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| Date: | 09 February 2018 |

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| To: | Craig deLaine |
| From: | Nick Wills-Johnson |
| SUBJECT: | Approaches to Return on Equity |

This memorandum attempts to provide a prediction of where the AER might head in its forthcoming Guidelines process, based upon what it has said in decisions since the last Guidelines in 2013. The decisions may have been “hold the line” type documents intended to keep the outcomes of the last Guidelines whole against criticism from businesses in each AA process, and the AER may intend to approach its reasoning afresh in these Guidelines. However, even if it does this, it cannot “un-say” what it has said in the relevant decisions and it may find it difficult to walk away from what it has said on the public record over the past four years. It is thus useful to revisit these decisions.

If the rhetoric of the decisions is reflected in the forthcoming guidelines, then this is problematic for us, because the decisions have generally upped the ante in respect of increasing the amount of judgement being exercised, decreasing the amount of transparency used in exercising that judgement and seeking to limit any of the “upside arguments” which might have been given some airplay back in 2013. They have also increased the evidentiary burden for moving away from entrenched positions; the AER could never have reached the positions it now holds if they were subject to the level of evidentiary requirements it now requires to move away from them.

I also include a review of approaches taken by the ERA, the regulator with which I am most familiar outside the AER, as the ERA has been somewhat more transparent that the AER in several key areas, leading to better outcomes for business.[[1]](#footnote-1) It would also be worthwhile assessing IPART, which I understand performs better than the ERA in this respect, but with which I am more familiar.

Finally, I close each sub-section below with a brief review of an “optimally transparent” approach, which makes better, more robust use of relevant information than the AER does and, in so doing, is likely to lead to better outcomes for business. Bringing some of these aspects of the discussion to the expert conclaves will be a key early task for the ENA.

To presage the findings of this memo, the AER will continue to use the SL-CAPM and their foundation model. This model has four elements; the risk-free rate, beta, the market risk premium (MRP) and the degree to which the “pure” or “textbook” model results do not reflect expected efficient costs in the marketplace and need to be adjusted. The risk-free rate appears to be relatively uncontroversial; we might see minor methodological changes like a longer averaging period, but it seems highly unlikely that it will be anything other than the ten-year government bond rate. For the remaining elements:

* **Beta:** The AER appears to be seeking to cement 0.7 as the number representing the ceiling value for beta. This is not a ceiling for the mean estimate of beta, with adjustments for the shortcomings of the model added to it, but rather a ceiling for beta after any adjustments for the shortcomings of the model (or the input data) have been accounted for under the AER’s “range and point on a range” approach.
* **MRP:** The AER appears to be aiming for a target suited to stable economic conditions of six percent, what it used prior to the GFC.
* **Low beta bias:** This is a casualty of rising empirical estimates of beta. The AER is aware that empirical estimates of beta have been rising. If it is to maintain 0.7 as the numerical ceiling, it needs to reduce the consideration it might give to factors like low beta bias which cause an adjustment upwards. There are two ways in which it can do this. The first is to “re-evaluate” the low beta bias issue from a different conceptual perspective, and Partington has provided just such a perspective. The second is to consider new “factors” which might cause it to lower its allowed return on equity. This would have the practical effect of getting the same outcome as ignoring low beta bias once the various factors cancel out, but with the benefit of not seeming to ignore evidence.

The net effect is an equity risk premium of 420 basis points. This might not seem like much of a drop from the present 455 basis points. However, the longer term effects are more profound. Beta is probably at its peak right now (which is why they might keep 0.7 as a beta allowance), but it will fall in future and with it our equity risk premium. Moreover, any falls will not be cushioned by (meaningful) consideration of issues like low beta bias.

Additionally, because of where empirical values are at present, the AER will need to utilise a lot of judgement to throw relevant information out on principle (like the DGM for the MRP) and to down-weight other information. This will cement in place a judgement-centric approach which the AER can later use in an essentially unrestricted fashion in future to create “analysis” which leads to the numerical outcomes it prefers. The decisions over the past four years provide ample evidence of the AER following exactly this path.

I now turn to each of the three dot-pointed issues above, and discus the relevant evidence in more detail. In each section, I have a sub-section on how the AER currently estimates the relevant parameter and its use of judgement, a sub-section on the ERA approach, and a short discussion on what an “optimally transparent” approach might mean.

Beta estimation

In this section, I focus just on the ways of estimating beta, rather than addressing low beta bias which is addressed in a separate section below.

This section touches only briefly on perhaps the key underlying issue in respect of beta estimation in recent times; the fact that the number of energy firms in the sample set has dwindled from 9 in 2013 to only three today (Spark, APA and Hastings). It is very difficult to obtain a robust estimate of beta from a sample set of only three firms, because measures for any single firm tend to be highly variable. Using a longer time series does introduce more firms, but at the cost that the final estimate from a firm which now no longer trades is “frozen in time” and lacks currency. Neither the AER nor ERA have suggested what they might do in response to this issue. However, both are alive to the issue in the forthcoming Guidelines.

AER approach

The AER’s approach to the estimation of beta last time around was ostensibly to rely upon the work of Henry (2014), and it is signalling that it intends to at least start at this point again based on the notes from Garth (email of December 19th), although it has recognised that there are issues with sample size. At the level of each individual regression run by Henry, the approach is very transparent; we can see exactly what Henry did and how he did it, and numerous consultants have subsequently replicated this approach.

However, at the level of what the AER did with the information from Henry, the approach suddenly becomes a lot less transparent. Essentially, what Henry does is a large number of regressions using different portfolios of the available energy firms. He then forms a range, using his judgement, which contains most of these estimates, and stretches from 0.3 to 0.8, and notes that the average for individual firms within this range is 0.52.[[2]](#footnote-2)

The AER do not use this information directly in their 2013 Guidelines, but instead maintain a range of 0.4 to 0.7 from an earlier study, noting that the results of Henry do not contradict this earlier range.[[3]](#footnote-3) The question then becomes how the range of 0.4 to 0.7 was derived in that earlier study. There is some discussion of this on page 87 of the Explanatory Statement to the 2013 Guidelines, and a table which references several studies. In Appendix C to the 2013 Guidelines,[[4]](#footnote-4) the AER notes that its 2009 review found a range of 0.4 to 0.7, and examining that document, it appears that it drew its conclusion about that range because 66 of the beta estimates considered fell in this range.[[5]](#footnote-5)

By the time of the 2013 Guidelines, the AER appears to have changed focus and begun asking itself not what the best range should be (the 2009 question), but whether or not new information should cause it to change its view.[[6]](#footnote-6) In subsequent decisions, the AER went further, suggesting it would only change if evidence was provided that showed a statistically significant difference from the 2009 range.[[7]](#footnote-7) 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. If the AER continues in this vein, the range of 0.4 to 0.7 will be unchangeable.

The actual choice of beta within this range is even more opaque. There is nothing at all in the Guidelines which details how the AER got from this range to a point estimate, save these quotes on p88 of the Explanatory Statement:

Under our approach, we adopt a point estimate for equity beta from the top of the empirical range. This is consistent with the point estimate proposed in our equity beta issues paper. We consider a point estimate from the top of the range to be consistent with alternative evidence international equity beta estimates and the theory behind the Black CAPM for the following reasons:

* Theoretically, under the Black CAPM, firms with an equity beta below 1.0 should have higher returns on equity than what the standard Sharpe–Lintner CAPM predicts. This is because, as a result of different starting assumptions, the Black CAPM predicts the slope of estimated returns will be flatter than for the standard Sharpe–Lintner CAPM. This information informs our proposal to select a point estimate at the top end of the 0.4–0.7 range of empirical estimates.
* We consider empirical estimates from a number of international energy networks across the US, UK and Europe, support a point estimate closer to the upper end of our range.

There is more detail in pages 83 to 88, which expands upon the two dot points above, and explains what evidence the AER has considered, but nothing to explain how it got from the range to the point estimate. In subsequent decisions, there has been nothing save repetitions of similar statements, buttressed by assertions that the AER has always been transparent. By “transparent”, the AER clearly means transparent in describing why it favours some information over other information, not transparent in how that information was used to derive outputs.

The basic point is that there is nothing in the AER’s 2013 Guidelines or subsequent decisions to indicate how the AER might choose a range or a point on a range this time around.

Based upon other evidence from the AER’s evolving rhetoric, however, it appears likely that the AER is seeking to cement 0.7 as the numerical upper bound for beta estimation, once all of the adjustments that attempt to capture the flaws in this model and/or data inputs have been accounted for. It is important to note that it is only by using judgement that the AER is able to cement in place this upper bound, as any examination of the empirical evidence, just of beta (I deal with the bias issue separately below) shows a clear rise in recent years.

To see this, note the changes that have occurred since 2013.[[8]](#footnote-8) The work by Henry in 2013, and the earlier work in 2009, used a large number of different regressions involving different portfolios and different periods of time. Although there was a lot of variation between estimates, there didn’t appear to be anything particularly systematic in the differences. This has, however, changed recently. Specifically, estimates of beta, using all portfolios the AER favours, have been much higher for five year estimates than they are for ten year or longer estimates.

This suggests that there has been a change in the marketplace. The formal way in which one tests for this is by using a structural break test; something which CEG did for Multinet. The AER has also apparently done some structural break tests, noting:[[9]](#footnote-9)

As an illustration, CEG found a break in 2009 during the Global Financial Crisis. A similar finding is noted in our 2017 update. This structural break could be explained by the effects of the GFC.

The AER also proposed, in the Multinet Draft Decision, a particular way of doing structural break tests in the future.[[10]](#footnote-10) However, despite its own evidence of structural breaks, potentially around 2009, the AER, the AER gave more weight to the longest available time series (which, coincidentally, gives the lowest beta estimates), noting that in respect of five-year beta estimates (given more weight by Multinet, and relied upon by the ERA):[[11]](#footnote-11)

Multinet also referred to the ERA's estimation to support a mean beta of 0.7. However, the ERA's estimation is based on a sample of four firms and a period of five years. We note that short term data is more prone to one-off events, fluctuations and volatilities in the market–which may obscure the ‘true’ equity beta for a benchmark efficient entity. Therefore, we have most regard to longer term estimates and a large sample of firms when determining the equity beta.

There is no reason, based on the AER’s own evidence, to adopt this position, save to keep beta down. We might expect similar reliance on longer time periods during these guidelines as the AER understand the effects of relying on this data.

Moreover, the AER went still further than just relying upon long time series, stating:[[12]](#footnote-12)

We have estimated five-year estimates as Henry has done (at the firm-level and portfolio-level) using data to 28 April 2017. The results (portfolio estimates: 0.54–0.57, firm estimates: 0.31–0.72) support Henry's range of 0.3–0.8 (and as a result our range of 0.4–0.7) and do not suggest an increase in equity beta.

This is an odd finding; both the ERA and CEG, using essentially the same data as the AER would have used, find significant increases in the five-year beta estimates over the same time period. Multinet asked for the AER’s results, and these were provided (they were not included with the Draft Decision). The 2017 five-year beta results, from the AER, are provided in the following tables.[[13]](#footnote-13)

Table : AER Individual Firms Scenario 3 - The most recent 5 years of data ending on 30 April 2017

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **AAN** | **AGL** | **APA** | **DUE** | **ENV** | **GAS** | **HDF** | **SKI** | **AST** |
| Start - After GFC |  |  | 4/05/12 | 4/05/12 |  |  |  | 4/05/12 | 4/05/12 |
| End |  |  | 28/04/17 | 28/04/17 |  |  |  | 28/04/17 | 28/04/17 |
| OLS Beta |  |  | 0.6689 | 0.3061 |  |  |  | 0.4762 | 0.7227 |
| LAD Beta |  |  | 0.6759 | 0.3821 |  |  |  | 0.5293 | 0.7252 |
| N |  |  | 261 | 261 |  |  |  | 261 | 261 |
| Gearing |  |  | 0.4527 | 0.6075 |  |  |  | 0.2679 | 0.5661 |
| W |  |  | 1.3684 | 0.9813 |  |  |  | 1.8303 | 1.0848 |
| OLS De-levered/Re-levered Beta |  |  | 0.9153 | 0.3004 |  |  |  | 0.8716 | 0.7840 |
| LAD De-levered/Re-levered Beta |  |  | 0.9249 | 0.3749 |  |  |  | 0.9688 | 0.7867 |

Table : AER Fixed Portfolio Weights Scenario 3 – The most recent 5 years

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Portfolio** | **P1** | **P2** | **P3** | **P4** | **P5** | **P6** |
| Firm | APA, ENV | AAN, AGL, APA, ENV, GAS | APA, DUE, ENV, HDF, AST | APA, DUE, ENV, HDF, SKI, AST | APA, DUE, ENV, SKI, AST | APA, DUE, SKI, AST |
| Start | 4/05/2012 |  |  |  | 4/05/2012 | 4/05/2012 |
| End | 28/04/2017 |  |  |  | 28/04/2017 | 28/04/2017 |
| OLS Beta | 0.6623 |  |  |  | 0.5356 | 0.5435 |
| LAD Beta | 0.6638 |  |  |  | 0.5841 | 0.6490 |
| N | 261 |  |  |  | 261 | 261 |
| Gearing | 0.4642 |  |  |  | 0.4739 | 0.4735 |
| W | 1.3396 |  |  |  | 1.3151 | 1.3162 |
| OLS De-levered/Re-levered Beta | 0.8872 |  |  |  | 0.7044 | 0.7154 |
| LAD De-levered/Re-levered Beta | 0.8892 |  |  |  | 0.7682 | 0.8542 |

Table : AER Variable Portfolio Weights Scenario 3 – The most recent 5 years

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Portfolio** | **P1** | **P2** | **P3** | **P4** | **P5** | **P6** |
| Firm | APA, ENV | AAN, AGL, APA, ENV, GAS | APA, DUE, ENV, HDF, AST | APA, DUE, ENV, HDF, SKI, AST | APA, DUE, ENV, SKI, AST | APA, DUE, SKI, AST |
| Start | 4/05/12 |  |  |  | 4/05/12 | 4/05/12 |
| End | 28/04/17 |  |  |  | 28/04/17 | 28/04/17 |
| OLS Beta | 0.6658 |  |  |  | 0.5707 | 0.5741 |
| LAD Beta | 0.6525 |  |  |  | 0.6386 | 0.6397 |
| N | 261 |  |  |  | 261 | 261 |
| Gearing | 0.4642 |  |  |  | 0.4739 | 0.4735 |
| W | 1.3396 |  |  |  | 1.3151 | 1.3162 |
| OLS De-levered/Re-levered Beta | 0.8919 |  |  |  | 0.7505 | 0.7556 |
| LAD De-levered/Re-levered Beta | 0.8741 |  |  |  | 0.8398 | 0.8420 |

The figures for “OLS Beta” and “LAD Beta” in the tables above are what is known as “raw betas”. That is, no accounting has been made for differences in leverage. Leverage matters for beta estimation because a firm with higher leverage, even if the asset faces the same risk as another, similar firm, will have a higher equity beta because more debt makes the cashflows to equity more volatile. It is entirely standard to adjust beta estimates from disparate firms to account for differences between the leverage of firms in the empirical dataset and the “target” leverage level (60 percent in our case). This is what was done in 2009 to give rise to the range of 0.4 to 0.7, it is what Henry did, and it is what the AER itself did in the tables above, as can be seen in the “De-levered/Relevered Beta” estimates above. However, it is not what was reported in the Multinet Draft Decision, where it appears the raw beta results were reported (though not attributed as such). This is not an apples with apples comparison to the Henry work.

We have seen some cover for a greater focus on raw beta estimates in expert reports from Partington, who has long advocated such an approach.[[14]](#footnote-14) This continues in recent reports with Satchell, and the most recent report from September 2017 contains a lengthy discussion on the merits of raw versus leveraged beta estimates and the problems associated with leverage adjustment.[[15]](#footnote-15) The AER may take up this work, using its judgement to mix together raw and re-levered betas (or to ignore re-levered betas altogether because of the “problems” Partington has raised) and thus assist in keeping beta down to a level where an adjustment upward for the flaws of the CAPM still doesn’t breach the ceiling of 0.7.

