taken to ensure that the information is relevant to the systematic risk profile of the benchmark efficient entity.¹²
- Longer data series are preferable from the perspective of precision, but this needs to be considered in the context of market data changing, which may be better revealed by shorter time periods.¹³
- Experts agree (see above) that there is no reason to expect that the systematic risk exposure of gas and electricity firms will be the same. This does not necessarily change the methods outlined below, but it would change the sample sets to which that method is applied.

We agree with the consensus view from experts and consider that it provides the AER with some guidance on how to proceed, and we consider it might be useful to follow a simple two-step process. This is not a deep theoretical or principled approach, but rather attempts to make use of what we have in terms of data, and the best advice experts were able to give. The two steps are:

- (i) Use the currently trading regulated energy businesses to determine a beta estimate, but include in that estimate a confidence interval.

⁹ CEPA, 2018, *Expert Joint Report: Rate of Return Guideline Review – Facilitation of Concurrent Expert Evidence*, April 2018, available from <https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/review-of-rate-of-return-guideline/initiation>, p39-41. Partington and Satchell provide the main dissent, but they do not expand upon their views, noting only a series of problems which may or may not exist and, in respect of debt betas, note only that they (at least Partington) has seen debt betas higher than 0.1, without giving any references, sources or evidence to suggest that this is material in the context of the particular benchmark efficient entity the AER assumes. Such evidence is clearly required.

¹⁰ CEPA, 2018, *Expert Joint Report: Rate of Return Guideline Review – Facilitation of Concurrent Expert Evidence*, April 2018, available from <https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/review-of-rate-of-return-guideline/initiation>, p42. We note the support of Johnston for cashflow betas (p48).

¹¹ CEPA, 2018, *Expert Joint Report: Rate of Return Guideline Review – Facilitation of Concurrent Expert Evidence*, April 2018, available from <https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/review-of-rate-of-return-guideline/initiation>, pp43-48

¹² *ibid*

¹³ CEPA, 2018, *Expert Joint Report: Rate of Return Guideline Review – Facilitation of Concurrent Expert Evidence*, April 2018, available from <https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/review-of-rate-of-return-guideline/initiation>, p50.

- (ii) Use information from the remaining sources (in the above order of precedence) to determine where in the relevant confidence interval the point estimate is likely to be, or to narrow the confidence interval to something which is more reasonable.¹⁴ The final interval may extend above the top end of the original range or below the bottom end; it is not intended that the range in Step One would represent a set of hard boundaries.

The first step is different from the status quo because the range is a standard confidence interval around the mean or “best” estimate which captures the imprecision in the data which are thought to best represent the benchmark efficient entity, rather than a collection of mean estimates chosen using judgement (and are almost a decade old) with no indication of precision.

Note in the first step that we do not envisage dozens of different regressions using several different methods, timeframes and portfolios. Rather we envisage a limited set of regressions based upon something which experts can agree approaches best or at least robust practice.¹⁵ There does not seem to be much value in torturing the same data dozens of different ways, which tends to give only the impression of comprehensive analysis. We would also envisage forming the confidence interval using some transparent mathematical approach for deriving such intervals from several regressions, rather than regulatory judgement.

The second step is more of a challenge. Our preference is to move to a confidence interval rather than a point estimate, at least in the first instance; at the very least it facilitates the potential future use of an approach like that used by the NZCC (See Section 5 below). However, we do not admit to particularly great insights as to how the AER might use the remaining sources of data to narrow the confidence interval appropriately. At some point, regulatory judgement would be required. However, it would be very useful to firstly confer with experts to understand whether there might be some transparent and objective ways in which to use the other sources of data to narrow the range before judgement is used. Two ideas which might work (we welcome feedback) are:

- Make use of relevant statistical tests to understand whether the sets of firms amongst those recently delisted, international energy firms or other domestic firms represent sets that can be compared with the firms used in the estimates at step one, and then follow the same mathematical process for combining confidence intervals done at step one using these new firms.¹⁶
- Noting the concerns raised by experts in respect of the international CAPM,¹⁷ make estimates using it and then use techniques to compare domestic and international rate of return estimates with a view to refining the range for the former using the latter.

The adjustment of beta estimates and accounting for the low-beta bias

One aspect of the expert sessions which was perhaps a little disappointing was the very small focus on the issue of the “low-beta bias” (that is, the tendency of the CAPM to under-predict, on average, the returns to low-beta stocks and to over-predict the returns to high-beta stocks). This is a not a small issue in respect of the scale of the potential problem. To see this, consider the Table 2 below from the DBP AA Proposal:¹⁸

¹⁴ The latter is particularly apt if one is following what Lally proposed from the NZCC (see Section 5) whereby a regulator uses confidence intervals on parameters to form a confidence interval for, say, the return on equity, and then uses judgement to form an estimate of the return on equity from that “meta” range. This cannot be done, obviously, if the beta estimate is already turned into a point estimate using judgement at some earlier stage, and the information about statistical uncertainty is lost.

¹⁵ Recognising that the experts didn’t quite get to this level of technical discussion in the last sessions.

¹⁶ We recognise that these tests have been proposed to the AER in the past, and the AER raised issues with the work, but it would be useful to understand from experts the potential of them in the current context.

¹⁷ CEPA, 2018, Expert Joint Report: Rate of Return Guideline Review – Facilitation of Concurrent Expert Evidence, April 2018, available from <https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/review-of-rate-of-return-guideline/initiation>, p44 and 85

¹⁸ See DBP, 2014, Proposed Revisions: DBNGP Access Arrangement – Supporting Submission 12 p66

Table 2: Vanilla empirical SL-CAPM - Wald and t-test results

		Method A		Method B	
Wald test		26.766		29.792	
Portfolio	Betas	mean forecast error	t tests	mean forecast error	t tests
1	0.536	-4.70%	-2.018	-5.34%	-2.915
2	0.608	-4.61%	-1.878	-5.32%	-2.938
3	0.576	-4.14%	-1.652	-4.84%	-2.765
4	0.766	-4.56%	-1.726	-5.34%	-3.207
5	0.857	-2.41%	-0.798	-3.27%	-1.891
6	0.882	-0.88%	-0.294	-1.89%	-1.259
7	0.966	1.80%	0.539	0.76%	0.443
8	1.182	2.46%	0.639	1.07%	0.569
9	1.362	7.59%	1.715	5.89%	2.522
10	1.384	6.37%	1.165	4.65%	1.220

Note – mean forecast errors are in percentage points per annum. Method A and Method B refer to different ways of characterising the MRP and the forecast error is forecast minus actual, so the low-beta bias comes up as a negative; the forecast is too low. For current purposes, the Wald and t-test results can be ignored.

What it shows is that, over the course of the last 40 years, a portfolio with a beta of around 0.5 to 0.6 actually earned, on average, four or five *hundred* basis points more than a vanilla or textbook version of the CAPM commonly found in textbooks would predict. By contrast, choosing a beta of 0.7 when the mean or best statistical estimate of beta is 0.5 (essentially what the AER did in 2013) adds 130 basis points to a vanilla version of the CAPM if the MRP is 6.5 percent (that is 0.2x6.5).

There is thus a big difference between the returns the AER was prepared to allow in 2013, and the returns that investors could observe have been made by firms with the same level of systematic risk exposure in the past. To the extent that such investors pay any attention to this actual historical record, such a big difference is likely to have an effect on their investment decisions, and if the result is that they consider they can get better returns for their desired level of systematic risk exposure outside the regulated energy sector, investment will fall. This is not in the long-run interests of consumers.

These findings are not unique to Australia, as made clear in the expert report.¹⁹ They are also not unknown to the AER. However, the key issue is what to do about them; it seems highly unlikely that there will be general stakeholder agreement that 400 basis points ought to be simply added to the returns predicted by the CAPM, and indeed DBP did not advocate this when it provided the evidence in Table 2. However, something must be done other than simply ignoring evidence.

On the question of the existence of low-beta bias, the experts were in unanimous agreement, but on the question of what to do about it, there was less guidance. The majority view was essentially that the AER ought to do something, without specifying exactly what.²⁰ Partington and Satchell dissented, and effectively said that the AER should do nothing; mirroring advice they have given in the past (see Appendix).

In the expert report, Partington suggested that this is because the zero-beta premium is hard to estimate.²¹ The Black CAPM was developed as a response to the empirical failure of the SL-CAPM, which emerged

¹⁹ CEPA, 2018, *Expert Joint Report: Rate of Return Guideline Review – Facilitation of Concurrent Expert Evidence*, April 2018, available from <https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/review-of-rate-of-return-guideline/initiation>, p52-53.