Box : Beta and inflation

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| The recent inflation review concluded in its final report that:[[16]](#footnote-16)  *The equity beta calculated for the benchmark efficient entity (BEE) (part of the return on equity) is based on equity returns of Australian energy utility firms we consider reasonably comparable to the BEE. We will consider historical share market data for these firms, in some cases going back many years. However, the current inflation approach has applied to these firms across the relevant time period (more than fifteen years). If inflation risk arising from our regulatory treatment of inflation meant that the networks faced increased (or decreased) systematic risk, then the calculated betas in the CAPM would be higher (or lower) than otherwise. The service providers are therefore likely to be compensated for their current levels of inflation risk.*  This is somewhat disingenuous, but might be of assistance in the beta debate. Prior to 2008, the AER did not use its current approach and thus, to the extent that the approach matters for systematic risk, this would seem to suggest that data prior to 2008 would be irrelevant. Moreover, the current levels of inflation risk are a relatively recent phenomenon, because it is only very recently that we have faced very low levels of inflation outside the RBA target band. Thus, to the extent that it is the level of inflation risk (as distinct from the calculation method) which matters for systematic risk, the AER can’t use data prior to around 2012, because this will reflect different levels of systematic risk.  The AER has two choices; either to ignore the impact of inflation on beta, or to take seriously the idea that inflation risk levels have changed. This point was made clear at the inflation workshop when it was raised by the AER’s consultant Van Zijl, and it was clear from discussions with consumer representatives that they realised the trade-off and were unwilling to risk the higher beta. This may be an area where some common ground is feasible; to at least sterilise inflation from the return on equity debate. |

There is one further item from the Multinet Draft Decision which gives evidence that the AER is seeking to cement 0.7 in as an upper bound, based on judgement. The AER began, in the Multinet Draft Decision, to question whether there might be reasons why beta is increasing that regulators ought to ignore. These are:[[17]](#footnote-17)

* There is no clear theoretical basis or substantive empirical rationale provided to explain the stated increases in the empirically derived equity beta of the regulated energy network businesses since 2014. This is particularly important given evidence of a relatively long period of stability in the empirically derived equity beta using data prior to 2014, despite the changes in the state of the economy over the historical assessment period.
* Given the lack of any theoretical underpinning for a change in the empirical beta, consumers can have no confidence that the recent observations (using 5-year data) represent a longer term ‘break’ in the historical data analyses which have remained fairly consistent since Henry's 2008 study. The analysis referred to above by CEG appears to be similarly based on short term data (3-years).
* There is no evidence provided that the market in general perceives a change in risk for regulated network assets. Nor does APA or other listed regulated gas networks appear to identify such a change in risk in their annual reports to shareholders. In fact, the listed networks continue to promote to investors the benefits of stable and predictable cash flows from their regulated businesses.

The AER appears to be saying that, even if market data suggest a shift in beta, in order to make a change, one must firstly show a theoretical reason why beta has changed, and show evidence in annual reports that the relevant businesses have reported a change in their risks to investors. This is an impossible hurdle to clear, particularly when coupled with the AER’s musings that perhaps increases in beta might be due to regulated businesses’ activities outside the regulatory sphere.[[18]](#footnote-18) If the AER continues with this kind of logic, the determination of beta will be entirely subject to judgement.

Subsequent to the Draft Decision, in the more recent communication via Garth, two more judgement calls have emerged from the AER which would be consistent with attempting to keep beta low. The first of these is the proposal by the AER that it simply ignore its 2017 work, on the grounds that it was only done in response to industry submissions. This is disingenuous as the AER’s own work quite clearly shows an increase in beta.

The second judgement call relates to the suggestion that the AER conduct:

A *conceptual evaluation of the risks network services face cf .to for example other potential comparators, e.g. toll roads and others*

In the Guidelines,[[19]](#footnote-19) and more stridently in more recent decisions,[[20]](#footnote-20) the AER has made the point that regulated businesses are somehow “insulated” from risks that firms in more competitive sectors, because of the protections (of asset values etc) that regulated businesses enjoy, and because of the stable incomes that come from regulation. The direction of this “conceptual examination” is likely to be along the same lines; that is, this “evidence” could be used to reduce the regulatory allowance from that provided by the CAPM, or to counter-balance upward adjustments such as an adjustment for low-beta bias.

This kind of judgement call is false from the perspective of the “foundation model” the AER purports to use. Under the CAPM, there is one risk factor; systematic risk. If two firms have a beta of 0.5, it doesn’t matter where in the economy they sit, or whether they are regulated or not, the CAPM explicitly says that they are expected to earn identical returns on equity. The “theory of the Black CAPM” doesn’t change this; although it uses a different risk-free rate, it is still a one-factor model. Likewise, the “international evidence” the AER purports to consider is all evidence about betas in CAPM models from overseas.

Here, what we see here is an attempt to create a quasi two-factor model, where the second factor is “exposure to regulation”. However, unlike the more well-known three-factor model of Fama and French, the second factor in the AER’s model is not tested empirically, but simply imposed via regulatory judgement, which also gives it a negative coefficient.

***Conclusion – under the AER’s current approach, and it likely extension of judgement, there does not appear to be any scope to obtain a beta above 0.7, regardless of empirical evidence, as the AER appears to be aiming to establish this level as an absolute ceiling. Note that this value of 0.7 would include any compensation of the downward bias of the CAPM.***

Taking international evidence into consideration and moving outside the regulated energy sector?

There are undoubtedly too few firms in the Australian regulated energy sector to get really robust estimates of beta. One solution is to use firms from outside the energy sector in Australia which the AER believes face similar levels of risk, and the other is to use data from international energy firms.

Both involve a degree of judgement and the key question is how one might choose those firms. Doubtless the AER would prefer to use its conceptual analysis. However, that is 100 percent judgement-driven, and it seems reasonable to predict that the AER will ensure that its choice of firms do not lead it to choose a beta above 0.7, if indeed the suspicion above that it is seeking to cement this value as a ceiling is correct.

Outside the “which firms” question above, there are two key questions we should ask. Firstly, whether we in fact want international firms and firms from outside energy and secondly, how one might bring the information in and what the result of that choice might be.

In the first instance, in 2013, Australian energy betas were relatively low compared to both international energy firms and other infrastructure firms, and so it made sense to try to include them. However, it is no longer clear whether this is the case. By way of an example, consider the betas in Tables One to Three above, and compare them to a set of US energy firm betas from SFG in 2013, reproduced below, with the average OLS 5-year portfolio beta from Tables One to Three superimposed as a red line.[[21]](#footnote-21)

Figure : Beta estimates for US firms

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Whilst it is true that estimates using only three firms will be imprecise and volatile, if we are using a mean beta estimate, and we are only doing the estimation once, then it might pay to place more emphasis on international evidence next time, if and when beta falls, than to drive the issue this time around, where we might end up with a more robust and stable, but lower beta as a result. This should certainly be considered before we repeat the arguments of 2013 which are methodologically more valid now that the sample size is smaller.

There is an additional issue with international data, and that is how the information is incorporated. If something like the NZ Commerce Commission approach is used, whereby US betas are simply averaged with Australian (or NZ, in the case of the Commerce Commission) betas to produce a final number, the impacts are only on beta.

However, this is not the only way the AER could take into account international energy firm information. It could, instead, assume that the relevant investor, in Australia, has access to international markets and not just the domestic market. This has the added virtue of being true. It would then make sense to do an international CAPM, and calculate beta against something like the MSCI Global Index, and not the Australian ASX or the US market (for US firms). It is not clear what this would do to beta, but it is clear that this would reduce the MRP, because the global MRP is much lower than the Australian MRP. This is shown in Figure Two.

Figure : Real annualised returns on equities, bonds and bills 1900-2016

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Source: Dimson, E, Marsh, P and Staunton, M, 2017, Credit Suisse Global Returns Yearbook 2017: Summary edition, p13

Australia (Aus), with average returns of 6.8 percent is significantly higher than the world (WLD) index at 5.1 percent. The ACCC has apparently suggested this kind of international CAPM model in the past and, in submissions to the recent AER issues paper for the Guidelines, Ian McCauley also suggested this as one possible approach.[[22]](#footnote-22) Since the ENA has supported the use of international data, it is perhaps prudent to understand firstly what beta would be obtained and then what overall equity risk premium, if the AER were to use an international CAPM approach.

ERA approach

The ERA approach to the estimation of beta is significantly more transparent than that adopted by the AER. There are similarities, in the sense that the ERA also takes a “top of the range” approach to the choice for beta which does (or at least did – see the discussion on bias below) reflect the downward bias of the CAPM (in fact more explicitly than the AER – see below), and the ERA purport to follow the same approach as Henry. However, there are certain key differences which make the ERA’s approach easier to follow. The first of these is that the ERA only uses five yearly estimates of beta,[[23]](#footnote-23) rather than several different time periods, which greatly limits the number of regressions it needs to do. The second is that makes use of confidence intervals for a small number of regressions rather than the mean beta estimates of a large number of regressions as the AER does. The third is that it restricts its attention to only two portfolio estimates (equal and value-weighted) rather than the six or so that the AER uses; this also reduces the number of regressions performed. Going forward, reducing the number of regressions the AER runs would be beneficial for us as it would limit their discretion to develop somewhat spurious “ranges” manufactured from multiple ways of looking at the same data.

The ERA’s approach may be described as follows:[[24]](#footnote-24)

* First the ERA makes an estimate of the weekly beta estimates for each firm in the sample and for the equal and value-weighted portfolios of these firms. It does this using Ordinary Least Squares, Least Absolute Deviation (both used by Henry), Theil-Sen, MM Robust Regression and, in the Final Decision for DBP, ARIMAX and GARCH regressions.[[25]](#footnote-25)
* Then the ERA forms confidence intervals for each of its estimates. It gets around the statistical problems the AER believes bedevils confidence interval estimation for beta by using bootstrap methods (where they can) to increase the robustness of results.
* To form its range, it takes the lowest lower bound of confidence intervals amongst the equal and value-weighted portfolios and the six regression models and the highest upper bound of the same set. Note that this means that the lower bound of the range may come from a different confidence interval than the upper bound, which is not strictly-speaking correct from a statistical perspective, but can at least be easily followed.
* The ERA then provides its statistical “best” estimate, which is the average of the equal and value-weighted portfolios from four of its regression models (OLS, TS, MM and LAD). This is not necessarily the beta estimate which is used, but at least one can see, and replicate, what the statistical “best” estimate is and compare this with the final beta estimate. This cannot be done with the AER for, although Henry gives a statistical “best” estimate, the AER do not.
* Finally, the ERA chooses a beta which captures the downward bias of the CAPM to the degree which the ERA thinks it is relevant to do so.

Amongst all of these steps, only the last is opaque; all of the others can be easily replicated. To understand the opacity of the final step, examine Table 4 below, which summarises the various different estimates made by the ERA of beta and the allowances it gave in its Final Decision. Note that, unlike the AER, the ERA has updated its own beta estimates of 2013; once in 2015 for the ATCO Final Decision (which was also used in the DBP Draft Decision at roughly the same time) and again for the DBP Final Decision in 2016.

Table : Summary of ERA beta estimates

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| --- | --- | --- |
|  | **ERA's range for beta** | **ERA's final point estimate of beta** |
| ERA's Rate of Return Guidelines  (November 2013) | 0.5 to 0.7  [Guidelines para 140] | 0.7  [Rate of Return Guidelines -Appendices to the Explanatory Statement page 217 para 26] |
| ERA's 2013 Study  (if it had been based on a 95% confidence interval)  (November 2013) | 0.31 to 0.76  [see Draft Decision Appendix 4 para 221 (page 51)] |  |
| The ERA's 2015 Study on beta  (based on a 95% confidence interval)  (2015) | 0.41 to 0.81  [Final Decision Appendix 4 para 227] |  |
| ERA's Draft Decision  ("consistent with" a 95% confidence interval)  (December 2015) | 0.3 to 0.8  [Draft Decision Appendix 4 para 227, 249 (page 52 and 53)] | 0.7  [Draft Decision Appendix 4 para 250 (page 57 and 58)] |
| ERA's Final Decision  (based on a 95% confidence interval)  (June 2016) | 0.479 to 0.87**[[26]](#footnote-26)**  [Final Decision Appendix 4 para 473] | 0.7  [Final Decision Appendix 4 para 434-437] |

The obvious point is that, regardless of what happens to the range, the final point estimate for beta is always 0.7. What changes each time is the reason for using 0.7. In the Guidelines, the ERA noted (see reference in Table above) that its:

..determination takes into account other relevant material, such as insights from the empirical performance of the Sharp Lintner CAPM. The Authority considers that relevant empirical evidence supports the view that there is some downward bias in equity beta estimates that are less than one, and upward bias in equity beta estimates that are greater than one

And for this reason chooses the top of the range. By the time of the ATCO Final Decision and DBP Draft Decision, the ERA considered that the top of the range was no longer appropriate because:

a value of 0.8, which is at the top end of this estimated range, would be excessive for a gas distribution network such as the DBP (sic), with its highly diversified demand base.

By the time of the DBP Final Decision, the ERA had decided that there was in fact no downward bias in the SL-CAPM (that is, in direct contradiction to its Guideline reasoning, also carried through to the Draft Decision) once the issue was “properly framed” as a consideration of expected equilibrium returns which, it insisted, were not in any way informed by evidence from actual returns. It therefore proposed to use the mean or “central best” estimate and to not make any adjustment for the downward bias of the CAPM.[[27]](#footnote-27) It was this aspect of the ERA’s decision, novel in the Final Decision and unique in Australia, which DBP challenged before the Tribunal.

A charitable view of the ERA’s approach is that its view of the downward bias of the CAPM was evolving from the time of the Guidelines to the Final Decision for DBP. A less charitable view is that it was stuck between its own empirical results and its desire to award a beta of 0.7 to be “consistent” between decisions, and that in so doing, it needed to keep changing its arguments.

Whatever the reason for the ERA’s changes to the last stage of its analytical approach to the estimation of beta (which is in any case not about beta estimation per se, but giving a beta estimate which reflects things outside the model, like bias), and noting that this last stage is both highly undesirable for business and opaque, the first four steps in the ERA’s process are transparent and replicable. This is in contrast to the AER, where the range and the point omn the range are chosen opaquely. It thus represents a small improvement.

***Conclusion: If the ERA’s approach were to be adopted, the mean or best beta estimate (based on Tables One to Three*** ***above, and noting these portfolios are subtly different to the ERA’s, and are from April 2017) is likely to be above 0.7. Note that this would not include any compensation for the downward bias of the CAPM, which the ERA no longer rewards. This needs to be considered as a separate issue.***

Optimal transparent approach

An optimal transparent approach has two elements:

* Firstly, it uses empirical methods to select the most suitable time period.
* Secondly, it limits the number of regressions undertaken to avoid obtaining a spuriously wide range as in the AER’s approach based on Henry.

In respect of the first point, one very simple approach could be to simply advocate following the ERA approach of using only five years, because it is five years of data that give good results for us at present. However, this is not advised; despite the fact that a minimal departure from an approach already used by regulators is preferable to a new method. In the first instance, this would violate a call for transparency and replicability, because the five-year cut-off is essentially arbitrary. In the second instance, although five years is favourable to us right now, it might not always be so, and a little bit of flexibility might be useful for us in future years.

We can get some flexibility by adopting an approach the AER has already suggested; structural break tests. Provided the tests do not indicate in 2019 that a break occurred in, say 2014, we would be able to keep data from 2012 onwards at the next guideline if we used such tests rather than a fixed number of years.[[28]](#footnote-28)

In respect of the second point, the AER’s 2009 study had more than 70 regressions run on different portfolios. This led to a very wide range, even when one considers only a histogram of the mean beta results (which is all the AER used; they showed no confidence intervals). This is not very helpful to us, as it just gives the AER wide latitude to decide which estimate it favours. A more appropriate approach would be something like the ERA approach, which has two portfolios, and then a simple rule for working out the statistical “best estimate”; which is just the mean of both portfolios. This suggests there may be merit in getting the experts in the conclave to agree on some clear and relatively simple approaches to the estimation of beta, rather than the confusing proliferation of portfolios the AER has favoured in the past.

***Conclusion: an optimally transparent approach which included an assessment of structural breaks would give roughly the same answer as the ERA above if a structural beak in 2012 is accepted, and a slightly lower result if a structural break in 2009 is accepted. Note that this does not include any adjustment for the bias of the CAPM.***

MRP estimation

In this section, I cover the estimation of the MRP. The main issue is whether the DGM is included or not and if so, to what extent.

AER judgement-centric approach

Perhaps the best indication of the problems with the AER’s judgement-centric approach can be gained by examining the case of Multinet and Ausnet and their recent AA proposals. This is summarised in some detail in the APGA submission to the AER’s rate of return issues paper, and the debate is not repeated here.[[29]](#footnote-29) In essence, the AER says that Multinet and Ausnet have over-simplified and misrepresented the AER’s approach to forming the MRP estimate. However, the approach that the two businesses use, relying upon the same expert report from Frontier, give 6.5 percent (the right answer, according to the AER) when using the AER’s own published numbers for the historical and DGM estimates of the MRP, but the AER could not have obtained 6.5 percent if it gave a different weight to the historical evidence than the businesses did, which is what the AER said that it had done (without specifying what that weight was). The basic issue is one of complete confusion on the part of the AER as to what it actually does.[[30]](#footnote-30)

There are two issues at stake in respect of the MRP; the number finally obtained and the methods used to get there. Our key risk is that the former will drive the latter, and not the other way around as it should be.

In particular, there is some evidence to suggest that the AER views 6.5 percent as a temporary measure for the GFC and its aftermath. Back in 2009, when the shift from six percent was originally made, the AER explained its reasoning thus:[[31]](#footnote-31)

The AER considers that prior to the onset of the global financial crisis, an estimate of 6 per cent was the best estimate of a forward looking long term MRP, and accordingly, under relatively stable market conditions—assuming no structural break has occurred in the market—this would remain the AER’s view as to the best estimate of the forward looking long term MRP.

However, relatively stable market conditions do not currently exist and taking into account the uncertainty surrounding the global economic crisis, the AER considers two possible scenarios may explain current market conditions:

* that the prevailing medium term MRP is above the long term MRP, but will return to the long term MRP over time, or
* that there has been a structural break in the MRP and the forward looking long term MRP (and consequently also the prevailing) MRP is above the long term MRP that previously prevailed.

That is, the move to 6.5 percent was presented as a response to a particular event. The AER has not subsequently found (or sought to find) evidence of a structural beak in market returns, but consumers have strongly advocated that they believe 6.5 percent is too large; in particular making points such as:[[32]](#footnote-32)

The AER’s draft decision has applied an equity risk premium of 4.55%, based on a market risk premium (MRP) of 6.5 and an equity beta of 0.7.

This is similar to the equity risk premium that the AER provided to the electricity networks during the previous regulatory period – i**.e. in the midst of the Global Financial Crisis.** (emphasis in original)

It seems reasonable to assume that consumers might seek to argue that the effects of the GFC on market returns have eased in the decade since that event.

In the Guidelines, the AER rejected the Wright CAPM, except as a cross-check (of the overall return on equity),[[33]](#footnote-33) which means that the focus lay upon the historical estimate and the DGM. Although the Guidelines are far from clear as to relative weights, and although the actual number of 6.5 percent was intended to be provisional, it is still worthwhile seeing how the AER said they used the two pieces of information at that time:[[34]](#footnote-34)

We consider a range for the MRP of 5.0 to 7.5 per cent is reasonable based on the evidence before us. The range we determine in this decision reflects the span of the evidence before us. This is because:

* The geometric mean historical excess return currently provides the lowest estimate of the MRP with a range of 3.6 to 4.8 per cent. However, as we discuss in more detail in appendix D, there are concerns with using the geometric mean as a forward looking estimate. Therefore, we consider a reasonable estimate of the lower bound will be above the geometric average. However, we give some weight to geometric mean estimates. Therefore, we consider a lower bound estimate of 5.0 per cent appropriate. The arithmetic average provides a range of 5.7 to 6.4 per cent.
* On the other hand, using our proposed models, the DGM currently provides the highest estimate of the MRP at about 7.5 per cent. We consider this an appropriate upper bound for the range. The upper and lower bound estimates reflect the evidence before us. These estimates may change over time and likewise the upper and lower bounds may change.

Given the available information we consider 6.5 per cent an appropriate estimate of the MRP having regard to prevailing market conditions. After assessing the information, we consider this estimate contributes to the achievement of the allowed rate of return objective.

In reaching the conclusion that 6.5 per cent is an appropriate estimate, we had regard to the following sources of evidence:

* Historical excess returns—these estimates provide a range of 5.7–6.4 per cent if calculated using an arithmetic mean and a range of 3.6–4.8 per cent if calculated using a geometric mean. We consider 6.0 per cent a reasonable estimate based on this source of evidence.
* Dividend growth models—these estimates, from two applications of the DGM and a range of inputs, suggest a range of 6.1–7.5 per cent is reasonable for the two months to November 2013. These estimates are broadly 60 to 80 basis points above the average for the period from March 2006 for which estimates are available.
* Survey evidence—surveys of market practitioners consistently support 6.0 per cent as the most commonly adopted value for the MRP. These surveys also indicate that the average MRP adopted by market practitioners was approximately 6.0 per cent. Like the conditioning variables, surveys are subject to various limitations.
* Conditioning variables—these give mixed results, and are each subject to various limitations. On the one hand, the dividend yield is approximately equal to its long term average with no discernible trend. On the other hand, credit spreads are above their pre–2007 levels and decreasing for lower quality instruments (for example, BBB) while being equal to their pre–2007 levels and decreasing for higher quality instruments (for example, swaps). Finally, implied volatility based MRP estimates suggest the MRP is currently below its historical average level at 5.6 per cent.

We have also considered:

* Recent decisions among Australian regulators—the AER notes both the ERA and the QCA consistently adopted an MRP estimate of 6.0 per cent under the same CAPM framework. However, IPART proposes to use DGMs to estimate a range for the current market risk premium. Decisions of other regulators are not direct evidence on the MRP but reflect other assessments of some or all of the information available to the AER.
* Recent Tribunal decisions—the Tribunal held the view that it was open on the evidence for regulators to adopt a 6.0 per cent MRP in all of the recent decisions where regulated businesses sought Tribunal review.
* Consultant advice—Associate Professor Lally, Professor McKenzie and Associate Professor Partington all recently advised us that a 6.0 per cent MRP was reasonable around the time of the Victorian gas final decision.

When explaining the consideration given to different estimates, the AER said:[[35]](#footnote-35)

Historical averages of the MRP are widely used by financial practitioners and regulators in Australia. While a point estimate of 6.0 per cent is common, the choice of the averaging period and judgements in the compilation of the data result in a range for plausible estimates of the MRP of about 5.0–6.5 per cent. We consider historical averages the best source of evidence available to estimate the MRP.

We consider DGM estimates of the MRP a useful source of evidence. While the estimates are not as robust as historical averages they may reflect current market conditions more closely. In the past we have raised concerns about the sensitivity of this source of evidence to the assumptions used.

DGMs are recognised financial models that are commonly used in practice. They rest upon the fundamental proposition that the value of an asset is a function of expected future income and the discount rate, which in this case is the required return on equity. DGMs are suited to the estimation of the rate of return from current market information, as demonstrated by US regulators using them for this purpose. However, the outcomes are sensitive to the model assumptions, especially the assumed long term growth in dividends and the transition from current dividends to the long term growth path. There are a range of plausible assumptions that one could make on these parameters. We note, however, consistent applications of the various models appear to show similar trends over time. There are also issues in applying the models in Australian conditions with more limited data.

In the past our starting point for DGM estimates of the MRP has been the specifications presented to us by the regulated businesses. Of which, there have been various specifications over time. These specifications have differed from decision to decision. In conducting our analysis, our approach has been to adjust these estimates to reflect our consideration of the evidence.

In this guideline process we have taken a different, bottom-up approach. We have considered the available evidence on the DGM and proposed our preferred construction of the model. We have consulted with stakeholders on our preferred construction and engaged consultants to review our proposal.304 As a result, in this explanatory statement we propose our preferred DGM estimates. Consequently, we have greater confidence in the symmetry of this information through time and give these estimates greater consideration than we have in the past.

However, we nevertheless consider any DGM, including our preferred construction, sensitive to the assumptions employed. This sensitivity might be moderated to some extent by:

* having regard to the outcomes of a range of models and assumptions on the future growth in dividends; and/or
* having regard to the current estimate of the MRP compared to the long term average for each of the models to assess the extent to which the MRP is above or below its long term average.

We have regard to a range of plausible assumptions and estimate a range for DGM estimates of the MRP of about 140 basis points.

Finally, in deriving its point estimate, the AER noted:[[36]](#footnote-36)

Our considerations when determining the point estimate are as follows:

* Consistent with the discussion in the previous section, we give greatest consideration to historical averages. We consider 6.0 per cent an appropriate estimate of this source of evidence.307 This represents the starting point for our determination of a point estimate. We note that while a point estimate of 6.0 per cent is common, the choice of the averaging period and judgments in the compilation of the data result in a range for plausible estimates of about 5.0–6.5 per cent.
* We also give significant consideration to DGM estimates of the MRP. Using our preferred application of these models, we estimate a range of 6.1–7.5 per cent.
* We give some consideration to survey estimates which generally support an MRP estimate of about 6.0 per cent.
* We also give limited consideration to conditioning variables which give mixed results at the time of this decision. Credit spreads and dividend yields are stable, while implied volatility suggests the MRP may be below the historical average at 5.6 per cent.
* Lastly, we give limited consideration to other regulators' estimates of the MRP. These generally suggest an estimate of 6.0 per cent is appropriate. The Tribunal has also affirmed several of these decisions.308

We consider an MRP estimate of 6.5 per cent provides an appropriate balance between the various sources of evidence. This point estimate lies between the historical average range and the range of estimates produced by the DGM. This reflects our consideration of the strengths and limitations of each source of evidence as summarised above and expanded upon in appendix D.

By the time of the most recent decision in November 2017, the AER’s views were being expressed (far more succinctly) as follows:[[37]](#footnote-37)

We derive our point estimate from within this range by considering the relative merits of all of the relevant material. The application of our approach is set out as follows:

* Historical excess returns provide a baseline estimate and indicates a market risk premium of approximately 5.5–6.0 per cent from a range of 5.1 per cent to 6.4 per cent. We consider both geometric and arithmetic averages of historical excess returns when considering this result. However we are aware of evidence that there may be a bias in the geometric averages. We take this into account when forming our result and baseline estimate, and as such our range for historical returns is based on arithmetic averages and informed by the geometric averages.
* Dividend growth model estimates indicate a market risk premium estimate above this baseline with a range of 6.86 to 8.12 per cent, which when conducting sensitivity analysis expands to 6.24 to 8.71 per cent. We consider our dividend growth model is theoretically sound but that there are many limitations in practically implementing the model. As previously stated in our assessment of the dividend growth model, it may capture current conditions to a certain extent but fails to adequately provide a 'true' estimate of the forward looking MRP. We consider our, and other, dividend growth models are likely to produce upward biased estimates in the current market due to reasons provided in appendix B.4. We also take into consideration that our model, and other models, may not accurately track changes in the return on equity for the market. For these reasons, we do not consider that the dividend growth model estimates are reliable on their own, but they do provide an indication for a point estimate above the range derived from the historical returns, as the guideline method shows. The guideline designated the dividend growth model to inform on whether the market risk premium may be above or below the historical estimates. The substantial widening in the range of results from the sensitivity analysis is indicative of the unreliability stressed by the limitations we discuss in appendix B.4.
* We also look at other regulator's decisions when considering our estimate of the market risk premium, after we have accounted for differences in objectives and approved calculation methods, as a cross check. Regulatory decisions over the past 12 months indicate a market risk premium of 6.5 per cent is reasonable.
* Conditioning variables indicate that there has not been a material change in market conditions since our May and April 2016 decisions. See section F.4 for more detail on regulators' recent decisions and their estimations
* Survey evidence generally supported a market risk premium around 6.0 per cent or less.

There are some clear differences in treatment of evidence between December 2013 and November 2017, most particularly in how the AER views the veracity of different sources of evidence and the role each piece should play. It is worthwhile exploring how this came about, and I do so in Table 5 below, which covers a dozen decisions between those two dates.[[38]](#footnote-38)

Table : AER regulatory decisions and MRP - 2103 to 2017

|  |  |  |  |
| --- | --- | --- | --- |
| Decision | Historical range | DGM Range | Key change to previous practice |
| JGN Draft Decision, November 2014 | arithmetic 5.9-6.5% ,geomean 4.0-4.9%, reasonable 5.1-6.5% | 6.6-7.8% | Evidence from Lally (2013) suggests there may be upward bias in the DGM (P232) and “most relevance” is now given to historical evidence which was previously described as “most robust” in the Guidelines (p195) |
| Essential Final Decision, April 2015 | arithmetic 5.8-6.4%, geomean 3.9-4.9%, reasonable 5.1-6.5% | 7.4-8.6% | Historical evidence forms a “baseline” and that suggests an estimate of 6% for the MRP (p119), whilst evidence in new reports from McKenzie & Partington (October 2014) and Partington (April 2015) make a much stronger case as to the shortcomings of the DGM (p47 & 125-127) |
| JGN Final Decision, June 2015 | arithmetic 5.8-6.4%, geomean 3.9-4.9%, reasonable 5.1-6.5% | 7.4-8.6% | n/a |
| SAPN Final Decision, October 2015 | arithmetic 5.8-6.4%, geomean 3.9-4.9%, reasonable 5.0-6.5% | 7.5-8.6% | n/a |
| Actew AGL Draft Decision, November 2015 | arithmetic 5.8-6.4%, geomean 3.9-4.9%, reasonable 5.0-6.5% | 7.5-8.6% | n/a |
| Jemena Distribution Final Decision, May 2016 | Arithmetic 5.2-6.2%, geomean 3.5-4.8%, reasonable 5.5-6% | 7.57-8.84% | Historical estimates suggest a range from 5.5-6% from a range of 4.8-6% (p57). Also more detail on problems with the DGM (pp224-30), which is not new evidence but just more exposition of their existing evidence. |
| Tas Networks Draft Decision, September 2016 | Arithmetic 5.6-6.3%, geomean 3.9-4.9%, reasonable 5.5-6% | 7.54-8.86% | n/a |
| Tas Networks Final Decision, April 2017 | Arithmetic 5.8-6.4%, geomean 4.1-4.9%, reasonable 5.5-6% | 6.46-7.72%, sensitivity  5.90 to 8.94% | Introduction of a “sensitivity range” for DGM which expands its range, and then discussion of how it might capture more recent information, but is unlikely to be an estimate of the “true MRP” due to its flaws and statement that the DGM was intended to show whether the current MRP was above or below historical averages (p78 – and note that the Guidelines says no such thing, not at the referenced page or elsewhere) |
| Multinet Draft Decision, July 2017 | Arithmetic 5.8-6.4%, geomean 4.1-4.9%, reasonable 5.5-6% | 6.53-7.8%, sensitivity  5.97 to 8.88% | n/a |
| Murraylink Draft Decision, September 2017 | Arithmetic 5.8-6.4%, geomean 4.1-4.9%, reasonable 5.5-6% | 6.92-8.17%, sensitivity  6.14 to 8.77% | n/a |
| Electranet Draft Decision, October 2017 | Arithmetic 5.8-6.4%, geomean 4.1-4.9%, reasonable 5.5-6% | 6.92-8.17%, sensitivity  6.14 to 8.77% | n/a |
| APA VTS Final Decision, November 2017 | Arithmetic 5.8-6.4%, geomean 4.1-4.9%, reasonable 5.5-6% | 6.86-8.12%, sensitivity  6.24 to 8.71% | n/a |

The two most important changes occur in April 2015 and May 2016; after the latter date there might be more rhetoric, but its nature doesn’t change much. In the former case, the AER introduces new evidence against the DGM in the form of reports from its consultants which was not considered in the 2103 guidelines and is painted as flaws which make that evidence less reliable. This evidence is given more precedence and in particular is described in more detail in subsequent decisions.