²⁰ CEPA, 2018, *Expert Joint Report: Rate of Return Guideline Review – Facilitation of Concurrent Expert Evidence*, April 2018, available from <https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/review-of-rate-of-return-guideline/initiation>, p53.

²¹ CEPA, 2018, *Expert Joint Report: Rate of Return Guideline Review – Facilitation of Concurrent Expert Evidence*, April 2018, available from <https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/review-of-rate-of-return-guideline/initiation>, p52. Partington is very clear in his own textbook on the incidence of low-beta bias, and indeed notes that it

almost as soon as the CAPM was subject to empirical testing. Simply ignoring the problem of bias because one of the models which was developed to provide a response to this empirical finding has some parameters in it that are hard to measure hardly seems like a prudent response for a regulator.

Satchell, by contrast, cites some of his own work that suggests that the bias is explained when one considers the movement of interest rates and that, because interest rates might be at historically low levels and likely to rise in future, the problem of bias is one of history that the AER could ignore.²² This appears inadequate as a response to the issue of low-beta bias. Quite apart from the issue of the evidence the AER might or might not have (Satchell provides none) about interest rates moving upward, there is the problem of unbalanced treatment of evidence. At the last guidelines, the AER rejected the Fama-French Model, which was likewise developed to respond to failings in the CAPM. This model has not only been published in one of the three most highly ranked finance journals and has formed the basis of a great deal of (peer reviewed) finance work over the past two decades, but also was part of the body of work which won its author a Nobel Prize. By contrast, Satchell's model does not appear in a peer-reviewed article in a highly ranked finance journal. It would not be balanced to reject Fama and French and accept Satchell's model on the basis of the standards the AER set in 2013.

There is, thus, no reasonable basis to dismiss the issue of low-beta bias that has been acknowledged in reputable corporate finance textbooks and indeed the finance literature over 50 years. The AER needs to consider the issue more deeply, and provide more transparency in respect of the issue and its solution.

In the past, the AER has made tentative steps towards drawing a distinction between expected and actual returns. Its consultants, Partington and Satchell have also proposed a more extreme "expected equilibrium framework" which we discuss briefly in an appendix. We accept that the bias is found when one compares CAPM model outputs with actual returns. We also accept that the AER is endeavouring to measure expectations. Finally, we accept that actual returns are different from expectations.

However, the scale and scope of the systematic differences between actual returns and those predicted by the CAPM, which have been found almost every time the issue is studied in each market over more than 50 years means that ignoring actual returns entirely because actual returns are different to expectations due to, say, random shocks to the market (which ought to have a mean effect of zero), does not appear to be an adequate response. This is particularly the case because the AER has no information about market expectations, but instead relies upon a model (the CAPM) which purports to shed light on such expectations, but only under a very narrow set of assumptions.

The "usual" way to address the problem the AER faces in respect of the low beta bias is to use actual returns to adjust models like the CAPM.²³ As the AER has noted in the past, this involves an assumption that markets reach an equilibrium in the long run.²⁴ This is true, but the SL-CAPM not only assumes that markets reach an equilibrium even in the short run, but also that they reach a particular equilibrium defined by the restrictive assumptions the model makes. Thus, it would be inconsistent of the AER to reject an approach which assumes only that markets reach equilibria in the long run for lack of evidence in favour of an approach that requires that markets reach a particular equilibrium in the short run when all of the available evidence suggests that no markets do so.

Approaches which examine the scale of the bias of the CAPM and might thus underpin a robust adjustment to the predictions of the CAPM are well-established in the literature. It is true, as with any field of empirical analysis, that there is debate about how to undertake such tests. However, just as the fact of this debate has not precluded the AER from undertaking empirical analysis to determine beta itself, it should not prevent the AER from empirically examining the incidence of low-beta bias. This is especially the case

has increased in more recent times (see Brealey, R, Myers, S, Partington, G and Robinson, D, 2000, Principles of Corporate Finance: Australian Edition, p. 211)

²² CEPA, 2018, *Expert Joint Report: Rate of Return Guideline Review – Facilitation of Concurrent Expert Evidence, April 2018*, available from <https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/review-of-rate-of-return-guideline/initiation>, p53.

²³ Partington G and Satchell, S, 2016, *Report to the ERA: The Cost Of Equity And Asset Pricing Models, May 2016, p15*. The authors then go on to propose an alternative, without suggesting anyone does this, of subtracting alpha (the adjustment) from the long-run average of actual returns. This, of course, is tantamount to simply using the CAPM and ignoring empirical evidence on low-beta bias.

²⁴ AER, 2017, *Draft Decision Multinet Gas Access arrangement 2018–2022: Attachment 3 – Rate of return, July 2017, p62*

where no corner of the literature suggests a negative bias and the scale of the bias found in most papers is sufficiently large that even a wide range of empirical test results would give the AER a more robust foundation than simply relying upon judgement alone, or on a theoretical rationale to ignore the issue.

To give the debate some kind of starting point, to our mind, the best approach we have seen in the Australian regulatory context is that undertaken by HoustonKemp for Multinet in its most recent proposal. It was rejected by the AER, but the AER did not point to any actual flaws in the analysis, instead rejecting it almost entirely for the fact that it was based on actual returns.²⁵ If actual returns are accepted, the approach becomes more viable as a starting point. We also note that, due largely to the deliberate approach of looking for minimal adjustments consistent with the data, the estimates HoustonKemp propose are much smaller than the average error of the CAPM shown in Table 2.

We make two final points in conclusion. Firstly, we are somewhat indifferent as to whether the AER continues to adjust for a low-beta bias by adjusting beta or whether they make an “alpha” adjustment. The net effect is the same, although we think the latter is more transparent.

Secondly, although we do not present a firm indication of how big we think the adjustment ought to be, save for noting the Multinet findings above, it is certainly the case that it is not zero, or negative. In fact, we suspect it is considerably larger than whatever adjustment the AER made in 2013 when it took into account the “theory of the Black CAPM” when choosing the top of what it considered a reasonable range. Given that beta has certainly risen since 2013, this further underscores the lack of any evidence that a beta allowance of 0.7, accommodating both the “best” estimate of beta and adjustments for a low-beta bias, could be too high in the current context.

The market risk premium

Although there was no firm and unanimous answer as to the most appropriate market risk premium for the AER to use, there was, in our minds, sufficient agreement for the AER to be able to draw some reasonable conclusions and to chart a way forward. There was agreement on the following points:

- Neither constant mean real market returns nor a constant market risk premium is correct; the truth lies somewhere in the middle.²⁶
- Estimates that use historical returns (which are backward looking) and the dividend growth model (which is forward-looking) both play a role.²⁷
- Experts appear to agree that historical returns should use long time periods (absent of concerns about potential structural breaks; which we suggest might be hard to uncover), and that the AER’s recent addition of a 17-year time horizon reflecting recent data is much too short.²⁸
- Experts appear to agree that the NERA work on historical returns is more robust than the BHM work the AER has previously used; a finding which is endorsed by the use of the former in the highly-regarded *Credit Suisse Global Investment Returns Yearbook*.²⁹
- There does not appear to be any concern with the AER’s form of the DGM, and the debate centres on one aspect of the DGM; long-term dividend growth rates.³⁰

²⁵ AER, 2017, *Draft Decision Multinet Gas Access arrangement 2018–2022: Attachment 3 – Rate of return*, July 2017, pp61-62.

²⁶ CEPA, 2018, *Expert Joint Report: Rate of Return Guideline Review – Facilitation of Concurrent Expert Evidence*, April 2018, available from <https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/review-of-rate-of-return-guideline/initiation>, p61.

²⁷ CEPA, 2018, *Expert Joint Report: Rate of Return Guideline Review – Facilitation of Concurrent Expert Evidence*, April 2018, available from <https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/review-of-rate-of-return-guideline/initiation>, p57.

²⁸ CEPA, 2018, *Expert Joint Report: Rate of Return Guideline Review – Facilitation of Concurrent Expert Evidence*, April 2018, available from <https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/review-of-rate-of-return-guideline/initiation>, pp58-60.

²⁹ CEPA, 2018, *Expert Joint Report: Rate of Return Guideline Review – Facilitation of Concurrent Expert Evidence*, April 2018, available from <https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/review-of-rate-of-return-guideline/initiation>, p59.