In May 2016, the range for the historical data was reduced. The overall range, reported in the appendices of Attachment 3 doesn’t change by very much. What happens instead is that, in the main body of attachment 3, the AER announces a new subset of the historical range which it proposes is now the best estimate. There is nothing by way of a derivation of this narrower range, or even a discussion of the judgement which led to it; it is simply announced. It has the practical effect of putting distance between the historical and DGM results (which overlapped in the Guidelines) and thus giving the AER cover to suggest that it is only going above the historical results because it is paying attention to the DGM.

Faced with this evidence, it seems highly unlikely that the AER will provide an MRP of above 6.5 percent. It is also difficult to see just exactly what it will do with the DGM.[[39]](#footnote-39) Even if it is the case that the pattern of sticking to 6.5 percent through the last four years as DGM estimates changed substantially was simply a bureaucratic response to having produced a number and then feeling it necessary to give that same number to all businesses, the AER cannot now simply un-say all the things it has said about the DGM without facing considerable backlash from stakeholders outside business. It may find that the easiest response, particularly given that MRP is difficult to test as it is exogenous (that is, not determined by) to models like the CAPM, to simply adopt its previous estimate of six percent and make some minor adjustments to its treatment of evidence from November 2017 in order to get it there.

***Conclusion: The AER is likely to find itself boxed in by its previous rhetoric about the DGM and thus might find it difficult to give it more weight or be more transparent without contradicting itself. It may simply take the easy option and work its analysis to give what it seems to consider a more appropriate answer in keeping with historical results and stable conditions of six percent.***

ERA approach

At its last Guidelines, the ERA’s approach to the estimation of MRP was neither clear nor particularly desirable. However, it evolved over subsequent decisions, following feedback from stakeholders, and current form of the ERA approach can be seen in the DBP Final Decision (pp 103-127) and the Further Final Decision for ATCO (pp 5-13) where the ERA adapted its MRP measure following a change in gamma.[[40]](#footnote-40) This current approach is by no means perfect; for example, we have but two observations of it in use and, to understand is operation better, an application under different market conditions is required. However, it is reasonably transparent, and it does preserve a degree of regular discretion. It shows that, in order to be transparent and replicable, regulators don’t need to lose all discretion.

The ERA approach does not use markedly different information from the AER (although it does give more weight to the Wright model and less to the DGM), but it does use this information in a different way. The ERA process is as follows:

* First, the ERA forms an historical MRP estimate using the Ibbotson approach; that is, by forming a long run average of the MRP. This forms the lower bound of the historical range
* Second, the ERA forms an historical MRP as a long run average of market returns minus the current risk-free rate. This forms the upper bound of the historical range.
* Third, the ERA forms several DGM estimates to provide a forward-looking MRP range. The upper bound of this range, together with the lower bound of the historical range, forms the overall range the ERA considers.
* Fourth, the ERA looks at the middle of the historical range and considers whether the range of DGM estimates and the conditioning variables it considers (essentially the same conditioning variables the AER considers) ought to warrant a move above or below the mid-point of the range. In recent decisions, the ERA did in fact conclude that a move above the mid-point was warranted, and chose a point 60 percent along the historical range.

The historical estimates are easily calculated by any stakeholder under any market conditions, as is the DGM, and the indicator variables are available from Bloomberg and similar data providers. A stakeholder, armed with this information, can reasonably safely assume that the final answer will be fairly close to the mid-point of the range between the two historical measures, and likely above this mid-point if the DGM estimate is relatively high. Of course, with only two observations of the ERA’s approach in action, it is hard to be more definitive about different market conditions and the degree to which these would move one away from the mid-point, and this is work that the ERA needs to do in the context of its own forthcoming guidelines process if it is minded to keep the same approach to the determination of MRP. However, the approach does represent a good starting point on the road to greater transparency.

Two caveats are needed in respect of the ERA approach. Firstly, the ERA itself, in conversation, is not clear whether it will be able to continue to use its approach if guidelines are binding. This is because it thinks that it might preserve too much discretion for regulators and not be as mechanistic as the legislation will require. Thus, the ERA may move towards some change to its approach once the legislation is promulgated.

Secondly, because the ERA uses the Wright CAPM as the upper bound of its historical range, and because market returns (particularly their long run average) are more stable than the risk-free rate, as risk-free rates increase, the market risk premium will naturally decrease. At the time of DBP’s Final Decision, the ERA approach gave a market risk premium of 7.4 percent above the five year CGS (roughly 6.9 percent above the 10 year CGS the AER uses). This was lower than the result ATCO obtained (7.6 percent) and a rising risk-free rate would result in lower numbers still. We would therefore still want to have some kind of an “out” mechanism for extreme events as the measure is not self-correcting.

***Conclusion: The ERA approach, if it can be implemented, requires more case studies from the regulator to see how it would operate under different conditions. If risk-free rates increase from their present values by the time of the guidelines, it will give a lower number than the 6.9 percent (AER equivalent) from the DBP Final Decision, but seems likely to still give an answer higher than 6 percent.***

Optimal transparent approach

Our key aim would need to be bringing more forward-looking information into the equation, and attempting to rescue, in particular, the DGM to give the AER a reason to consider it. We might also make use of other regulators and their use of models like the Wright CAPM if we can.

It is not clear how we might be more transparent in respect of the MRP, as empirical tests of “models” of market returns tend not to be done given that there are few such “models” to be tested; the CAPM, for example, is a model of returns relative to one factor, the market, and not of returns to the market itself. Nevertheless, it may be possible to do some relatively simple forecast tests (Diebold Mariano tests, for example) of different combinations of the historical, DGM and Wright models, for example, and see if any one of them predicts better. The danger being that this would be seen as data-mining, and thus it would need to be driven through the expert conclave, to see if said conclave could come up with an agreed technical approach.

The ENA, in its submission on the Issues Paper, raised a point about how the AER treats evidence, particularly how it appears to twist evidence from things like surveys, valuation reports and the findings of regulators to support its viewpoint, no matter how this evidence changes through time. This is a fruitful avenue for our efforts not only for the MRP, but more broadly; it is frequently impossible to know how the AER will treat evidence (and thus what kind of evidence to present), because the AER is never clear on how evidence is used.

If the AER is not simply being opportunistic, an issue may exist in respect of its basic understanding of how to incorporate evidence into a finding in a clear and transparent manner, and it may genuinely believe that the only way to make decisions is via judgement. To this end, it may be useful to step outside of regulation and see how the issue is addressed elsewhere.

In the finance industry, investment analysts produce thousands of reports daily on the future prospects of firms; a task not unlike a regulatory determination in respect of using evidence to arrive at a conclusion. In amongst the ethical standards developed by the CFA Institute is a requirement that research reports have a “basis that can be substantiated as reasonable”; that is, someone must be able to see what evidence was used and how, to get from inputs to outputs.

There may be scope to use this, to provide worked examples of how the transparent link between inputs and outputs is made every day in thousands of research reports in finance, and thus to educate the AER as to how it might similarly make such links and not simply rely upon judgement every time. This may require different expertise, from consultants who advise investment analysts on how to prepare such reports, than we have used in the past.

***Conclusion: it is not clear that there is one clear “optimal transparent” approach, but we should aim for between six and seven percent for MRP (numbers will be updated by Stephen soon) and we should aim to increase our own credibility by showing that our approach is capable of giving a lower answer than the current AER approach under certain circumstances which are not complete outliers.***

Adjusting for the downward bias of the CAPM

Perhaps the key issue this time around (at least in terms of difficulty) is the issue of “low beta bias”; the fact that the CAPM generally under-predicts subsequent actual or realised returns for firms with a beta less than one. Although this got some recognition in 2013 (arguably less than industry has subsequently believed – see below), there is good reason to think that it will get far less recognition, in practice if not in principle, this time around.

The reason for this is the steady rise in empirical calculations of beta in the period subsequent to the 2013 Guidelines. Whether the thesis of AER rhetoric leading to a ceiling for beta of 0.7 (see above) is accurate or not, it seems highly unlikely that the AER will be willing to either extend its range or choose a point estimate higher than it did last time, because so many stakeholders already think it is too generous with WACC and because allowing utilities higher returns in the current political climate would be untenable.

If beta needs to stay at or below 0.7, and the mean beta estimates of Australian energy firms are rising towards that number (or indeed, have surpassed it – see Tables One to Three above), then something from the 2013 Guidelines needs to give, and the most obvious thing is the degree to which low beta bias is given consideration.

There are two ways the AER might choose to do this. One is to take an in-principle decision that low beta bias is not an issue they need to consider when setting the allowed return on equity. This is a decision the ERA has taken, but the AER has not. The AER’s advisors, Partington and Satchell have advocated doing this, and have provided the AER with the rhetorical cover they might need to do so if they so desire. For this reason, I devote some time to the rhetoric of these two experts and their “expected equilibrium framework”.

The second approach is to simply increase the number of factors and issues the AER considers when estimating beta and using the CAPM and, in particular, to add a few factors which adjust CAPM estimates downwards and counteract any upwards adjustments for low beta bias. The relative regulatory risk arguments highlighted above may be one of these factors, as is the use of raw betas. The point is that, with such countervailing factors, the AER could claim to still be giving just as much emphasis to low beta bias as previously, whilst ensuring that the practical outcome is an answer which is indistinguishable from that which is obtained from a textbook implementation of the CAPM.

The AER might try both approaches simultaneously. The key point is that both approaches involve a high degree of regulatory judgement, and the more we accept these fudges, the less transparent the approach becomes. By contrast, if we insist on clear reasoning and high standards of evidence, it is harder for the AER to manipulate analysis to outcomes.

There is no doubt that making the argument is difficult (if only for political, rather than evidentiary/analytical reasons), and it is highly unlikely that we will get a number for the adjustment which is remotely reflective of the real scale of the issue. However, if we do nothing, not only do we get nothing this time, but the issue is taken off the table in future, when perhaps beta estimates have fallen again, and the AER will have fewer barriers to taking down beta by another notch.

When attempting a robust, transparent and replicable quantification of low beta bias (rather than relying upon the “magic soup” of regulatory judgement), a key problem we have is devising a methodology which meets our requirements of robustness, objectivity and replicability, whilst simultaneously delivering a low beta bias adjustment which is *small* enough to be credible to other stakeholders. To see this, consider the table below from the DBP AA Proposal:[[41]](#footnote-41)

Table : 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 is 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). Whilst not suggesting that the DBP work is the final word on the relevant adjustment, it does suggest a large gap between a robust adjustment based on replicable, objective empirical work using realised returns and what stakeholders have become used to given what the AER has done in the past; in short, we need to find a way to tone things down.

Subsequent to the DBP work, Multinet adopted a subtly different approach which centred around an “alpha” adjustment; first suggested by the ERA’s consultants. This involved taking a textbook CAPM forecast, adding a small number to it (alpha), testing it against subsequent returns over the same 40-year period, and stopping where the alpha got large enough to remove systematic bias.[[42]](#footnote-42) Averaged across all ten portfolios (the same ten as in Table 6 above), this gave an adjustment of 114 basis points. This is smaller than the AER’s original adjustment, but Multinet proposed to add it to a mean beta estimate of 0.7. There may be more merit in adapting Multinet, rather than working with the original DBP results, and there may be merit in exploring other approaches to see if similar numbers obtain as this would enhance credibility.

AER judgement-centric approach

To the extent that the AER deals with low beta bias at all (see below), it does so by choosing a point at the upper end of a range for beta. In the 2013 Guidelines, it described its key consideration thus:[[43]](#footnote-43)

Under our approach, we adopt a point estimate for equity beta from the top of the empirical range. This is consistent with the point estimate proposed in our equity beta issues paper. We consider a point estimate from the top of the range to be consistent with alternative evidence international equity beta estimates and the theory behind the Black CAPM for the following reasons:

* Theoretically, under the Black CAPM, firms with an equity beta below 1.0 should have higher returns on equity than what the standard Sharpe–Lintner CAPM predicts. This is because, as a result of different starting assumptions, the Black CAPM predicts the slope of estimated returns will be flatter than for the standard Sharpe–Lintner CAPM. This information informs our proposal to select a point estimate at the top end of the 0.4–0.7 range of empirical estimates.
* We consider empirical estimates from a number of international energy networks across the US, UK and Europe, support a point estimate closer to the upper end of our range.

There is more detail in pages 83 to 88, which expands upon the two dot points above, and explains what evidence the AER has considered, but the story is essentially the same.

Businesses have taken the opaque reference to the “theory of the Black CAPM” as referencing the well-known issue of low-beta bias associated with the SL-CAPM, because the Black CAPM was developed to address this problem. Moreover, this is, roughly-speaking, the way the Tribunal has also interpreted what the AER did in the only finding, to date, to have considered the issue at all.[[44]](#footnote-44) The Tribunal's discussion of downward bias includes the following:[[45]](#footnote-45)

1. In considering the rationale for the Black CAPM compared to the SL-CAPM, the Tribunal observed (at paragraph 661):

The AER considered that the Black CAPM relaxes one of the key assumptions of the SL CAPM, namely the assumption that investors can borrow and lend unlimited amounts at the risk free rate. It is accepted that this leads the SL CAPM to underestimate the return required for low-risk investments.

1. At paragraph 726, the Tribunal, in addressing the applicants' (ultimately unsuccessful) challenge to the AER's use of the SL-CAPM as a foundation model, observed *"…other material exposed the risk of bias where the entity concerned has an equity beta of less than 1. The AER was alert to that."*
2. Then at paragraph 731:

It is, as the AER noted, correct that the three parameters for the SL CAPM – equity beta, risk free rate, and MRP – are recorded as giving a low beta bias for businesses with a beta (that is, the risk of the asset relative to the average asset) of less than 1.0, and that the Network Applicants are all within that group. There was also evidence that the low beta bias is exacerbated when it is combined with conditions of low government bond rates and a high MRP. Those conditions were applicable at the time of the AER Final Decisions. The AER at p 3-240 of Attachment 3 to the Ausgrid Final Decision concluded that “notwithstanding potential limitations with the model, we consider that our implementation of the model recognises any potential empirical limitations.

1. The Tribunal also addressed in detail a submission from PIAC that the AER had erred by setting beta too high. The Tribunal made the following observations, consistent with an acceptance of low beta bias (at paragraphs 772 and 779], emphasis added):

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

….

As with the submissions of Networks NSW, supported by the Vic/SA Interveners and Ergon (although differently focused), the Tribunal can readily understand PIAC’s reasons for urging error on the part of the AER. However, for much the same reasons, it has not taken the step of concluding that the AER was in fact in error in finding that the proper point estimate was 0.7 for equity beta. There are reasons why it might have chosen another point estimate. But the Tribunal accepts that the AER was entitled to start with a range. **Upon reviewing the whole of the material before the AER, the Tribunal however is not satisfied that that material does not support a conclusion that the SL CAPM provided a low equity beta bias.** When, therefore, it comes to the selection of a point estimate, and having regard to the range of data available to the AER, the Tribunal must consider whether it is satisfied of the correctness of an alternative to that adopted by the AER. The short answer is that it is not so satisfied.

However, it is arguably not clear that the AER does now, nor did at the time of the 2013 Guidelines, explicitly take into account the downward bias of the CAPM. In its submission to the current issues paper, the ENA quotes a little selectively from page 12 of the Appendices to the Explanatory Statement, but is worthwhile providing the whole quote (from pp11-12):

The Sharpe–Lintner CAPM, particularly relative to alternative asset pricing models, has been the subject of much empirical analysis. The importance of the empirical performance of any model is reflected in our assessment criteria, and is supported by submissions from the MEU and PIAC. In the case of the Sharpe–Lintner CAPM, the empirical shortcomings of the model are often cited as key drivers for the consideration of alternative specifications of the CAPM. These shortcomings have been highlighted in submissions from the ENA and the APIA. Most notably, they submitted evidence that the model may systematically under or overestimate expected returns for low and high beta stocks respectively (that is, low or high beta bias).

Many of the empirical tests of the Sharpe–Lintner CAPM, however, are themselves the subject of ongoing academic debate. For example, a common test used to demonstrate low beta bias is to plot the average beta of share portfolios against the realised returns on these portfolios. Indeed, similar evidence was included in the report by NERA, and submitted by ENA. In previous decisions we have highlighted the limitations of these tests, as suggested in the academic literature. These limitations include:

* They use a market proxy that does not accord with the Sharpe–Lintner CAPM market.
* They consider realised returns, whereas the Sharpe–Lintner CAPM requires expected returns.
* They use short–term intervals (less than one month), whereas the Sharpe–Lintner CAPM uses a long–term investment horizon.
* They use inappropriate statistical tests or procedures.

Notwithstanding the above, we consider that our implementation of the Sharpe–Lintner CAPM recognises the empirical criticisms of the model. For example, using the Black CAPM theory to inform our equity beta estimate may mitigate possible low beta bias. This is consistent with the approach outlined in our draft guideline. Our use of the Black CAPM, and our estimation of the equity beta are discussed in detail in appendix C and chapter 6 respectively.

What the AER is clearly saying is that, firstly it has some doubts about the low beta bias issue, and secondly, if it is an issue that it ought to have considered, then the way in which it has chosen to implement its foundation model is likely to have addressed concerns someone might have about issues like low-beta bias. Thus, to the extent that the AER downplays the low beta bias issue this time around, it would be able to point to precedent in 2013.

Further, although the businesses have subsequently, including in the ENA submission to the recent issues paper, used the “theory of the Black CAPM” as rhetorical shortcut way of describing the issue of low-beta bias, this is not what the AER mean when they talk about the “theory of the Black CAPM”.

For example, on pages 68 to 69 of the same Appendices, the AER notes, in respect to the “theory of the Black CAPM):

The key theoretical difference relates to borrowing and lending. The Sharpe–Lintner CAPM assumes that investors can access unlimited borrowing and lending at the risk free rate. However, the Black CAPM instead assumes that investors can access unlimited short selling of stocks, with the proceeds immediately available for investment. Either of these assumptions might correctly be criticised as being unrealistic, and it is not clear whether the replacement assumption is preferable. Of course, such simplifications are inherent in all financial models.

From these starting assumptions, the following formula for the Black CAPM can be derived (formula omitted):

Note that this equation follows the same form as the Sharpe–Lintner CAPM, except that risk free rate has been replaced by the zero beta return.

There are clear conceptual definitions for the expected return on the zero beta portfolio. It will sit between the borrowing rate (upper bound) and lending rates (lower bound) available to the representative investor. It is not possible to directly observe these borrowing and lending rates for the representative investor. However, this nonetheless provides a rough guide for any estimated return on the zero beta portfolio. Interest rates for different types of investors (including different credit ratings) are observable in the market. Previous expert advice to the AER indicated that the relevant borrowing rates may set an upper bound that is quite close to the risk free rate.

Further, if it is assumed that investors can lend (but not borrow) at the risk free rate, the expected zero beta return will sit between the risk free rate and the expected return on the market. This provides a further check on the reasonableness of empirical estimates of the zero beta return.

Where the zero beta return is above the risk free rate, the Black CAPM predicts that the Sharpe–Lintner CAPM will underestimate the expected return for shares with an equity beta below 1.0. That is, if the Sharpe–Lintner CAPM is used to generate an estimate of the return on equity, the conceptual prediction from the Black CAPM is that the return on equity will be above this figure (for all shares with an equity beta below 1.0). The magnitude of the increase is difficult to determine conceptually, though there is some rough guidance from the observation of borrowing rates in the market.

That is, the relevant theoretical difference relates to the rates at which investors borrow and lend and, when the borrowing rate is above the risk-free rate, this would cause the security market line to be shallower than the SL-CAPM predicts. The ENA submission to the current issues paper notes that the Black CAPM was developed to provide an explanation for the empirical fact of low beta bias,[[46]](#footnote-46) but the fact that a model was developed to provide an explanation to an observed empirical anomaly, and the regulator considers the theoretical aspects of that model to be sound, does not necessarily lead to a conclusion that said regulator believes the empirical findings that led to the new model. In fact, it appears that the AER believes that the only useful role empirical estimates of the Black CAPM (which do capture the low-beta bias, by construction) could play is to proxy the borrowing rates for investors which are not directly observable in the marketplace. However, it is clear that the AER also believes, from all the negative things it has said about the Black CAPM in the Guidelines and subsequently, that it does not believe that the Black CAPM is even remotely successful in forming a proxy for borrowing and lending rates. In continuing to conflate low beta bias with the Black CAPM, the ENA may in fact be inadvertently ensuring that it talks past the AER, who may have something entirely different in min when they refer to the “theory of the Black CAPM”.

This can also be seen in the issues paper (p 54) that the AER produced as part of its 2013 Guidelines process, which has subsequently been repeated in other decisions, where it notes of the Black CAPM:

Theoretical principles underpinning the Black CAPM are grounded on economic theory.

However, the empirical analysis is not sound, since there is an unresolved inconsistency between the zero beta return estimate and the model restrictions.

If this were not sufficient, subsequent to the Guidelines, the AER has been even less enthusiastic about the issue of low beta bias.[[47]](#footnote-47) I track the debate below.

The Jemena Gas Networks Final Decision of June 2015, the AER reflected work commissioned by several of its consultants, and noted, from Handley:[[48]](#footnote-48)

Handley noted in relation to the evidence (from other models) on low beta bias:

[i]n considering the relevance of this evidence, however, it is important to recognize that the current objective is to determine the fair rate of return given the risk of the benchmark efficient entity rather than to identify the model which best explains past stock returns.

In Handley's subsequent report, he clarified the key point of this statement as:

(i) given there are multiple possible (but not necessarily mutually exclusive) explanations for the low beta bias – some of which are risk based explanations and some of which are not; and

(ii) the allowed rate of return objective makes it clear that the rate of return should reflect the risk of the benchmark efficient entity,

then there is doubt as to whether the empirical finding of a low beta bias is relevant for the purposes of determining an appropriate level of compensation since there is doubt as to whether the low beta bias reflects risk (over and above that already captured by the Sharpe-CAPM).

Handley appears to recognise that low beta bias exists, but he seeks to downplay it. Firstly, he is suggesting that it is not the role of regulators to see which models fit the data best, which is a version of the arguments Partington later raises that expected and actual returns are different things (see below).

Secondly, he paints a broad general picture of a wide range of factors (which he leaves unstated) which might be causing low-beta bias to appear in the data, but that the relevant test is whether the finding of bias can be explained by risks which can be pointed to and priced. This appears to be a version of the “anomalies” arguments later favoured by Partington (see below); that all points where actual returns differ from what the CAPM predicts, even if they are systematic, are simply “anomalies” that were not expected by investors.

However, it is somewhat more than that. What he is suggesting is that, if any evidence of bias is found, before compensating for it, regulators must satisfy themselves that it represents risk that is actually priced. In a subsequent paper, the AER pick up the topic again, with specific reference to work by Satchell:[[49]](#footnote-49)

Further, there are a number of explanations (for example, economic conditions) that do not imply a bias in beta. These explanations were noted by Partington and Satchell as well as Handley. For example, Mujisson, Fishwick and Satchell (2014) found that beta for a given portfolio remains relatively constant despite changes in the interest rate and market movements.

Handley’s suggestion quoted above and then alluded to in the second quote from the AER is an impossible hurdle in most instances (see below); in 2013, McKenzie and Partington for the AER noted that one could not tie a particular beta to particular risks (or decompose a beta into particular systematic risk),[[50]](#footnote-50) and it would similarly be impossible to tie additional risk factors not in the CAPM to parts of the low-beta bias. It would also be somewhat inconsistent to be unconcerned about which systematic risks are reflected in how much of beta, and then focus heavily on which risks are not in the CAPM but priced by the market.[[51]](#footnote-51) However, it clearly gives the AER licence to go down this path, if it so chooses, as another way in which to quash or downplay low beta bias by establishing a hurdle that we could not ever in practice meet, whilst still in principle insisting that it did consider the issue of low beta bias in its deliberations.

In respect to the Mujisson, Fishwick and Satchell paper cited above, although the AER are attempting to tie it in with Handley’s view, they miss the point of the paper; the model in which beta remains stable is not the model the AER uses, but is in fact a two-factor model (the second factor is associated with changes in interest rates). Since the AER uses a one-factor model (that is, there is just the market risk premium) then the results of the Mujisson et al work do not support the AER. In fact, precisely because they show that one needs to control for the interest rate cycle, they support the contention by the businesses that the AER ought to do something different right now when interest rates are at record lows.

The Jemena decision of 2015 also provides a brief commentary on work commissioned by several service providers and undertaken by NERA, which sought to test the CAPM, Fama-French Model and other models against realised returns in the Australian regulatory context. This was essentially the same evidence as DBP put forward, as it was originally developed by DBP with the assistance of NERA. The AER’s response to this evidence was as follows:[[52]](#footnote-52)

Several service providers submitted an empirical test of the SLCAPM and the Black CAPM by NERA. We observe that the results in NERA's report appear counterintuitive. For instance, NERA's in-sample tests indicated there was a negative relation between returns and beta—which is not consistent with the theory underpinning the SLCAPM or the Black CAPM.

There is no refutation of the results, no indication of what empirical errors were made, if any and no real assessment of the work. The conclusion seems to be based solely on the fact that the modelling must be wrong if the findings contradict the theory of the CAPM.[[53]](#footnote-53) This is another example of an impossible hurdle; the evidence against the CAPM is downplayed or dismissed because it does not reflect the “intuition” of the model.

In the same decision, the AER are also rather more specific in respect of the treatment of downward bias, responding to the accusation that, whatever adjustments are being made for downward bias, they are not sufficient (essentially the finding of the NERA work alluded to above). They note:[[54]](#footnote-54)

On the consultants' second view, we do not make a specific adjustment to our equity beta point estimate to correct for perceived biases in the SLCAPM. We do not consider our use of the SLCAPM as the foundation model will result in a downward biased estimate of the return on equity for a benchmark efficient entity (see section A.3.1 of appendix A–equity models).

And further, in a footnote to the above quote:

We also do not consider the evidence from the Black CAPM implies that the estimates produces from the SLCAPM are downward biased for low beta stocks (see section A.3.3). Additionally, we do not consider the service providers have provided us with commonly accepted evidence that a value factor is priced in the return on equity (see section A.3.2).

The basic tenor of both quotes is that, whatever problems there might be with the CAPM in its textbook version, before the AER has made the relevant adjustments, these do not exist, and no service provider has satisfied the AER that they might exist, in respect of the version of the CAPM it actually implements. Again, this is impossible to refute, precisely because there is no clarity in how the foundation model results are actually formed considering the issue of bias, so no “null hypothesis” can be formed.

The AER has also sought to narrow the definition of bias, to wash it away as a statistical artefact that is dependent solely upon the type of test done, and to conflate various different problems to confuse stakeholders. In the UED Draft Decision of November 2015, the AER noted:[[55]](#footnote-55)

We consider the empirical information submitted in relation to the ex post performance of the different models does not show our application of the SLCAPM will undercompensate the benchmark efficient entity for its efficient cost of equity. The benchmark firm is not average risk and its risk is not expected to change given its regulated monopoly nature. Empirical evidence by Professor Henry supports this and shows no clear evidence of mean reversion of risk towards the average risk of the market (see appendix D—Equity beta). Partington also observed Henry's result in advising that a Vasicek adjustment was not valid. He advised:

we note the work of Henry (2008), who finds no evidence that would support the use of the Vasicek model for Australian data. The results of the Henry (2008) study:

“… suggest that there is little convincing evidence of regression to unity in this data. Therefore, it is difficult to justify the application of the Blume or Vasicek adjustments.” (p. 12)

Further, Partington and Satchell made the following observations for testing empirical performances of asset pricing models:

* Testing of an asset pricing model involves how well it describes ex-ante expected returns when security prices are in equilibrium. Empirical work attempts to examine how well the asset pricing model explains ex-post realised returns which 'may not be a particularly good test'.
* The results are dependent on the method used to conduct the test (for example the characteristics used in sorting stocks into portfolios when testing model performance).
* Fischer Black has previously suggested that testing of model performance using ex-post realised returns 'might be telling…more about the shocks to the expected returns (volatility) rather than the equilibrium expected returns'.

The first part of this quote mixes up two different ideas. The Vasicek adjustment is made due to concerns with the estimate of beta, not the CAPM itself. Specifically, there appears to be a tendency for the betas of firms to move towards one over time; at least in US data. Thus, if one was to attempt to capture a forward-looking beta estimate using historical returns data, one might decide to adjust the beta estimate to capture this trend. This is not the same as the low-beta bias problem highlighted by the evidence from ex-poste performance of firms, which shows that the model itself produces biased estimates of actual returns. The Vasicek adjustment is irrelevant in this context. Partington and Satchell conceded this point in their May 2016 report for the AER, noting:[[56]](#footnote-56)

There are two uses of the term of low beta bias. One, that has been the topic of many submissions by the regulated businesses, is that ex-post realised returns for low beta portfolios are higher than the expected returns from the SLCAPM given the beta of the portfolio. This has been discussed in the section above headed “low beta bias” and in the discussion of the Black model. A second type of low beta bias is that estimates of beta that are low may be downwardly biased estimates of the true beta due to measurement error. Reversal of this measurement error over time would give rise to mean reversion as later estimates of the original downwardly biased betas drift up towards one. In our prior work we have concluded that there is little evidence of mean reversion with respect to the betas for energy utilities.14 The appropriate conclusion is that the estimates of utility betas are not downward biased. In turn, therefore, this will not be a source of downward bias in estimates of the cost of equity for utilities.

The references in the quotation beginning *“Further, Partington and Satchell…”* relates to how empirical tests are performed and, in particular, how portfolios are formed which test the relevant models. Partington is referring in particular to work by DBP who, in a very early version of work eventually submitted to the ERA, made use of some industry portfolio results which did not show bias, or indeed anything else, with sufficient statistical precision, because the data were too noisy. The ERA, in its Final Decision for DBP, attempted to use these results as evidence against bias, but misinterpreted the statistical results and subsequently withdrew the claim in submissions before the Australian Competition Tribunal as part of DBP’s challenge of its recent Final Decision.[[57]](#footnote-57) This will not, however, necessarily dissuade the AER.

The more important point amongst the three dot points in the quote above is the one relating to testing in an equilibrium, which has subsequently been developed into an “expected equilibrium framework” by the two authors. We turn to this framework below and discuss it in some detail, because it is designed to give regulators the cover they need to ignore empirical evidence inconvenient to their use of the CAPM.

I focus first on the case made by Partington and Satchell, and then on the case made by the AER itself. That latter is far more confused, but it needs to be explored because it potentially open some opportunities for us.

The reports of note from Partington and Satchell are:

* Partington G and Satchell, S, 2015, *Report to the AER:* *Analysis of the Criticisms of the 2015 Determinations,* October 2015
* 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

The first mention of the “equilibrium expected return framework appears in the October 2015 report, where the consultants note:[[58]](#footnote-58)

There is considerable discussion in the Frontier (2015, Key) report about the fit of models to realised returns. However, what we require to know in testing an asset pricing model is how well it describes ex-ante expected returns when security prices are in equilibrium. Empirical work attempts to examine how well the asset pricing model explains ex-post realised returns, which may not be a particularly good test. Fisher Black, for example, suggested that such tests might be telling us more about the shocks to expected returns (volatility) rather than the equilibrium expected returns.

This is not quite an instruction as to what regulators should aim at, but rather what asset pricing tests should be testing. Thus it is highlighting a difference between actual and expected returns and encouraging the AER to take a view that tests based on realised returns can safely be ignored, because expected and actual returns are different.

The next two reports, produced only a month apart for the AER (April 2016) and ERA (May 2015) form the core of the “expected equilibrium framework” doctrine. Moreover, although the basic thrust of the argument is the same in each case, there are subtle differences in what the consultants say between the two documents, such that it is only through reading both that one can properly understand it.