³⁰ CEPA, 2018, *Expert Joint Report: Rate of Return Guideline Review – Facilitation of Concurrent Expert Evidence*, April 2018, available from <https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/review-of-rate-of-return-guideline/initiation>, p60 and pp62-63.

- Experts appear to agree that the MRP should be fixed for the duration of the guideline, but subject to re-openers to deal with crisis events, and the AER should describe in some detail the circumstances which would warrant a re-opener.³¹

The major areas of disagreement appear to be as follows:

- The weight to put on the DGM.³²
- The role of the Wright assumption that the mean real return to the market is approximately constant through time, which some experts say should play a role in using historical returns to estimate the long-run MRP, and other experts disavow on the basis that it has no theoretical support, and no proven empirical support in the Australian context.³³
- The use of surveys, which most experts thought were unreliable but which some experts thought were useful in understanding expectations; even though they tend to provide very poor predictions.³⁴
- The use of arithmetic and geometric means when using historical returns to estimate the long-run MRP.³⁵

We believe this is actually a reasonably solid framework upon which the AER can base its determination of the market risk premium. In particular, the experts have given a good indication of the end points of the range that ought to be considered forward-looking returns at one end and historical returns (be they the historical MRP or the Wright approach) at the other. The experts have also provided some guidance as to how best to determine some of the models the AER uses, notably the historical MRP, and have clarified the real issues in others, such as the DGM.

What is left is a way to pragmatically sort through what really are a handful of relatively small issues and come up with an answer which is capable of being accepted by stakeholders.

Examining the points of differences from the bottom up, the first is the role of arithmetic versus geometric returns. It is unclear to us why this issue remains on the table as a proper understanding of the way in which the PTRM operates makes the answer obvious, and we suggest that, perhaps, some experts who are experts in finance, not in the minutiae of the particular regulatory model applied in Australia may not have adequately appreciated how the PTRM operates.

The PTRM determines a fair rate of return on the RAB one year at a time. It is the AER, however, that determines how the RAB should evolve from one year to the next. Since the evolution of the RAB is controlled by the AER and does not depend on the WACC, to all intents and purposes, the WACC is never compounded. At no stage are firms given the option of reinvesting at the WACC that the AER chooses; there is no dividend reinvestment. This implies that no weight should be placed on an estimate of the WACC that uses a geometric mean. This point has been made clear for some years now both by advisers to the regulated firms and by an adviser to the AER, but it is understandable if experts unfamiliar with this debate misunderstand the operation of the PTRM and its implications for WACC.

Thus, it is perfectly correct in a general sense to suggest that geometric returns are what investors receive.³⁶ That is, if one were to invest in a fund for five years and not make withdrawal during that time,

³¹ CEPA, 2018, Expert Joint Report: Rate of Return Guideline Review – Facilitation of Concurrent Expert Evidence, April 2018, available from <https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/review-of-rate-of-return-guideline/initiation>, p64.

³² CEPA, 2018, Expert Joint Report: Rate of Return Guideline Review – Facilitation of Concurrent Expert Evidence, April 2018, available from <https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/review-of-rate-of-return-guideline/initiation>, p60 and 62.

³³ CEPA, 2018, Expert Joint Report: Rate of Return Guideline Review – Facilitation of Concurrent Expert Evidence, April 2018, available from <https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/review-of-rate-of-return-guideline/initiation>, pp61-62

³⁴ CEPA, 2018, Expert Joint Report: Rate of Return Guideline Review – Facilitation of Concurrent Expert Evidence, April 2018, available from <https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/review-of-rate-of-return-guideline/initiation>, p63.

³⁵ CEPA, 2018, Expert Joint Report: Rate of Return Guideline Review – Facilitation of Concurrent Expert Evidence, April 2018, available from <https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/review-of-rate-of-return-guideline/initiation>, pp57-8.

³⁶ CEPA, 2018, Expert Joint Report: Rate of Return Guideline Review – Facilitation of Concurrent Expert Evidence, April 2018, available from <https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/review-of-rate-of-return-guideline/initiation>, p58.

it would be the geometric return which is relevant. However, if one withdrew all equity returns each year, it would be the arithmetic mean, and that is what the PTRM assumes. Likewise, investor time horizons may be longer than one year.³⁷ However, this again points to a view encapsulating re-investment; if investors with a multi-year time horizon anticipated taking their returns out of the fund each year (as the PTRM assumes) then it would be the average of those annual earnings which is calculated via an arithmetic mean, which is important to them. Finally, there may be potential for autocorrelation between years for market returns,³⁸ but if this an issue, and it is significant, then one should use this auto-correlation structure and not either the arithmetic or geometric mean, when determining the MRP estimate.³⁹

With this in mind, it is clear to us that there is no case for the use of geometric means, regardless of how they might be used in other contexts, because of the nature of the regulatory system we are using.

In respect of surveys, the main reason given by dissenters to the majority view appears to be that they might provide bad forecasts, but they are good for providing an overview of what the expectations of some investors are, given that it is expectations that investors act upon. This may be the case, although we would concur with the majority view that the AER would need to be very careful in how it uses survey evidence, and in particular whether the MRP estimate in the survey is consistent with the other elements of the return on equity that the AER is actually using.

In respect of the Wright method, we would agree with experts that it does not represent how the market operates; we do not think that expectations of real market returns are constant either. However, this is somewhat irrelevant because none of the experts think that the assumption of a constant or near constant (given the length of time series) market risk premium is realistic either. This, however, has not prevented the use of the assumption. We would suggest that placing some weight on the assumption of a constant MRP and some weight on the assumption of a constant mean real return to the market could form a useful input to forming one bound of the MRP estimate, with suitable forward-looking information forming the other.

This brings us to the question of the DGM and two intertwined issues; how much relevance to accord it (no expert says it should be given zero weight) and how to determine its key assumption driven parameters. The two are intertwined because it is clear from the dissenting expert statements that it is practical difficulties in respect of these parameters that drives favouring a low weight, and not some in-principle aversion to the model.

This, in our mind, gives rise to a sensible and pragmatic approach to the use of the DGM. The main issue for experts appears to be the long-run growth rate for dividends. There are many different growth rates which might be used, and no clear answer has been delivered. However, some experts suggested a pragmatic way forwards, and that is to firstly establish whether there is a link between something for which independent and reasonably robust forecasts are available, like GDP growth and dividend growth, and then to use GDP forecasts to help forecast the long-term dividend growth rate.⁴⁰ This is discussed in Box 2, overleaf.

To our minds, a single DGM estimate is a better way of proceeding than re-estimating the AER's DGM model with every long-run dividend growth model a Google-search can uncover; torturing data many different ways often doesn't reveal much that is useful and can give rise to wide and rather meaningless ranges for the MRP estimate which do not really reflect the relative quality of the different models.⁴¹ We believe it is

³⁷ *Ibid.*

³⁸ *Ibid.*

³⁹ *However, we are not aware that serial correlation in annual market returns is sufficiently high that accounting for it in the MRP estimate would represent an improvement. This case would need to be made.*

⁴⁰ *CEPA, 2018, Expert Joint Report: Rate of Return Guideline Review – Facilitation of Concurrent Expert Evidence, April 2018, available from <https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/review-of-rate-of-return-guideline/initiation>, p62.*

⁴¹ *For example, in its issues paper, the AER includes a construction of the DGM using an assumption by Damodaran which uses the long-run risk-free rate as the long-run dividend growth rate, and a DGM attributed to Fenebris which subtracts two percentage points from this forecast (see p 19 of the MRP paper). There are not appropriate measures because, to our knowledge, neither has undergone any kind of peer-reviewed process. By contrast, the AER has previously rejected DGM models developed by Frontier which have been through a peer review process and have been published in the academic literature. Using the former and not the latter would not represent balanced treatment of evidence.*

better to establish one defensible and robust way of determining the DGM, and then activate the lack of confidence the measure may or may not have given its general level of robustness, or given particular economic conditions when the estimate was made by altering the weight given to that estimate.

Box 2: Using GDP forecasts in the DGM

NERA shows in a 2012 report that real growth in dividends per share (DPS) and real growth in gross domestic product (GDP) are closely linked.⁴² NERA finds, using data from 1981 to 2011, that there is a significant positive relation between real DPS growth and current and lagged real GDP growth. The regression estimates that NERA provides indicate that when real GDP growth is expected to be high, real DPS is expected to be high and when real GDP growth is expected to be low, real DPS growth is expected to be low.