The first comment comes in the April report, where the consultants admit that the key issue is not bias in the estimation of beta, but in the CAPM model itself, but they then go on to suggest why this should not be a concern:[[59]](#footnote-59)

There is also much discussion by the regulated businesses of “low beta bias” which although widely used is a somewhat misleading term. The gist of all of this discussion is not that estimates of beta are biased, but that low beta funds have tended to outperform the CAPM benchmark. The consequence of this is not necessarily that the CAPM gives a downward biased estimate of required returns. One interpretation is that low beta stocks have positive alphas, where alpha measures the abnormal component of risk adjusted returns. Since the benchmark for alpha is zero, the so called low beta bias can also be characterised as upward bias in alpha. Realised returns would then be equal to the equilibrium required return plus alpha and plus a random error that would normally be assumed to have a zero mean. As consequence, one perfectly sensible adjustment would be to subtract alpha from realised returns in order to provide an empirical measure of the required rate of return. Depending on the magnitude of alpha the AER’s CAPM estimate of the required return might be above or below the resulting empirical measure.

This is pretty obtuse. The consultants admit that the evidence shows low beta bias (or in the consultant’s terms, that firms “tend to outperform the CAPM benchmark”). However, they suggest that this does not mean there is a problem with the model, but just that low-beta stocks have “positive alphas”, which they link to “abnormal returns” or, in a footnote to the quoted paragraph, “anomalies”. They then make the rather extraordinary claim that it is alpha that is somehow biased upwards, because data don’t match with theory. From there they reason that realised returns would be required returns, plus alpha, plus a random component; essentially replicating in words an equation from a previous paper.[[60]](#footnote-60)

This is playing with words; the “required return” to which the consultants refer is not the return which might actually be required by investors in the marketplace, which is unknown, but is just the output of a model like the CAPM. What they actually mean is that realised returns are the outputs of a model like the CAPM, plus any systematic errors it makes, plus any random errors which occur because expectations are very rarely met. This much is true, but it ignore the fact that the systematic errors are an important consideration; the whole point of the debate is whether or not investors take these systematic errors into account when forming expectations. Satchell and Partington are really asking us to assume that investors pay no attention to these errors at all, despite their prevalence in almost 40 years of research, and instead simply use the CAPM just as it appears in a first-year finance textbook as their *only* tool in developing expectations. This would surely strain the credulity of any regulator, particularly given the multi-billion dollar investment advice industry which has sprung up to exploit problems with the CAPM and develop and sell models better than it;[[61]](#footnote-61) which is probably why the consultants hide what they really mean behind confusing terms and rhetoric.

To try and clear the air a little in respect of terminology, Multinet provided the following definitions in its original AA proposal, which may also be useful going forward to combat obtuse wordplay by the likes of Partington.[[62]](#footnote-62)

Box : Defining returns

|  |
| --- |
| A *realised return* is the return that an investor realises (or actually receives) on his or her investment over some period. If the investment is risky, the realised return will not be known in advance.  An *expected return* is the expected value of a future realised return. While the expected return to an asset will, in principle, be known in advance (at least to the investor forming the expectation), it typically cannot be observed, because it is generally impossible to see inside the heads of investors and understand what expectations they are making.  A *required return* is the return that investors require on an investment. While the required return to an asset will also, in principle, be known in advance, it too typically cannot be observed; for the same reason. A required return is not synonymous with an expected return. An investor might make an assessment of a stock and decide she requires a return of ten percent in order to bear the risks associated with that stock, but might assess conditions in the marketplace and conclude that the likely returns (ie – here expected returns) are 12 percent. Only under certain conditions will expected and required returns be equal, and only under more restrictive conditions will they be equal to the returns predicted by any particular asset pricing model.  If markets are in equilibrium, then the expected return to holding an asset will equal the return that investors require on the asset and the common return can be labelled the equilibrium return to holding the asset. Like the expected and required returns, the equilibrium return will, in principle, be known in advance, but will typically not be observed.  Regulators often use asset pricing models to estimate the return that investors require on an asset. A measure of the required return produced by an asset pricing model can be labelled a modelled return. If all of the assumptions underpinning a particular asset pricing model are correct, then the modelled return will equal the expected return. The asset pricing model, however, may not be correct and the modelled return may differ from the expected return it seeks to measure. The difference between the expected return and the modelled return to a portfolio is typically referred to as the portfolio’s alpha. |

Having attempted to define the issue in such a way that the systematic errors of the CAPM are given no weight by assumption, Partington and Satchell then add some more clarity about what they believe the business of regulators should be:[[63]](#footnote-63)

The SLCAPM is based on a theoretical model of equilibrium expected returns. Equilibrium expected returns are what we want to measure when determining the cost of capital. Like the SLCAPM, the zero beta CAPM has the advantage of being an equilibrium model, but relative to the SLCAPM it has the disadvantage that the return on the zero beta portfolio cannot be directly observed it has to be estimated.

This quotation appears a little out of context, and a long way further into the document than the previous one; in fact it occurs in the middle of a discussion about the zero-beta premium. Importantly, there is nothing in the intervening text which makes the case as to why regulators should be seeking to estimate the “expected equilibrium return”; it is merely presented as a somehow self-evident fact, and indeed used as a means of assessing proposed approaches. If the AER treats the “expected equilibrium return” as a self-evident fact, then challenging the framework and getting a proper, transparent treatment of low-beta bias becomes very much harder. By contrast, mapping the concept to the ARORO would quickly highlight that there is nothing in the Rules which require, or even suggest to the AER that it needs to follow such an approach. It may thus be necessary to debate this point early in the expert conclaves so that the framework does not get treated as a self-evident fact.

The consultants then go on to attempt to re-define “low beta bias” in a way which is favourable to the interpretation of the regulator’s task in respect of expected equilibrium returns outlined in the previous two quotes:[[64]](#footnote-64)

HoustonKemp (2016) raise the issue of low beta bias in the SLCAPM and argue for the use of a zero beta CAPM. We have put the heading low beta bias in quotes, because it is potentially misleading. In the context of HoustonKemp’s report it does not mean that beta is downward biased, neither does it necessarily mean that the equilibrium expected returns from the CAPM are downward biased. In the current context, low beta bias means that equilibrium expected returns given by the CAPM for low beta portfolios are lower than the subsequent realised returns for those portfolios. The interpretation that HoustonKemp makes of this is that the equilibrium expected returns from the CAPM are downward biased, this is a possible explanation, but it is not necessarily the true explanation.

As is clear, the consultants are trying to downplay the whole issue of problems associated with the CAPM, by suggesting that this is somehow a side-issue from the task regulators ought to perform; a distraction perpetrated by businesses. There is no mention of the fact that the “interpretation” made by HoustonKemp is entirely consistent with standard empirical finance; something which is at least made clear in a subsequent report (see below).

This theme is expanded further later in the report such as:[[65]](#footnote-65)

The regulated businesses repeatedly argue that application of the Black CAPM will help correct “low beta bias”. What “low beta bias” actually means is that there is a tendency for low beta stocks to overperform and high beta stocks to underperform relative to the CAPM, but if this is (and there is substantial evidence that it is) the case, this does not necessarily imply anything other than that the stocks have outperformed or underperformed. The SLCAPM can still be used in the usual manner to compute the equilibrium expected return to the asset

And then:[[66]](#footnote-66)

We believe that the statement above should read counter-intuitive, not counter-initiative. We agree that the results of NERA (2015b) can be seen as counter intuitive relative to the description of equilibrium expected returns from the CAPM. In particular, a zero beta premium equal to the market risk premium is implausible. However we also agree with HoustonKemp (2016) that a relatively flat or inverted relation between beta and realised returns is quite common in empirical work, particularly using data from more recent periods. What this shows is that low beta shares have had realised returns that outperformed and high beta shares have had realised returns that underperformed relative to the CAPM equilibrium expected return benchmark. This may or may not be because the CAPM is a poor model of equilibrium returns and some examples of varying explanations are given in Handley (2014). Harvey, Liu and Zhu (2015) report more than 300 variables have been found significant in explaining the cross section of realised returns. Possibly one or several of these variables might explain the divergence of realised returns from the CAPM. The question is do any of these variables determine equilibrium expected returns and that is a question that is unresolved.

The key takeaway from this comment is the way the consultants draw the distinction between findings of low-beta bias and what they see as the task of a regulator in respect of forming an estimate of equilibrium expected returns. In particular, all of the evidence is immaterial only if one is seeking to understand expected equilibrium returns and (although this is not mentioned), if one believes that the particular equilibrium is that described by the CAPM.

The next report, for the ERA, adds some more clarity to this framework, particularly as it pertains to the regulatory task. The consultants start by adding clarity about what asset pricing models ought to be used for, and the inter-relationship between the different types of returns outlined in Box 2 above, noting:[[67]](#footnote-67)

Our reading of DBP (2016) submission in relation to model adequacy tests is that this is a masterpiece of marketing that could easily lead the unwary reader into believing that the purpose of asset pricing models was to forecast returns and that therefore the test of an asset pricing model’s adequacy is whether it predicts subsequent returns. So let us be absolutely clear that the purpose of asset pricing models is to determine the ex-ante return that investors require. When prices are in equilibrium this required return is equal to the expected return, but there is no guarantee that expectations will be realised, or that prices are always in equilibrium. If there were a guarantee that expectations would be realised then the asset would have no risk. The consequence of the foregoing for asset pricing tests is well expressed by Davis (2011, p3):

The key error is that asset pricing models do not “determine” required returns at all. Instead, they merely proxy what would be the required returns in a marketplace if a number of simplifying assumptions about that marketplace were true. Required returns are something unobservable, like expected returns (see Box 2 above). This is an important distinction to make; if one accepts a view that models determine the required return, then they are all that is needed to meet the ARORO, but if one accepts a more standard view that they are mere (assumption-laden) proxies of required returns, then there is a need to look beyond the models. The choice of words by Partington and Satchell, in this context, was entirely deliberate and intended to convince the AER not to look beyond models.

The consultants then add clarity to their original comments (pp8-9) of the April report outlined above, by presenting the ERA with a clear alternative (which the ERA took, but the AER did not) way to think about the issue and importance of bias:[[68]](#footnote-68)

The ‘problem’ thrown up by many SL CAPM tests is that they have a positive intercept. The financial industry tends to regard this as ‘smart beta’ i.e. low risk stocks outperform high risk stocks; this outperformance is often understood in behavioural terms. In this context, if an adjustment is necessary, it would be to subtract the intercept rather than adjust beta. This merits some explanation as it contrasts with the usual claim for a need to adjust the risk free rate upwards, as in the usual arguments for adopting the Black CAPM.

This usual argument for the Black CAPM is based on the premise that actual returns are equal to equilibrium returns on average and thus a positive intercept in tests of the SL CAPM are assumed to be driven by the SL CAPM underestimating (overestimating) realised returns for low (high) beta stocks. An alternative premise is that the results are a consequence of actual returns outperforming (underperforming) equilibrium returns for low (high) beta stocks. In the parlance of funds management such outperformance is expressed as alpha. Thus low beta stocks have positive alphas. In this case an estimate of the equilibrium return is obtained by subtracting alpha from the actual return. Whether the resulting return is then higher or lower than the regulated return is an open question and will depend upon the magnitude of alpha and beta.

In simple terms, as the consultants make clear, the normal approach is to assume that actual returns equal required returns on average (an assumption that the AER criticised Multinet for making – see below), but one can confect a different way. That is, as in the April report, assume that required returns are something produced by a model (here the CAPM) and thus, to the extent that you use realised returns at all, subtract the “alpha” from them; equivalently, use the CAPM in its textbook fashion (see above).

This is in fact what the ERA did; it shifted from an assumption that actual returns over a long enough time period give some indication of required returns to an assumption that only the CAPM could do so. As is clear from the quotation above, Partington and Satchell give no evidence to suggest that this novel approach is the best approach, or that it is widespread (ironic given the number of pages the devote to criticising HoustonKemp, CEG and Frontier for advocating the Black CAPM on the ground that there is no evidence of its use), but instead simply mention it as a kind of “good idea”. If we allow this kind of reasoning to pervade the Guidelines, we have lost before we begin.

The recommendation of the consultants to the ERA is summed up towards the end of the report thus:

We need to be clear what unbiased means. If it means that the DBP Black CAPM estimates, when subject to a model adequacy test as proposed by DBP are such that the model adequacy test is not rejected, then they are generally unbiased, at least with respect to the beta sorted portfolios. However, this view of unbiasedness then gets translated into a view that the regulator who uses the SL CAPM is providing investors with approximately 4% per annum less compensation. This treats low beta ex-post returns as equilibrium returns. Here and elsewhere in the document we take the view that the low beta anomaly is indeed an anomaly. The correct regulatory return would be more sensibly based on subtracting the intercept term from returns, not adjusting the slope and certainly not treating the Black CAPM (unbiased) returns as fair compensation. The more so since the SL CAPM industry portfolios also pass the unbiasedness test.

Apart from continuing their advocacy of not using ex-poste returns as any indication of expected equilibria, the main objection appears to be that the approach used by DBP simply gave an answer which was much too big. It is worth noting that Multinet agreed with Partington and Satchell that adjusting beta (the slope) was the wrong approach and instead used alpha (adding it, rather than subtracting it, consistent with a view that one model is not the expected equilibrium return). As noted above, the assertion that the industry portfolio results pass the unbiasedness test is wrong, and the ERA later retracted this assertion before the Tribunal.

The last of the Satchell and Partington reports referred to above is also the only one which responds directly to the Multinet approach, in June 2017. Multinet’s AA Proposal responds forcefully to the flaws of the “expected equilibrium framework”, subjecting it to a little of the scrutiny it would (and should) face from experts during this guidelines process if we are able to ensure it gets debated. Their response was to take a step back.

The consultants begin by taking a slightly different tack to previous reports and suggesting that use of actual returns by regulators could introduce a degree of circularity:[[69]](#footnote-69)

The Houston Kemp (2016 Nov) report makes a great deal of the apparent low returns from the CAPM for low beta stocks as opposed to returns subsequently realised and sets up unbiased forecasts of realised returns as the criteria for selecting a rate of return model. It is therefore appropriate to consider how such evidence may be interpreted. Interpretation may be conditional on the lens through which the evidence is viewed. Consider, for example, a study of the returns obtained by shareholders in regulated utilities relative to the equilibrium returns according to the CAPM. Further suppose that the study showed that the returns subsequently realised by shareholders were greater than those determined by use of the CAPM. We suggest that consumers would likely interpret this as the regulators being too benign in setting allowed returns, resulting in regulated utilities earning more than was justified. Conversely, we expect that regulated utilities would either argue that they had been super-efficient, or as in the current case, that the CAPM underestimated the required rate of return.

This is not true. The HoustonKemp work was quite deliberately targeting returns by firms outside the energy sector to compare what the CAPM said these firms should earn, and what they subsequently earned, to avoid the problem of circularity. However, at a superficial level, misleading statements like this might appeal to other stakeholders with a vested interests in low rates of return, and may become part of the Guidelines debate.

There is also a subtle change in the arguments, from the bald reliance on an “expected equilibrium framework” which is different from realised returns, and a focus instead on an hypothesis that these two things might in fact coincide in the long run, but that markets might be out of equilibrium for very long periods of time, and this might be why one sees failure of the CAPM. Thus:[[70]](#footnote-70)

Abstracting from the issue of self-interest, the objective question is whether the benchmark for required returns is given by the CAPM, or by the returns subsequently realised. To put it another way is the bias in the CAPM, or in the realised returns. It is true that a substantial number of academics, presumably not motivated by self-interest, have implicitly or explicitly concluded that realised returns are the appropriate benchmark. Thus, the evidence that returns to low beta stocks according to the CAPM are below returns subsequently realised has been interpreted by such academics as evidence of a downward bias in the CAPM. We note, however, that this is not a universal view.

Those who hold the view that CAPM returns are biased are likely influenced by the idea that markets are efficient and in equilibrium, hence realised returns are an appropriate benchmark. They also take as given that the method used in the analysis conducted by the researchers was correct. With respect to the former, the idea that markets are continuously efficient and in equilibrium is increasingly challenged by the proponents of behavioural finance and of course by practitioners who seek to profit by earning alpha (abnormal returns). As we discuss later divergence between equilibrium expected returns and realised returns is possible and may persist for extended periods. With respect to the research methods used, these have been challenged and the literature critical of the tests used in relation to asset pricing models continues to grow. In this respect, Lewellen, Nagel and Shanken’s (2010) paper “A skeptical appraisal of asset pricing tests” has a particularly appropriate title. It is appropriate to be sceptical about the results of tests of asset pricing models.

Here we see an attempt to establish two camps within the academic community; one which thinks that models produce descriptions of equilibria, and one which thinks that realised returns do. There is no attempt to suggest where the balance lies in the size of these two camps; largely because Partington and Satchell know that almost nobody would simply reject empirical evidence in the way they suggest. However, showing the existence of differing views is a useful way to provide regulators cover for what they intended to do anyway and is perhaps Partington’s most common rhetorical trick.

The basic premise, that the AER can adopt an “expected equilibrium” framework which allows it to ignore empirical evidence is still present, but it appears slightly muted compared to previous papers. Note:[[71]](#footnote-71)

We agree with Houston Kemp (2016 Nov), that a substantial number of previous studies find that the estimates of return from the CAPM for low beta stocks are less than the returns subsequently realised. However, taking this evidence at face value, there is a considerable difference between CAPM estimates of the return required on a low-beta asset being lower than subsequent returns and a downward bias in CAPM estimates of required returns. Furthermore, it is quite clear to us that, if CAPM returns and subsequent realised returns differ, it does not necessarily require a beta adjustment upwards. Such a solution might be appropriate if it was unambiguously clear that there was a CAPM bias and it was due to downward bias in the beta. However, to the extent there is evidence for bias it is evident in alpha not beta. Furthermore, if the source of the higher returns was systematic outperformance of stocks relative to their required returns, different adjustments would be required, rather than adjustments to beta. This would include the subtraction of alpha from realised returns, as we outlined in our previous report to the ERA, Partington and Satchell (2016 ERA, p15), and which we quote below.

The quotation they refer to is the one above which suggests one could subtract alpha. There is a bit of confusion here in respect of bias in beta (estimates) and the downward bias of the model for low beta stocks, but the previous quotation on this point makes it clear that Partington and Satchell are not deliberately trying to mix the two; what they do say is that, unless you think that the problem lies in the estimation of beta itself, you should not adjust it, as the AER does. They then go on to repeat the line about subtracting alpha, but the context of their previous work which suggests trusting models over data, and they note with the phrase “this would include” that there might be other approaches; that is to say, the normal approach of adding a factor to reflect the downward bias that they alluded to previously.

Partington and Satchell then appear to have an even stronger each way bet with the following:[[72]](#footnote-72)

Houston Kemp (2016, Nov, p36) comment on this as follows:

“The advice of Partington and Satchell is that no matter how large an estimate of [the alpha] turns out to be, attribute the estimate to ‘outperformance’ and deduct the estimate from the sample mean of the series of realised returns. This is unusual advice.”

This remark by Houston Kemp (2016 Nov) somewhat misstates our position as inspection of the two quotations makes clear. Furthermore “smart beta strategies” and many other strategies promoted by the fund management industry rely on a belief that divergence from equilibrium returns can be exploited to extract additional abnormal returns (alpha). Thus our advice is not so unusual.

HoustonKemp were responding to the Partington and Satchell quote above pertaining to subtracting alpha from their May 2015 report for the ERA. Partington and Satchell’s response is more than a little disingenuous; what they actually said is that, although others added alpha, regulators should subtract it. Here they appear to be saying that, because they mentioned that others did the precise opposite of what they advocated, their advice was not unusual. In fact, if the fund management industry really is relying upon a belief that they can exploit a divergence from equilibrium (that is CAPM model) returns, then this must imply that expectations are not being formed by textbook use of the CAPM, that the systematic errors the model makes do matter for expectations, and thus that the “expected equilibrium framework” cannot be used.

The section concludes by examining the “out of equilibrium” hypothesis a little further, and in a way that assists us, by essentially making a point like that made by me above.[[73]](#footnote-73) Thus:[[74]](#footnote-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.

The consultants are making things reasonably clear here; if the market is not in equilibrium, then the CAPM is not going to give you very useful forecasts and would need to be augmented with something which describes expected (non-equilibrium) excess (that is, to the CAPM) returns. The consultants have, just previous to this, described long periods of disequilibrium.[[75]](#footnote-75)

This gives a pretty obvious starting point for the expert conclaves to cut through some of the obtuse rhetoric and get to the heart of the matter; if the markets are not expected to be in equilibrium, then we have no “expected equilibrium framework” and, as Partington and Satchell themselves point out, the CAPM all by itself is simply insufficient for determining the appropriate return on equity allowance. Knocking the idea away like this at the outset would certainly be preferable to slogging through long sessions trying to determine how investors actually form expectations.

This is useful because of what the AER said in response to Multinet about its use of “expected equilibrium frameworks”, which I discuss further below. To get there, we need first to chart the AER’s evolving view of low beta bias; informed by, but subtly different from, the views of Partington and Satchell above.

Perhaps the most fulsome view of the AER’s current position on bias can be found in the Multinet Draft Decision of July 2017.[[76]](#footnote-76) This responded to Multinet’s approach of addressing low beta bias via an “alpha adjustment” (essentially adding a constant to the CAPM) where the size of the alpha was calibrated by comparing CAPM forecasts with subsequent actual returns. The AER did not seem to have an objection to an alpha adjustment per se, but rather the fact that the adjustment was made using data from actual returns.[[77]](#footnote-77)

The AER does not appear to be in any doubt that the CAPM performs poorly when tested against realised returns. It notes, for example:[[78]](#footnote-78)

We acknowledge that the Sharpe-Lintner CAPM tests poorly using ex post returns data, and appears to underestimate the ex post returns for businesses with an equity beta less than one.

The issue comes when considering what to do about this. The AER is of the opinion that realised returns cannot be used to assess whether the CAPM is right or wrong. This has two bases; the AER appears to believe that realised and expected returns are two different things, and the advice from Partington and Satchell (see above) that the AER ought to be focussing on “expected equilibrium returns”.

In respect of realised versus expected returns, the AER says:[[79]](#footnote-79)

Realised returns can differ from expected returns over a persistent period of time and capture myriad factors that can contribute to realised returns being higher than Sharpe-Lintner estimates such as economic shocks and outperformance. Partington and Satchell have also advised that it is sensible to 'subtract alpha from the realised returns in order to provide an empirical measure of the required rate of return.

The reference to Partington and Satchell is to the arguments outlined above by those consultants supporting an “expected equilibrium framework”. The AER goes further arguing:[[80]](#footnote-80)

We note the use of ex-post data to compute adjustments is not dissimilar to previous regulatory processes where service providers submitted on the empirical performance of the Sharpe-Lintner CAPM and proposed use (or elements) of the Black CAPM and Fama-French model for estimating the return on equity. These models effectively use ex-post data (in combination with additional assumptions) to adjust the Sharpe-Lintner CAPM by including additional terms (for example, the Fama-French model adds size and value terms) or changing certain terms (for example the Black CAPM replaces the risk free rate with the zero beta rate).

We do not agree with Multinet's proposed use of ex-post data. Such a method assumes that 'markets are efficient and in equilibrium, hence realised returns are an appropriate benchmark'. However, as noted above, expected returns can diverge from realised returns over a persistent period of time, markets can be in disequilibrium and expectations are not always realised even on average. Partington and Satchell advised that 'the idea that markets are continuously efficient and in equilibrium is increasingly challenged by the proponents of behavioural finance and of course by practitioners who seek to profit by earning alpha (abnormal returns)'

The first leg of this argument is simply an attempt to tie the Multinet approach to the multiple model approach which the AER had previously rejected. Things then get confused. The AER is correct in a narrow sense that Multinet’s use of realised returns assumes that there is some kind of “efficient market equilibrium” which can be discovered by looking at actual returns if the time series is long enough; that is in fact why most of the literature tests models against actual returns.

However, its argument then falls in something of a heap; the CAPM requires not only that markets reach an equilibrium in the long run (required by tests of any model using actual returns) but that it reaches, or is expected to reach, equilibrium in every single period. Therefore, one cannot, logically, reject results from a test which requires equilibrium be reached in the long run, and then instead use a model which requires said equilibrium to be reach in (every) short run as well. Realised returns may be different from expected returns, even for long periods of time, and even forever, but this chain of reasoning leads the AER nowhere useful.

Moreover, if the AER was minded to believe that the CAPM might not be strictly correct in theory because of arguments like that made in the preceding paragraph, but that from a practical perspective, it ought to sufficient to use the CAPM to give a rough approximation, knowing that the answer would not be perfect, then it would be disappointed. Roll and Ross have examined this question and find, to their consternation, that:[[81]](#footnote-81)

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

I now turn to the second basis noted above for concluding that realised returns are different from expected returns and therefore of little value, and this is the “expected equilibrium framework” of Patington and Satchell. As discussed above, provided markets were in equilibrium (and that equilibrium was the one described by the assumptions underpinning the CAPM) then this would be valid. However, the AER never gets there, because it suggests it is not assuming markets are in equilibrium.

In Multinet’s AA Proposal, it addressed the issue of an “expected equilibrium” framework, as the AER’s experts Partington and Satchell have recommended to both the AER and ERA. The AER responds by noting:[[82]](#footnote-82)

We agree that the regulatory task does not specify an equilibrium rate of return. Our assessment of the various equity models and material submitted to us is based on their merits and suitability for our regulatory task. To that end we deploy the Sharpe-Lintner CAPM for the reasons extensively discussed in this decision and all previous decisions including our Guideline.

If this is in fact what the AER does, then, as noted above, its own consultants have told it that it must use something else. However, the problem deepens still further when, later on the same page, the AER notes:[[83]](#footnote-83)

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.

The second statement in no way follows from the first; the CAPM only provides sensible results in a situation of equilibrium (or, to put it in Partington and Satchell’s terms, an “expected 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, the AER has dug itself into something of a logical hole; it rejects empirical tests using actual returns on the grounds that markets may not reach equilibria even on average and in the long run, ignoring the fact that this world-view also invalidates the use of the CAPM. It then goes on to explicitly reject an assertion that it assumes an expected equilibrium, which has the implication that its beta estimates must be wrong, and that its use of the CAPM is further misplaced.

The above, from the Multinet Draft Decision, may be simple reflexive denial of every point the business has made without really thinking through the consequences of what it has written. The AER may have come to realise this error. In the November Final Decision for the APA VTS, it notes:[[84]](#footnote-84)

We also wish to clarify our statement that ‘we do not adopt an equilibrium expected return framework’ in the draft decision. Our statement was in response to Multinet mischaracterising our regulatory task and that we give limited consideration to realised returns. Our regulatory task is to estimate the required return on equity for the benchmark efficient entity with a similar degree of risk as Multinet in supplying the reference services. This must provide ex-ante compensation for efficient financing costs as our regulatory regime is an ex-ante (forward looking) regime.

We do not reject information from realised returns. However, we do not agree using it for assessing asset models as proposed by Multinet’s original proposal. Realised returns are typically submitted as part of tests of asset model performance. Realised returns can diverge from expected returns myriad reasons (as noted above) and may not always be realised. This raises questions about adjustments based on realised returns.

We note that there are issues with empirical tests of asset model performance (see above and section B.1.2) which cast doubt on the usefulness of realised returns for assessing asset models. For example, Multinet is testing the model against actual outcomes which can capture a range of additional factors such as outperformance and economics shocks.

However, we do not disregard realised returns. We have assessed that historical excess return is suitable for estimating when estimating forward looking parameters for the Sharpe-Lintner CAPM and give it appropriate regard consistent with its merits.

It is not clear that the AER have clarified anything at all; certainly not that they do in fact assume equilibria, but the use of the word “clarify” may be a signal that the AER has seen that it will need to step back from its position in the Multinet Draft Decision if it is to make a coherent argument which can be used to reject the low beta bias phenomenon.

***Conclusion: The AER is alive to the issue of the bias of the CAPM and what the evidence associated with realised returns means. It may take several approaches to deal with this, including:[[85]](#footnote-85)***

* ***Adopting the “expected equilibrium framework” of Partington and Satchell which is designed to allow them to ignore this evidence.***
* ***Insisting that businesses provide evidence that said bias is priced ex-ante, and is not just something which is an artefact of modelling, and to play around with the notion of bias in general and what it really means.***

***Alternatively, the AER might recognise the issue and say it is dealing with it, but then add other countervailing factors which reduce the CAPM output just as accounting for low-beta bias increases it. This would have the advantage of avoiding a fight about bias, and instead shifting the fight to nebulous “other factors”, which would probably be subjective in nature and designed to be impossible to disprove.***

***If the former approach is taken, then the debate needs to start with principle, and then proceed to appropriate empirical analysis. It is likely, however, to require evidence from other than realised returns (see below) despite the well-founded nature of such evidence, because of the ongoing statements by the AER and its consultants about the unreliability of realised returns.***

***If the latter approach is taken, there is no need for the principled debate, because the point of low beta bias is accepted. We will instead need to focus on the other factors the AER proposes and ensure that these are only included if they can be determined in a robust fashion (see the discussion on the capability of having a reasonable basis in the MRP section above). To this end, adopting a rigorous standard for low beta bias evidence, via the expert conclave, may assist in weakening the case for more ad-hoc adjustments.***

ERA approach

The ERA Guidelines process is likely to require a slightly different approach towards the issue of downward bias, chiefly because it has accepted the “expected equilibrium framework” of Partington and Satchell. It is useful to understand how the ERA arrived at this position, because it started its 2013 Guidelines more clear than the AER about the nature of the issue of low beta.

Briefly, at the time of its 2013 Guidelines, the ERA was much clearer in recognising that the problem of the CAPM was its downward bias associated with the empirical results; it even undertook to quantify that bias at some stage in the future.[[86]](#footnote-86) However, as noted above, its own increasing estimates of beta caused it to change its arguments through time, and the ERA’s case got more confusing.

By the time of the DBP and GGT Final Decisions, the mean estimate of beta was 0.7. However, the ERA now had access to the Partington and Satchell work which exhorted it to adopt an “expected equilibrium framework”.[[87]](#footnote-87) Under such a framework, there is logically no adjustment to the CAPM associated with any downward bias or “anomalies”, because, as outlined above, this framework is synonymous with saying “if the data contradict the model, ignore the data and accept the model”. The ERA accordingly made no adjustment to its textbook CAPM estimation.

A more detailed treatment of the ERA’s changing approach to the issue of bias was filed by DBP as part of its challenge on this point before the Tribunal. This can be read on pp 28 to 46 of the Submission filed by DBP to the Tribunal on 24 October 2016.[[88]](#footnote-88) DBP’s case in respect of the ERA’s errors in ignoring downward bias is summarised on pp 48-59 of the same document, and again (more briefly) in the submission in reply to the ERA filed with the Tribunal on 21 December 2016. These may be of some use if the AER follows a similar tack to the ERA in respect of bias, and I do not repeat them here to save the reader from wading through more of the tortured logic of the previous few pages.

The ERA has indicated that its Guidelines will essentially reflect what was in its Final Decision for DBP and GGP (absent of any Tribunal decision which overturns these in the meantime) and, if this is to be believed, the issues of downward bias requires a different treatment than is the case for the AER. On the one hand it is simpler; the ERA just uses a limited number of five-year beta estimates and it has accepted adjustment in alpha not beta, which means there is no debate about judgement-driven ranges and points on ranges to account for different factors.[[89]](#footnote-89) All we need to focus upon is evidence pertaining to alpha to try and capture upside, as the ERA’s mean calculation of beta is already at 0.7 (or higher) and would only change if the ERA changes how beta is estimated.

On the other hand, it could be more difficult. The ERA has made it clear that it is using an expected equilibrium framework, and thus that it is not willing to consider evidence from actual returns.[[90]](#footnote-90) However, it has left the door open to new evidence:[[91]](#footnote-91)

The Authority has concluded that, if any adjustment could be justified, it should apply to the intercept term in the SL-CAPM, thereby taking account of the alpha term arising in ex post tests of the model. However, the Authority is not convinced there is adequate evidence, at the current time, to justify making such an adjustment.