Over the 30 years from 1981 to 2011 real DPS growth, computed using the dividends thrown off by the All Ordinaries, was on average 3.07 per cent per annum while real GDP growth, computed using Australian Bureau of Statistics (ABS) data, was 3.24 per cent per annum. So the means of the two series were approximately equal over the 30-year period.

In light of this evidence, a reasonable way of forecasting real DPS growth would be to combine short-term analyst forecasts of real DPS growth – properly adjusted for any documented bias – with forecasts of real DPS growth that use the relation that one observes between real DPS growth and real GDP growth together with forecasts of long-term real GDP growth.

NERA estimates the relation between real DPS growth and real GDP growth to be:

$$DPS(t) = -17.29 + 3.25 \times GDP(t) + 3.11 \times GDP(t - 1) \tag{1}$$

where DPS(t) and GDP(t) are real DPS growth and real GDP growth from year t-1 to year t.

To see how one would use these regression estimates to forecast real DPS growth, assume, for the sake of argument, that long-term real GDP growth is forecast to be 3.25 per cent per annum. With this forecast and the NERA estimates, long-term real DPS growth in per cent per annum would be forecast to be:

$$-17.29 + 3.25 \times 3.25 + 3.11 \times 3.25 = 3.38 \tag{2}$$

Not surprisingly, this forecast is similar to mean past real DPS growth because this forecast suggests that real GDP growth will match, approximately, its historical mean. Different forecasts will obviously have different results. It is also possible that NERA’s analysis could be improved upon by using any co-integrating relation found to exist between the logarithms of DPS and GDP

In the current context, for example, one would have one historical MRP estimate formed by either or both the historical average MRP (NERA approach) and/or the Wright approach that would form one bound for the MRP estimate in the Guidelines, and one would have one forward-looking estimate formed by the single DGM estimate outlined above. Then the AER would choose a point between the two based on the relative confidence it had in each. A-priori, it would be expected that each would have equal weight, and the AER would therefore provide detailed reasoning as to why it had moved away from this mid-point, linking specific reasons with specific adjustments and potentially ranking them in order create consistency between the scale of the perceived evidence for adjustment and the actual adjustment made. The conditioning variables the AER has used in the past may play a role in providing this information; though we do not have the benefit of the views of experts in a concurrent session as to how valuable those conditioning variables are.⁴³

⁴² NERA, 2012, *Prevailing Conditions and the Market Risk Premium, March 2012*, available from: <https://www.aer.gov.au/system/files/APA%20GasNet%20-%20G-5%20NERA%20%20Prevailing%20Conditions%20and%20the%20Market%20Risk%20Premium%20March%202012.pdf>

⁴³ AER, 2018, *Market Risk Premium, Risk Free Rate Averaging Period and Automatic Application of the Rate of Return: Discussion paper, March 2018*, pp29-31.

3. RETURN ON DEBT AND GEARING

In this section, we discuss two relatively uncontroversial issues where only limited change from the 2013 guidelines is required; the cost of debt and gearing. We note in doing so that the AER is soon to release a separate cost of debt issues paper, with a particular focus on the use of different debt indices and a summary of its work on the actual cost of debt of businesses. We will be submitting separately on this paper, and thus focus our comments here only on issues pertaining to the cost of debt during the concurrent expert sessions.

Cost of debt

The only issue raised in respect of the cost of debt during the concurrent expert sessions was the question of the trailing average cost of debt. On this topic, the experts were almost unanimous, noting:⁴⁴

- It is consistent with the way a benchmark efficient firm would finance its debt.
- Returning now, so soon after the 2013 Guidelines would raise regulatory risk and reduce the stability of and confidence in the regulatory system.
- The AER has not signalled that changing the trailing average cost of debt is part of this incremental review.

We understand that other stakeholders, like us, do not support a change to the trailing average approach, and on this basis we would consider that maintaining this approach is non-controversial.

Gearing

The conclusions of the concurrent expert sessions in respect of gearing are clear; gearing should be based upon a long-run average of the market value of (gross) debt, unadjusted for the (very small) value of unregulated activities, and that the current value of 60 percent is appropriate. This is also supported by the AER's own evidence.

The expert views appear to comprehensively support the status quo in respect of how the AER examines gearing and should provide sufficient. We recommend that the AER takes this as an endorsement of its current approaches and, given the incremental nature of this review.

⁴⁴ CEPA, 2018, *Expert Joint Report: Rate of Return Guideline Review – Facilitation of Concurrent Expert Evidence, April 2018*, available from <https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/review-of-rate-of-return-guideline/initiation>, p81.

4. GAMMA

The discussion on gamma below proceeds under the context of our decision, along with other stakeholders, to accept the AER's preferred approach of defining value of imputation credits to be on the basis of utilisation rather than market value. This definition has been determined to be open to the AER in recent Federal Court decisions, and we do not consider it in the interest of customers to re-open this debate, noting that at a principle level market value is the most appropriate value to be used.

In this context, and the debate amongst experts, it is useful to commence with the views of the AER's expert, Lally, who notes:⁴⁵

Even the ACT (2016, para 1010) implicitly recognizes that "value" could mean "numerical level" because it defines the distribution rate by using the word "value", by which they must mean the "numerical level" of this parameter because market value has no application here. Furthermore, the NER is not the arbiter on this matter. Nor is the ACT, despite submissions to that effect (United Energy, 2016). Instead, one must look to the relevant academic literature.

AGPA does not endorse Lally's view that the academic literature has precedence over the law of the land, but Lally's view is apposite because a great deal of the discussion on gamma in the concurrent expert sessions focussed on its theoretical basis. Here, the only point on which the experts did agree is that the AER's approach on the question of value, and thus the way in which it proceeds to estimate gamma has no basis at all in any model that could be used to derive parameters in a way that is consistent with that model, and thus we are restricted to estimating gamma as a utilisation rate because that is how the AER has defined it.⁴⁶ Thus, in the context of Lally's quote above, if we look to the relevant academic literature, we will find nothing that could assist us, in a principled manner, to determine the value of gamma.

This has important consequences for how we approach the task of estimating gamma. In particular, since the AER's chosen approach has no grounding in the academic literature, the debate is not one of principle about what number is somehow "right", as might be argued in, say, the return on equity which does have such a grounding. Rather the debate is about finding the least bad pragmatic compromise amongst the data sources which are available that produces a number which is capable of being accepted by stakeholders.

It is with this context in mind that we make our points below. To begin with the obvious, in order to estimate gamma, the AER needs to make (at most) two estimates; of the utilisation rate and of the distribution rate, with the former being an "economy-wide" number and the latter being "firm specific". In order to do so, it has three sources of data available to it; equity ownership share data from the ABS (used only for theta), tax statistics data (for both theta and distribution rates) and an estimate by Lally of distribution rates for a particular subset of firms (used only for distribution rates).

In respect of the estimates which need to be made, we agree with the experts that theta is an economy-wide measure and the distribution rate is firm specific and based on dividend distribution practice identified with the benchmark efficient entity. If the AER proceeds down this route, it should be explicit in exactly how it is representing the benchmark efficient entity when it determines the distribution rate estimate. However, the pragmatic approach we propose below makes this issue, as well as the separation of distribution rates and theta somewhat less immediate.

Turning to data sources, and in particular equity ownership share data from the ABS. We agree with the consensus expert view, expressed by Stephen Gray and echoed by Martin Lally (with a more positive spin) that the equity ownership share data are useful primarily because of the way in which the AER has chosen

⁴⁵ Lally, M, 2016, *Gamma and the ACT decision*, 23 May 2016, p 8, and see also p 11 (2nd paragraph).

⁴⁶ CEPA, 2018, *Expert Joint Report: Rate of Return Guideline Review – Facilitation of Concurrent Expert Evidence*, April 2018, available from <https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/review-of-rate-of-return-guideline/initiation>, p69-71

to define gamma.⁴⁷ Partington suggests that equity ownership values may be biased downwards because of an implicit assumption that the value of credits to foreign shareholders might not be zero, but this is not supported by any evidence that could inform our views on this issue.⁴⁸ Acceptance of an unsupported assertion would represent unbalanced treatment of evidence because the AER has rejected evidence provided by businesses in respect to reasons (the 45-day rule, for example) why domestic investors might value a dollar of imputation credits at less than a dollar. This is discussed further in Section 5 below.

We do agree, however, with Partington's suggestion that it would be useful to obtain more information about the precision of the ABS estimates.⁴⁹ We also agree with the un-named expert who suggested that:⁵⁰

There are concerns about the reliability of the equity ownership data in that it is based on surveys, it is highly aggregated, and various filters and refinements must be applied.

We find it somewhat perplexing that so much effort has been expended by the AER in assessing data from the Australian Tax Office, but the flaws associated with the ABS data, and acknowledged by the ABS itself appear to have been overlooked.⁵¹ For the purpose of a balanced treatment of evidence, it would be very useful for further clarity to be sought on this issue, and for the AER to make the results of this analysis public, just as it did with the ATO data request recently.⁵²

Thus, whilst we are prepared to accept that equity ownership shares can play a role, we are not satisfied, just as the AER's experts were not satisfied, that sufficient work has been undertaken to ensure they are fit for purpose.

A similar issue exists in respect of the distribution rate data provided by Martin Lally, in respect of the top 20 firms. Work like this is vital if we are to understand what the distribution rate for the benchmark efficient entity is. However, we echo the concerns raised by other experts that:⁵³

- Many of the top 20 firms have a large amount of foreign income which is not part of the definition of the benchmark efficient entity. We note that Martin Lally himself, shares the view that foreign income needs to be properly controlled for.
- There appear to be some technical issues in the data itself (two are mentioned). This raises the issue of a need for further review of the analysis.

Using Lally's work as a starting point, there would seem to be merit in collecting a set of firms which are representative of the benchmark efficient entity, and we concur with the experts' views that this should not be a survey of the population, which would be far more costly than the value from the data would merit, but should rather be some form of sample from firms with appropriate characteristics. This would, obviously, be subject to a peer review from other experts to ensure robustness.

⁴⁷ CEPA, 2018, Expert Joint Report: Rate of Return Guideline Review – Facilitation of Concurrent Expert Evidence, April 2018, available from <https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/review-of-rate-of-return-guideline/initiation>, pp75-76

⁴⁸ CEPA, 2018, Expert Joint Report: Rate of Return Guideline Review – Facilitation of Concurrent Expert Evidence, April 2018, available from <https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/review-of-rate-of-return-guideline/initiation>, p75. We note, however, that, if it were the case that foreign investors did value imputation credits at more than zero then, by mathematical necessity, the bias would be as Partington suggests. Our objection is to the assumption that foreigners might so value imputation credits.

⁴⁹ CEPA, 2018, Expert Joint Report: Rate of Return Guideline Review – Facilitation of Concurrent Expert Evidence, April 2018, available from <https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/review-of-rate-of-return-guideline/initiation>, p75.

⁵⁰ Ibid

⁵¹ The original issues associated with the data and raised by the ABS (see <http://www.abs.gov.au/AUSSTATS/abs@.nsf/Previousproducts/5306.0Feature%20Article150Jun%201992?opendocument&tabname=Summary&>) do not appear to have been remedied, but since 2013, the ABS appears to have undertaken significant revisions of historical data, including back-casting results which would reduce the volatility of the measure and may serve to cloud issues. We consider it apposite to ask more questions of the ABS pertaining to these data to understand if they are fit for the purpose to which the AER proposes to put them; namely the estimation of gamma.

⁵² <https://www.aer.gov.au/system/files/AER%20-%20Staff%20note%20on%20tax%20data%20-%20March%202018.pdf>.

⁵³ CEPA, 2018, Expert Joint Report: Rate of Return Guideline Review – Facilitation of Concurrent Expert Evidence, April 2018, available from <https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/review-of-rate-of-return-guideline/initiation>, pp76-7

We turn at last to the taxation statistics data, and a pragmatic suggestion for their more central use in determining gamma. To begin, we share the AER's (and experts') concern in respect of potential quality issues, and believe the AER was right to seek clarification on several issues. The issue is one of the ATO's response, which noted some problems but did not undertake to explain the scale of the problem. We endorse the call of the experts for the AER to approach the ATO for more clarity on the scale of the problems.⁵⁴ It is vital that the AER do this from the perspective of fair treatment of evidence; the AER has determined that the 45-day rule does not have an appreciable impact on the use of equity ownership shares without really establishing how prevalent the effects of this rule are and, were it to exclude tax statistics data without assessing how large the problems associated with it are, then it would be engaging in unbalanced treatment of evidence, as we discuss in Section 5 below.

If evidence from the ATO suggest that the problems with the data are relatively small, then we think that most of the experts' problems with ATO data would fall away. This then opens up a pragmatic approach to the estimation of gamma using tax statistics for a "one-step" estimation of gamma for a firm with an average distribution rate and then adjusting the resultant gamma estimate if the AER thinks the benchmark efficient entity has something other than an average distribution rate; say following an assessment based on extending Lally's 20-firms analysis discussed above. This was suggested by Simon Wheatley in the expert sessions, and we describe his approach in more detail in the box overleaf.⁵⁵

⁵⁴ CEPA, 2018, *Expert Joint Report: Rate of Return Guideline Review – Facilitation of Concurrent Expert Evidence, April 2018*, available from <https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/review-of-rate-of-return-guideline/initiation>, p73

⁵⁵ CEPA, 2018, *Expert Joint Report: Rate of Return Guideline Review – Facilitation of Concurrent Expert Evidence, April 2018*, available from <https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/review-of-rate-of-return-guideline/initiation>, p74-75

Box 3: A pragmatic approach to estimating gamma using tax statistics

A natural place to search for information about the rates at which credits are created and redeemed is the Australian Taxation Office (ATO). It is reasonable to expect that the ATO will know what corporation tax has been paid and so how many credits have been created and that the ATO will also know how many credits have been redeemed. The ratio of credits redeemed to credits created, drawn from the data that the ATO provides, should provide a reliable estimate of the rate at which credits created are redeemed for the economy as a whole. Although this rate may differ from the rate at which credits created by a benchmark entity are redeemed, it will nevertheless represent a sensible first estimate of the rate at which credits created by a benchmark entity are redeemed.

There are, as one would expect, a number of adjustments that one must make in using the data that the ATO provide to estimate the rate at which credits created are redeemed for the economy as a whole. The ATO refers to two adjustments that one must make in its recent response to some AER enquiries.⁵⁶ The first of these involves a recognition that net tax does not represent tax payable. The ATO has in the past made it clear that these two quantities differ and both NERA and Frontier in 2015 and 2016 reports make the necessary adjustments to net tax.⁵⁷ The second of these involves accounting for non-resident companies paying company tax which does not generate franking credits. The ATO's response states that this second adjustment 'may appear to be small at first glance' and Company Table 1A of the ATO's Taxation Statistics 2014-15 supports this preliminary assessment. In the tax year 2014-15, 911,321 resident companies filed, 1,640 non-resident companies with no permanent establishment filed and 989 non-resident companies with a permanent establishment filed. Further correspondence with the ATO will surely reveal whether this second issue is indeed as trivial as it appears at first glance.

To make use of the tax statistics information in a pragmatic fashion that can allow for different distribution rates than the average which is embedded in the estimation of gamma via a "one-step" approach using this data,⁵⁸ one needs the following information:

- The economy-wide gamma provided by Hathaway. In 2013, this was 0.3.
- Estimates of an average distribution rate for the economy as a whole provided by Hathaway based on tax statistics data. He has provided two numbers, 0.49 and 0.69, and professes no preference for either, and we thus take an average in this worked example, of 0.59.
- The benchmark entity distribution rate. This has yet to be determined, but for the sake of argument assume that this is 0.83 as Lally has done in the past.⁵⁹

An adjusted or benchmark gamma will be:

$$\text{economy wide gamma} \times \frac{\text{benchmark firm specific distribution rate}}{\text{economy wide distribution rate}}$$

With the numbers in our worked example:

$$0.3 \times \frac{0.83}{0.59} = 0.42$$

Obviously, different input numbers give different results, but the approach, we think, gives a simple and pragmatic way to deal with the issue of the benchmark distribution rate differing, potentially, from an economy-wide average which the AER has suggested as one reason why, even without concerns about errors in the data, the tax statistics information cannot be used in a simple fashion.

⁵⁶ AER, Note on ATO staff response to AER staff inquiries about Hathaway's 2013 report on imputation credit redemption, March 2018.

⁵⁷ Frontier, 2016, The Appropriate Use of Tax Statistics When Estimating Gamma, January 2016, NERA, 2015, Estimating Distribution and Redemption Rates from Taxation Statistics, March 2015.

⁵⁸ See p2 of Hathaway's letter to the AER, available from <https://www.aer.gov.au/system/files/Energy%20Networks%20Association%20-%20submission%20on%20rate%20of%20return%20issues%20paper%20-%2012%20December%202017%20-%20Attachment%20C%20-%20Letter%20-%20Dr%20Neville%20Hathaway%20-%20Tax%20Statistics.pdf>

⁵⁹ We are obviously not, in this worked example, endorsing Lally's number. As we clearly note in the main text, we believe this estimate requires further review.

5. REGULATORY PROCESS AND JUDGEMENT

There are five key issues in respect of process by which the AER develops its Guidelines and administers them that we wish to highlight. Some of these have been addressed to some degree by the experts in the concurrent session. They are:

- Transparency and the use of judgement.
- Treatment of disparate evidence.
- RAB multiples and ex-post measures of profitability as a cross check.
- Risk and reward in regulation.
- Binding guidelines and re-opening

Transparency and the use of judgement

One of the key issues in response to the last Guidelines is a view amongst stakeholders about the need for an improvement in transparency in respect of how the AER uses its judgement; in particular, how it gets from inputs to outputs. This has been raised by experts,⁶⁰ and also by both consumer and business stakeholders.

What is missing, however, is clear advice on how the AER might provide greater transparency. To answer this, it may be useful for the AER to tap into a different area of expertise than it has used to date. The AER is far from unique in needing to develop reasonable forecasts of appropriate rates of return. The day-to-day business of a financial analyst, for example, is producing forecasts of likely rates of return,⁶¹ using a variety of information sources. Part of the ethics training for the Chartered Financial Analyst exam involves the preparation of suitable policies and procedures to govern the writing of research reports within an investment analyst firm, where the requirement is to:⁶²

Establish a policy requiring that research reports, credit ratings and investment recommendations have a basis that can be substantiated as reasonable and adequate....

This appears very similar to the sort of goal a transparent AER approach might have, and the underlying topic is broadly the same. It may therefore be apposite for the AER to seek expertise from within equity analyst companies employing CFA Charterholders, and to ask them for advice on how to create a transparent description of the approach being taken.

Another measure which might assist in improving transparency which does have regulatory precedent is the approach followed by the NZCC and outlined briefly by Martin Lally in the concurrent expert sessions. From Lally's discussion, we understand that uncertainty around parameter estimates from the various sources is used to create a statistical distribution (not a range, as with the AER's best estimates say, but a statistical distribution whose parameters and derivation are transparent) and then the joint probability distribution for the relevant estimate is mathematically derived in a standard way. Finally, the NZCC chooses a point on the distribution based upon qualitative judgement.⁶³ The process does not need to be followed exactly. For example, we understand the NZCC creates a distribution in this way for the WACC, whereas it might be appropriate to do so just for equity in the Australian context, since the approach to the cost of debt is fairly settled. Moreover, we understand that the primary piece of qualitative judgement the NZCC uses is to consider the consequences of over and under-estimating the WACC, and we accept the fact that the AER does not use that judgement, and that some stakeholders do not want them to.

⁶⁰ CEPA, 2018, Expert Joint Report: Rate of Return Guideline Review – Facilitation of Concurrent Expert Evidence, April 2018, available from <https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/review-of-rate-of-return-guideline/initiation>, p21

⁶¹ We accept that a likely rate of return is different from an allowed rate of return, but the basic process of assembling information to produce a result is the same; indeed it must be if the AER is in fact attempting to provide as an allowed return, a number which would prevail as the efficient expected return in financial market as per the ARORO.

⁶² CFA Institute, 2018, CFA Level Programme Curriculum Level III, Volume 1: Ethical and Professional Standards, p130

⁶³ CEPA, 2018, Expert Joint Report: Rate of Return Guideline Review – Facilitation of Concurrent Expert Evidence, April 2018, available from <https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/review-of-rate-of-return-guideline/initiation>, p82

Our interest is more in the idea, because it entails using judgement just once, at the end of the assessment process. This makes it easier for stakeholders to see how judgement was used, and what effect its use has had on the overall outcome of the regulatory decision. We recognise that the approach potentially involves more than an incremental change from the status quo, but there may be merit in engaging with experts and other stakeholders to ascertain whether there is scope for similar approaches in Australia, and how they might operate. Even if this is a topic for future Guideline reviews.

Treatment of disparate evidence

A key element of transparency for stakeholders is the treatment of evidence; stakeholders need to see that evidence which might lead to different conclusions is treated equally and symmetrically to evidence which eventually underpins an AER decision. We consider this to have three elements:

- Evidence required to move away from an existing position needs to be treated similarly to the evidence that established the position in the first instance.
- Evidence used to settle on one side of a debate needs to be treated similarly to evidence which was ultimately not found to be compelling and which supported another side of the debate.
- Evidence needs to be treated similarly across different parameter estimates.

In respect of the first item, consider the range of 0.4 to 0.7 for beta. This was first established in 2009 by taking a collection of mean estimates of beta, constructing a histogram and then using judgement to form a range based on where most of the estimates lay.⁶⁴ This may have been fit for purpose at the time, but it was not a particularly statistically sophisticated approach; it did not, for example, make any use of confidence intervals or any other means of showing the precision of each mean estimate of beta. In the 2013 Guidelines, the work of Henry showed a different range, but the AER used its judgement to suggest that this was not sufficiently different to the existing range to warrant a change. In subsequent decisions, the AER went further, suggesting it might only change if evidence was provided that showed a statistically significant difference from the 2009 range.⁶⁵ Given the noise in finance data, and the fact that the range has no statistical grounding in the first instance, this is a practical impossibility. Moreover, it points to a significantly higher barrier in respect of evidence to change from an existing number than was used to get the number in the first instance. Such examples of differential treatment of evidence through time serve only to suggest to stakeholders that particular numbers are being entrenched by a kind of “regulatory precedent” which undermines confidence that relevant market information is capable of playing a role in the determination of the allowed rate of return.

In respect of the second point, consider either the discussion on the Damodaran vs Frontier DGM estimates, or on the potential value of imputation credits to domestic and foreign investors discussed in sections above. We note that neither of these differential treatments has been incorporated into a decision by the AER yet, but the former was suggested in the issues paper and the latter by one of the AER’s advisors. Were either of these pieces of evidence to be used by the AER, one would have a situation whereby evidence that was less favourable to a given outcome was treated differently (in fact more strictly) than evidence that was more favourable. This is not balanced, and creates the danger that stakeholders may come to think the AER is fitting evidence to outcomes, rather than the converse.

The final point refers to different treatment of evidence across parameter estimates; if the evidentiary standard for beta is different, say, to that for gamma or the MRP. Not all data will be of the same quality, but the AER must exercise particular care to ensure that all parts of its decision are held to the same high evidentiary standard, lest stakeholders believe that certain aspects of the decision are somehow pre-ordained.

⁶⁴ See AER, E2009, *Electricity Transmission and Distribution Network Service Providers: Review of the weighted average cost of capital (WACC) parameters*, May 2009, pp320-26. The reference includes a histogram, which makes it clear that 66 observations is indeed the majority of the sample. It does not appear, however, that the AER has used formal confidence intervals; it states that it has not on p87 of the 2013 Guidelines Explanatory Statement.

⁶⁵ AER, 2017, *Draft Decision Multinet Gas Access arrangement 2018–2022: Attachment 3 – Rate of return*, July 2017, p80. See also Partington G and Satchell S, 2017, *Report to the AER: Discussion of submissions on the cost of equity*, June 2017, pp43-4, which appears to be where the AER has drawn its conclusions from.

RAB multiples and ex-post measures of profitability

The use of ex-post profitability and RAB multiple measures was widely discussed in the concurrent expert sessions, and both have been particularly important for consumer groups. Like the majority of experts, we agree that these measures can play an important role ex-post in monitoring outcomes, but that they can play little role in setting allowed rates of return ex-ante.⁶⁶ This is an important distinction; if the AER sets an allowed WACC of seven percent and a firm actually earns nine percent, this is important information, but it does not, and cannot, imply that the AER ought to then reduce the allowed rate of return next time around by two percentage points to “recapture” the additional earnings.⁶⁷

Like the majority view of experts, we believe that the AER needs to be very careful about what information it uses and how it is interpreted. For example:

- If a firm self-insures for bushfire risk as a one in 10-year event and the bushfire does not occur in a given year, this does not mean that profits have been excessive.
- There are issues with interpreting ex-post profitability numbers unless the exact measure used ex-post is included in the AA decision to ensure the comparison is one of apples with apples.
- The RIN accounting framework is a long way from being world’s best practice (consider, for example, the Uniform System of Accounts collected by FERC in the US⁶⁸) and being capable of giving consistent, robust results across companies. It would be prudent for the AER to improve RIN data accounts first, before the data are extensively used for anything.
- If RAB multiple data are to be used, Biggar has provided a very good checklist to ensure that the conditions which would mean that a RAB multiple of one was an appropriate expectation have in fact been met.⁶⁹ It should be incumbent on the AER, or anyone else, to put this to a stringent, transparent test before considering these data in any assessment.

An over-riding concern, however, is how the data are to be used. Just as consumers are clearly animated by a fear that they will not be used at all (which is not our recommendation), business is animated by a fear of the unknown in respect of how they might be used; if the AER sets an allowed WACC of seven percent and the firm earns 20, what happens? The AER has provided no clarity on this, and that clarity is an important component of the debate going forward.

The issue is important because of what has happened in the UK. There, OfGEM decided based on ex-post analysis of data that the regulated firms had earned too much, and so it wrote to them asking them to return some of these “excess” profits. Some did, and some did not, even after, in an almost Ayn Randian parody, the regulator wrote a letter to the Times on the issue. For the next RIIO process, we understand that OfGEM is considering seeking an ability to use its discretion ex-post to extract from firms profits that it deems excessive. Although it is unclear how this system is supposed to work, we hope that the AER can appreciate why businesses and investors would be nervous about a lack of clarity in respect of how profitability information might be used ex-post in Australia with examples like this overseas.

Risk and reward in regulation

Within the context of the Foundation Model as it currently stands, it is clear that it is systematic risk, borne by equity holders, which is to be rewarded within the return on equity allowance (and credit risk for debt holders). However, the concurrent expert sessions made one thing very clear; the CAPM as a model can only be applied to expected cash-flows and such expectations are informed by the various non-systematic

⁶⁶ CEPA, 2018, *Expert Joint Report: Rate of Return Guideline Review – Facilitation of Concurrent Expert Evidence*, April 2018, available from <https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/review-of-rate-of-return-guideline/initiation>, pp35-37.

⁶⁷ *With the obvious caveat that, if the extra earnings came from improved operational or capital efficiencies, these should be passed on to consumers as per standard benefit sharing schemes; this is how incentive regulation is supposed to work.*

⁶⁸ See <https://www.ferc.gov/enforcement/acct-matts/usofa.asp>.

⁶⁹ See Biggar, D, 2018, *Understanding the Role of RAB Multiples in the Regulatory Process*, available from: <https://www.aer.gov.au/system/files/AER%20-%202018%20RoR%20Guideline%20Review%20-%20The%20Role%20of%20RAB%20Multiples%20in%20Regulatory%20Process.pdf>

risks which a given pipeline faces.⁷⁰ Such non-systematic risks need to be accounted for somewhere, and they can have both an upside (demand increasing for price-capped pipelines) or downside (bushfire risk) elements.

The enumeration of non-systematic risks is not, strictly-speaking, in scope for this review. However, they are important for both it and the concomitant profitability review (see the above example on self-insurance for bushfire risk), and they need to be addressed somewhere outside piecemeal assessment as part of each AA review when businesses or consumers put the risks up. It would be useful, in other words, for the AER to develop a framework or a guideline to inform stakeholders how it plans on dealing with non-systematic risks, and for this to be debated in a transparent fashion. This way we can approach the issue in a more systematic fashion, which is important given that some non-systematic risks, such as asset stranding, are clearly very large emerging issues which will require more clarity than exists at present.

Binding guidelines and re-opening

This review is being undertaken in the shadow of forthcoming legislation which is likely to substantially increase both the power and responsibility of the AER, and to bind both it and stakeholders to what comes out of the current process for up to nine years (for a five-year AA decided at the end of the current guideline process). A binding guideline is a highly inflexible instrument, and nine years is a long way out to look when considering future economic conditions likely to affect stakeholders. For this reason, we consider that there must be some kind of re-opening mechanism.

We agree with experts, that any such re-opening mechanism must have a relatively high bar; otherwise the guidelines are not really binding on the AER. We also agree that the decision to re-open must be made by the AER, not the Energy Council or other parties who might be beholden to political pressures. Finally, we agree with experts that there needs to be some degree of clarity on the situations where the Guidelines would likely be re-opened, and how the AER would make a decision to re-open the Guidelines.⁷¹

We note, however, that the experts were in disagreement in respect of when and how the AER ought to re-open the Guidelines, beyond some relatively simple cases such as the cessation of the publication of certain data. This may be because the question was effectively an open one to the experts. In further discussions with experts, it may be more appropriate for the AER to propose some situations which it thinks would warrant a re-opening and an outline of how it might use its judgement in other situations more difficult to predict, and seek expert views on this proposal. If the AER asks for reasons, rather than just a vote, it may find that it gets a great deal out of its bad ideas in respect of re-opening; probably more than it gets from its good ideas. To the extent that there is time to do this in the current process, we would recommend the AER do so.

⁷⁰ CEPA, 2018, *Expert Joint Report: Rate of Return Guideline Review – Facilitation of Concurrent Expert Evidence, April 2018*, available from <https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/review-of-rate-of-return-guideline/initiation>, pp23-25.

⁷¹ CEPA, 2018, *Expert Joint Report: Rate of Return Guideline Review – Facilitation of Concurrent Expert Evidence, April 2018*, available from <https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/review-of-rate-of-return-guideline/initiation>, pp15-17

APPENDIX A: AN EXPECTED EQUILIBRIUM FRAMEWORK?

A more subtle version of the argument that expectation and actuals are different is the “expected equilibrium” framework which Partington and Satchell have exhorted that the AER follow.⁷² They suggest not merely at understanding expected returns, but at what investors might expect or require if they expect the market to be in equilibrium. The “framework” amounts effectively to an exhortation to ignore actual returns because they are not “expected equilibria” or in more simple terms to trust models (in which equilibria are defined) not data. There are, however, two problems with the proposed approach which preclude it forming a solid basis for regulatory practice under the foundation model approach.

Firstly, it is not clear that the AER in fact assumes that investors form equilibrium expectations; that they assume that markets will in fact be in equilibrium.⁷³ If it does not, then its experts advise it thus:⁷⁴

It is true that in general an equilibrium is assumed to exist in asset pricing models. However, in reality markets can have periods of disequilibrium and expectations are not always realised, even on average. Thus, when in forecasting mode, we are likely to be interested in models trying to forecast shocks to returns as well as their mean. Consequently, forecasting models can and do differ from asset pricing models.

The SLCAPM is a model of equilibrium returns where all relationships are contemporaneous. It thus gives the return that investors require as of a given date for the investments that are currently being made. That is not to say that the SLCAPM cannot be used for forecasting and it frequently is, but we need as an input what the excess returns on the market is expected to be in the next period. This is exogenous in the SLCAPM framework and so we have to resort to alternative procedures for estimating the excess return.

More simply; if the market is not in equilibrium, then the CAPM is not going to give you a very useful indication of expected returns and would need to be augmented with something which describes expected (non-equilibrium) excess (that is, to the CAPM) returns. The same report has, just prior to this quote, described long periods of disequilibrium.

One might argue that, even if an assumption of equilibrium is not made, provided any assumed disequilibrium is relatively small, the difference doesn’t matter much. However, it is not sufficient to assume that the CAPM might be “roughly right” even outside of its particular equilibrium. Roll and Ross have examined this question and find, to their consternation, that:⁷⁵

The almost pathological knife-edged nature of the expected return-beta OLS cross-sectional relation, even without measurement error, is a shaky base for modern finance. Surely the idea of a tradeoff between risk and expected return is valid and meaningful. Whatever model is eventually used to measure and apply that basic idea will have to be considerably more robust.

That is, the positive relation between expected return and beta that the CAPM predicts that one should find can evaporate when the market portfolio sits even a small distance inside of the efficient frontier along

⁷² See Partington G and Satchell, S, 2016, Report to the AER: Cost Of Equity Issues - 2016 Electricity And Gas Determinations, April 2016, Partington G and Satchell, S, 2016, Report to the ERA: The Cost Of Equity And Asset Pricing Models, May 2016, Partington G and Satchell, S, 2017, Report to the AER: Discussion of Submissions on the Cost of Equity, June 2017.

⁷³ See AER, 2017, Draft Decision Multinet Gas Access arrangement 2018–2022: Attachment 3 – Rate of return, July 2017, p65. Later (AER, 2017, Final Decision APA VTS Gas Access Arrangement 2018 to 2022: Attachment 3 – Rate of Return, p60) the AER suggested it was “clarifying” its position, but this clarification says nothing about equilibria; expected or otherwise.

⁷⁴ Partington G and Satchell, S, 2017, Report to the AER: Discussion of Submissions on the Cost of Equity, June 2017, p30

⁷⁵ Roll R and Ross SA, 1994, “On the Cross-Sectional Relation between Expected Returns and Betas”, Journal of Finance, 49(1), 101–21, p115. Immediately after the above quote, the authors note that the GLS cross-sectional relation does not have the same knife-edge property. Nevertheless, if the market portfolio is not mean-variance efficient, as will likely be the case if the market is not in equilibrium, then there will no longer be a linear relation between expected return and beta, regardless of whether the relation is positive. In other words, if the market is not in equilibrium, the prediction made by the CAPM about an asset’s expected return may not match the asset’s expected return.

which efficient portfolios of risky assets sit in expected return-standard deviation of return space; the CAPM will be wildly wrong.

The problem deepens still further in respect of determining beta. The AER notes:⁷⁶

In terms of the equity beta, our approach of empirically estimating beta using historical data is widely used both in practice and in academic work. The fact that realised returns can diverge from expected returns for a long period of time do not invalidate the equity beta data during that period. That is, it still measures the sensitivity of an asset or business's returns to movements in the overall market returns at a given period/time.

However, the second statement in no way follows from the first; the CAPM only provides sensible results in a situation of equilibrium, and thus any beta calculation only reflects systematic risk in the same equilibrium condition. If the AER believes (and can show investors believe) that the market will reach an equilibrium in the coming period, but that it has been out of equilibrium over the past few years, then the beta calculations it makes based on data from the out-of-equilibrium period will have no relevance for the coming equilibrium.

Thus, if the market is not expected to be in equilibrium, then the CAPM needs to be augmented, and if it is not assumed to have been in equilibrium in the past, then the beta estimates using actual market data will be wrong. This does not present a very happy situation for theory-based determination of return on equity allowances, and suggests the AER needs to step out from behind the models that are central to academic debate but less central in respect of the expectations of actual investors.

The AER might at least address the issue of needing to augment the CAPM if it did in fact adopt an "expected equilibrium framework", but even if it does assume that investors are forming expectations based on some perceived equilibrium, there is nothing to suggest that it is the equilibrium suggested by the CAPM. This is the second issue alluded to above.

The CAPM is not the only equilibrium model available; the Black CAPM is an equilibrium model, as is the ICAPM. Each is based on slightly different sets of assumptions about how markets operate. Since the 2013 Guidelines, a new equilibrium model has been developed by Hong and Sraer (2016) which adjusts the CAPM assumption of homogenous beliefs and replaces it with the possibility that some beliefs are heterogeneous; a relatively small change in assumption.⁷⁷ This produces a security market line which is much closer to that which is observed empirically using actual returns. Why would it be more appropriate, under an "expected equilibrium framework" to assume that investors all have the same beliefs rather than that some have different beliefs; particularly when the latter gives a much better approximation to how the world actually turns out, and the former has a systematic bias which has persisted for decades? This further underscores the need to step out from behind theoretical models as the sole determinant of regulatory outcomes.

Using expected returns?

We do not consider that the use of actual returns ought to be problematic in providing a more robust foundation for the determination of the quantum of low-beta bias which is reflected in the allowed rate of return. However, if the AER does require further information, or if is deemed necessary as a check on the relevant adjustment, then the AER could consider further the view of Partington in the expert report that:⁷⁸

⁷⁶ AER, 2017, Draft Decision Multinet Gas Access arrangement 2018–2022: Attachment 3 – Rate of return, July 2017, p65

⁷⁷ CEPA, 2018, Expert Joint Report: Rate of Return Guideline Review – Facilitation of Concurrent Expert Evidence, April 2018, available from <https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/review-of-rate-of-return-guideline/initiation>, p53. More detail on this model and its operation is provided in HoustonKemp, 2016, the Cost of Equity and the Low-Beta Bias: A report for Multinet, November 2016, available from: <https://www.aer.gov.au/networks-pipelines/determinations-access-arrangements/multinet-gas-access-arrangement-2018-22/proposal>

⁷⁸ CEPA, 2018, Expert Joint Report: Rate of Return Guideline Review – Facilitation of Concurrent Expert Evidence, April 2018, available from <https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/review-of-rate-of-return-guideline/initiation>, p63. The beginning part of this quote refers to a particular paper, and we acknowledge that the discussion was in reference to market returns, not expectations about individual stocks or portfolios.

...if you want to know what rate of return investors are thinking about and acting on then look at surveys. Surveys may not be a good forecast, but they do indicate what people expect.

We would concur with this to some extent, noting the problems other experts have noted with surveys. Moreover, we note that there is a particular type of survey which is regularly conducted and whose results have been shown in numerous papers in the literature to have a clear effect on investor actions, and that is surveys of analyst forecasts for the growth of stocks in the future.⁷⁹ In the US, Brav, Lehavy and Michaelley (2005) have used these analyst forecasts to test the CAPM using only data about expectations.⁸⁰

Similar work in the Australian context could assist in confirming or rejecting the quantum of bias found by using actual returns, and this could assist the AER in determining the adjustment for bias which it makes.⁸¹ This could also be discussed with experts if appropriate.

⁷⁹ See, for example, Brav A, and Lehavy R, 2003, "An Empirical Analysis of Analysts' Target Prices: Short-term Informativeness and Long-term Dynamics", *Journal of Finance* 58:1933-68, Asquith P, Mikhail MB, and Au AS, 2005, "Information Content of Equity Analyst Reports", *Journal of Financial Economics* 75:245-82. For the role of analysts more generally, see, for example, Ramnath, Rock, S and Shane, PB, 2006, "Financial Analysts' Forecasts and Stock Recommendations: A Review of the Research", *Foundations and Trends in Finance*, 2(4):311-421, who cite some 250 papers in 9 major journals on this topic between 1992 and 2005.

⁸⁰ Brav, A, Lehavy R and Michaely R, 2005, "Using Expectations to Test Asset Pricing Models", *Financial Management*, 34(3):31-64. See also Ang JA and Peterson DR 1985, "Return, Risk, and Yield: Evidence from Ex Ante Data," *Journal of Finance*, 40:537-48, Botosan CA and Plumlee MA 2005, "Assessing Alternative Proxies for the Expected Risk Premium," *Accounting Review*, 80:21-54, Shefrin H and Statman M, 2003, "The Style of Investor Expectations," *The Handbook of Equity Style Management*, Thomas Coggin and Frank Fabozzi, (ed), John Wiley & Sons, pp195-218, Easton P, 2009, "Estimating the Cost of Capital Implied by Market Prices and Accounting Data." *Foundations and Trends in Finance*. 2(4):241-364, Gebhardt WR, Lee CMC and Swaminathan B, 2001, "Toward an Implied Cost of Capital", *Journal of accounting Research*, 39:135-76, Guay WR, Kothari SP and Shu S, 2011, "Properties of Implied Cost of Capital Using Analysts' Forecasts", *Australian Journal of Management*, 36(2):pp125-149, Lee C, Ng D and Swaminathan B, 2009, "Testing International Asset Pricing Models Using Implied Cost of Capital", *Journal of Financial and Quantitative Analysis*, 44(2):pp307-35.

⁸¹ We are not aware of any Australian work which has been peer-reviewed and published in an academic journal, but one non-refereed paper which might provide insights is Partington G and Truong, G, 2007, *Alternative Estimates for the Cost of Equity Capital for Australian Firms*, 20th Australasian Finance and Banking Conference Paper, September 2007. The authors examine eight estimates of expected return and the relation between these estimates and estimates of beta are typically both economically and statistically insignificant while the intercepts in the regressions are typically both economically and statistically significant. That is, alpha actually explains returns better than beta (that is the CAPM) does.