The evidence the ERA had seen “at the current time” was the DBP evidence based on actual returns, which the ERA sees as:[[92]](#footnote-92)

….a major problem for ex post tests of asset pricing models, such as that proposed by DBP. Rational investors do not take on the additional risk of equity expecting it to deliver less than less risky debt, yet this has been an actual outcome in the market over recent times. DBP is not actually testing the return on equity models against investors’ expectations for the return, ex ante, as it needs to do in order to determine whether the outputs of the asset pricing models are biased. Rather, it is testing those models against actual outcomes, realised ex post. DBP has not recognised this distinction, which constitutes an error.

The obvious solution is to show the ERA some evidence, not presented at the time of DBP’s Final Decision, associated with true expected returns. This is covered in the following section. If this is accepted by the ERA, there is a much clearer pathway to an outcome acceptable to business with proper accounting for the low beta bias of the CAPM than is the case with the AER, because all that is required is some agreement on how to calculate alpha given evidence that all parties agree ought to be given some weight.

Optimal transparent approach

As alluded to above, there are three elements to an optimal approach before the AER, which encapsulates appropriate degree of transparency. The first of these is to gain clarity on exactly where the AER stands in respect to “expected equilibrium frameworks”, and to make sure this is debated in the expert conclaves, starting with the question of whether it is reasonable to assume that markets are likely to be in equilibrium for the next few years. This simple question, as noted above, shot-circuits much of the tortured debate about expectation formation, as the AER’s own consultants make it clear the CAPM alone cannot work unless the market is expected to be in equilibrium.

The remaining two elements reflect what one ought to do, pragmatically, in order to augment the textbook CAPM and provide a reasonable poxy of what investors are expecting in respect of the returns of the BEE. In particular, the questions should turn on whether it is feasible to come up with a reasonable quantification of the adjustment needed to ensure the foundation model can reflect investor expectations, rather than relying simply and solely on regulatory judgement as per 2013.

The second point, therefore, is to try and expand the evidence which the AER deems acceptable. In the past, it has cast doubt on evidence associated with realised returns, but such arguments have less force if we can present empirical data which are associated with genuine expectations of returns from at least some players in the market.

On this topic, there is an additional source of information which we could utilise. During the course of the DBP appeal, the ERA introduced new evidence which had not been considered during its decision process for DBP (nor at any stage by the AER), which made use of analyst forecasts as proxies for expected returns.[[93]](#footnote-93) The authors use this data to test whether various factors (including beta, the Fama French factors and momentum) in different models explain cross sectional expected returns, and they use analyst forecasts, from Value-Line and First Call, to explicitly avoid the concern the AER raises of the links (or lack thereof) between expected and actual returns.

The paper is part of a small, but growing literature which makes use of analyst forecast and other financial and accounting data in order to examine asset pricing models and explore questions associated with expected rates of return.[[94]](#footnote-94) Using Australian data, for example, Truong and Partington find that estimates of expected return produced from valuation models using analyst forecasts of dividends and earnings show little relation to estimates of beta.[[95]](#footnote-95) Truong and Partington 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. This is somewhat different to the advice Partington provides the AER.

Of course, analysts are not “the market”, and their forecasts can be considered to be useful information about market expectations only if there is evidence that their views are used by other market participants in forming their own investment plans, and if there is some evidence that their analysis “moves” markets (that is, that it is consequential in asset pricing by markets).[[96]](#footnote-96)

There is a very large literature on the role that analysts play in markets.[[97]](#footnote-97) However, many authors find that sell-side analysts produce reports that are widely used by buy-side analysts in major investment houses and by fund managers, particularly the reports of “star” analysts with a good track record, and particularly in order that these investment decision-makers can get up to speed quickly .[[98]](#footnote-98) More pragmatically, sell-side research is a multi-billion dollar industry worldwide, and all those analysts must be producing some useful output. There is also evidence that analysts can move the market, focusing in particular on the impact on price which obtains when analysts change their recommendations (for example, from “buy” to “hold”), and can do so in significant ways.[[99]](#footnote-99)

The point of this short discussion is not to be comprehensive, but simply to point out that there is a literature which makes use of different measures of market expectations, particularly information in analyst forecasts, in order to understand how asset pricing models are linked to said expectations, and avoid any problems which might exist (noting that the majority of the literature uses actual returns as a proxy for expected returns) between actual and expected returns. Moreover, there appears to be evidence that analyst forecasts do indeed represent an important part of investor expectations. This literature could therefore form part of the evidence the AER considers. Stephen Gray is currently considering this evidence for AGIG and APA in the context of the ERA, where it has more immediate application (see above). This work could be adapted to the AER context, but ideally, this needs to happen before the expert conclave, so it is the experts, not the AER, who consider it.

The major objection to the evidence is that he AER has already suggested (when assessing DGM estimates) that analysts are likely to give forecasts that are biased upwards.[[100]](#footnote-100) The AER might argue that results based upon these expected returns contain the most upward bias, those based on actual returns some upward bias and the predictions of the CAPM no bias at all. However, what this would mean is that the only data we have on expectations about returns is actually the worst data about expected returns. This might be credible if the AER could show that analysts are essentially talking into a vacuum and are ignored by all investors when they make investments, but this would be a difficult case to make; as noted above this is not the finding in the literature.

The third point we need is agreement amongst experts as to how the technical analysis ought to proceed in order that it might be used by a pragmatic regulator; essentially agreement on “best practice” empirical work. This is to prevent consultants like Partington taking pot-shots at empirical evidence on the basis that there might be different ways of doing it, or it might contain a flaw, and that changes might lead to different conclusions. In simple terms, there needs to be some buy-in as to how the relevant empirical work is done.

1. To a certain extent, this also assists in understanding where the ERA might go. In conversation, ERA staff have indicated the DBP Final Decision represents the starting point for their guidelines. [↑](#footnote-ref-1)
2. Henry O, Estimating Beta – An Update: Report for the AER, April 2014, p63 [↑](#footnote-ref-2)
3. To be fair, the results from Henry were available only after the Guidelines were complete, but the AER could easily have adapted its approach in the first decisions after the Guidelines had it so chosen. [↑](#footnote-ref-3)
4. AER, Rate of Return Guidelines: Appendices, December 2013, p53 [↑](#footnote-ref-4)
5. See AER, 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. [↑](#footnote-ref-5)
6. See, for example, AER, Rate of Return Guidelines: Appendices, December 2013, p57-67, where the AER refers to different estimates “sporting the range” of 0.4 to 0.7. To be fair, as described by the AER, most ranges at that time fell within this range. By the time of the Jemena Draft Decision in November 2014, the first after Henry’s 2014 report (which post-dated the Guidelines), the AER suggested that Henry’s results gave them confidence that the equity beta fell in the range of 0.4 to 0.7 and, despite reporting some of Henry’s results, they do not appear to mention Henry’s own conclusion that the relevant range was from 0.3 to 0.8 (see AER, 2014, Draft decision Jemena Gas Networks (NSW) Ltd Access arrangement 2015–20 - Attachment 3: Rate of return, November 2014, pp257-261. [↑](#footnote-ref-6)
7. AER, Draft Decision Multinet Gas Access arrangement 2018–2022: Attachment 3 – Rate of return, July 2017, p80. See also Partington G and Satchell S, 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 [↑](#footnote-ref-7)
8. This focusses mostly on the Multinet Draft Decision. Prior to that decision, the AER essentially ignored changes in beta. That is, despite there being evidence from the ERA of a rise in beta since 2013, in the various decisions from the AER, evidence in studies after 2013 were ignored, and the AER repeated the line of the Guidelines about the range of 0.4 to 0.7 and the consistency between long and short time period estimates. For example, see AER, 2016, Draft Decision TasNetworks distribution determination 2017–18 to 2018–19: Attachment 3 – Rate of return, September 2016, pp121-29. The AER includes ERA estimates of the equity risk premium and MRP from the ERA from its 2016 decisions, but not beta. The ERA’s beta estimates are first mentioned in the TasNetworks Final Decision of April 2017 (Attachment 3 pp256-7). [↑](#footnote-ref-8)
9. AER, Draft Decision Multinet Gas Access arrangement 2018–2022: Attachment 3 – Rate of return, July 2017, p273 [↑](#footnote-ref-9)
10. See the discussion on this point in the Multinet Draft Decision of July 2017 (Attachment 3, pp272-4). Not only did the AER apparently do such tests, but they also suggested a framework for doing them in future. Detail on the tests was provided in the staff paper eleased by the AER on beta on Feb 8th 2018 [↑](#footnote-ref-10)
11. AER, Draft Decision Multinet Gas Access arrangement 2018–2022: Attachment 3 – Rate of return, July 2017, p59 [↑](#footnote-ref-11)
12. AER, Draft Decision Multinet Gas Access arrangement 2018–2022: Attachment 3 – Rate of return, July 2017, p270 [↑](#footnote-ref-12)
13. Note – the tables here are those provided by the AER previously to Multinet. The AER released the analysis it purports to have done for that decision on the 8th of February 2018 in a staff paper on beta to assist in the Guidelines. However, the results are very different with portfolio betas roughly 0.1 lower. This is because the AER changed the gearing it assumed for SKI. [↑](#footnote-ref-13)
14. And earlier in reports with Partington’s previous collaborator, Michael McKenzie. See, for example, the discussion in MckKenzie, M & Partington, G, 2014, Report to the AER Part A: Return on Equity, October 2014, pp10-13 where the consultants dispute the effect of leverage for regulated firms (with their supposedly stable revenue streams) on beta. The AER may be minded to use reports like this to assist it in keeping the ceiling for beta at 0.7 by arguing that subsequent changes are due to leverage alone, and this is less relevant than it considered in 2013. [↑](#footnote-ref-14)
15. See Partington G and Satchell, S, 2017, Report to the AER: Issues in Re-Levering Beta and Testing for Structural Breaks, September 2017, pp5-14. [↑](#footnote-ref-15)
16. AER, 2017, Regulatory Treatment of Inflation – Final Position, December 2017, p22. [↑](#footnote-ref-16)
17. AER, Draft Decision Multinet Gas Access arrangement 2018–2022: Attachment 3 – Rate of return, July 2017, p82 [↑](#footnote-ref-17)
18. AER, Draft Decision Multinet Gas Access arrangement 2018–2022: Attachment 3 – Rate of return, July 2017, p271. The set of firms which the AER uses to calculate beta over its favoured longest available time series also contains firms which have significant amounts of non-regulated business activities. [↑](#footnote-ref-18)
19. AER, 2013, Rate of Return Guidelines Explanatory Statement, December 2013 pp34-35 [↑](#footnote-ref-19)
20. AER, Draft Decision Multinet Gas Access arrangement 2018–2022: Attachment 3 – Rate of return, July 2017, p24-29 [↑](#footnote-ref-20)
21. See SFG, 2013, Regression-based estimates of risk parameters for the benchmark firm, July 2013, available from: <http://www.aer.gov.au/system/files/Report%207%20-%20Beta%20Parameter%20Estimates%20%28Final%29%20-%2024%20June.pdf>. Table 6. Note that, although the US data are dated compared to the Australian data, US betas are a little more stable and in fact appear to have fallen slightly in recent years. [↑](#footnote-ref-21)
22. McCauley, I, 2017, Submission to Australian Energy Regulator on Rate of Return Guidelines, December 2017, p4. Note that this was merely mentioned; not turned into a core argument in the submission. [↑](#footnote-ref-22)
23. It does this because it recognises that the time series of market data is likely to exhibit structural breaks, meaning older data are no longer relevant. However, it eschews a formal test, which it believes may be difficult to do robustly, and instead adopts a five-year estimate (ERA, 2013, Explanatory Statement for the Rate of Return Guidelines, p171) [↑](#footnote-ref-23)
24. Note that the ERA itself does not lay out what it does with anything like this degree of clarity and certainly did not do so in the Guidelines (it only confirmed it was using confidence intervals when ATCO suggested its range had no basis), but is rather the result of working through a number of ERA decisions and the descriptions therein of what it has done. [↑](#footnote-ref-24)
25. All of the models listed are just different econometric techniques. [↑](#footnote-ref-25)
26. Note that the ERA no longer uses this range in any substantive way, as it has determined that it should not adjust for downward bias by adjusting beta away from its “central, best estimate”, and has in any event determined that no adjustment is necessary. [↑](#footnote-ref-26)
27. It noted also that it had determined not to make adjustments in beta anymore but to make an “alpha” adjustment (add a constant to the results of the textbook CAPM. However (DBP FD App 4 [436]) it noted that nobody had provided any evidence based on expected (not actual) returns which would give it reason to set an alpha other than zero. This is why the WA businesses have engaged Frontier to do work based on analyst forecasts, which are based on expected returns. [↑](#footnote-ref-27)
28. If we used ten years as the fixed number, we keep 2012 in 2019, but we lower our beta estimate right now compared to keeping data only from 2009 (the AER’s structural break) onwards. [↑](#footnote-ref-28)
29. See <https://www.aer.gov.au/system/files/Australian%20Pipelines%20and%20Gas%20Association%20-%20submission%20on%20rate%20of%20return%20issues%20paper%20-%2012%20December%202017.pdf> pp12-15. [↑](#footnote-ref-29)
30. At the stakeholder forum on the 18th of September, I sat next to one of the AER staff members who will be looking into MRP this time around. He was relatively new to the area, and said he could not understand how the AER got its answers either. This suggests the AER is simply manufacturing rhetoric to meet the 6.5 percent target, rather than actually doing analysis which just happens to be difficult to follow. [↑](#footnote-ref-30)
31. See AER, Electricity Transmission and Distribution Network Service Providers: Review of the weighted average cost of capital (WACC) parameters, May 2009, p46 [↑](#footnote-ref-31)
32. See Grant, H, 2016, AER Consumer Challenge Panel (CCP4) Submission to the AER Draft 2018-22 Revenue Decision Powerlink Revised 2018-22 Revenue Proposal, 23 December 2016, p44. [↑](#footnote-ref-32)
33. AER, 2013, Rate of Return Guideline: Explanatory Statement, pp24-6 [↑](#footnote-ref-33)
34. AER, 2013, Rate of Return Guideline: Explanatory Statement, pp93-4 [↑](#footnote-ref-34)
35. AER 2013, Rate of Return Guidelines: Explanatory Statement, pp95-96 [↑](#footnote-ref-35)
36. AER 2013, Rate of Return Guidelines: Explanatory Statement, p97 [↑](#footnote-ref-36)
37. AER, 2017, Final Decision APA VTS Gas Access Arrangement 2018 to 2022: Attachment 3 – Rate of Return, November 2017, pp75-76 [↑](#footnote-ref-37)
38. I am not covering every decision, but rather I pick one representative decision from each date at which there was a decision. Other decisions not covered may have additional information in them, but the standard practice of the AER has been to provide an identical Appendix 3 (covering rate of return issues) with each decision made on a given date. [↑](#footnote-ref-38)
39. Note that it may also make use of a report by Lally in 2013, which “corrected” for an “erroneous” assumption made by CEG in earlier work, being an implicit assumption of perfectly off-setting risk-free rates and MRP in the DGM. Correcting this error, according to Lally, reduced the lower bound from around 6.4 percent to 3.8 percent. If followed up in these Guidelines, this would make the DGM range so wide that the AER could work with the intersection between the DGM and historical estimates, as it did in 2013, and still get n answer of roughly 6 percent; depending upon weights used. [↑](#footnote-ref-39)
40. See <https://www.erawa.com.au/cproot/14319/2/Final%20Decision%20-%20Appendix%204%20WACC.PDF> in the former instance and <https://www.erawa.com.au/cproot/14523/2/GDS%20-%20ATCO%20-%20AA4%20-%20Revised%20Access%20Arrangement%20Decision%20-%20PURUSANT%20TO%20ORDERS%20BY%20THE%20ACT.PDF> in the latter. [↑](#footnote-ref-40)
41. See DBP 2014, Proposed Revisions: DBNGP Access Arrangement – Supporting Submission 12 p66 [↑](#footnote-ref-41)
42. The DBP approach did something similar, although it adjusted beta, to minimise departure from the then current ERA model. The end result was an adjustment which, if converted to an “alpha” was less than half the mean forecast errors shown above; confidence intervals in this work are fairly wide. [↑](#footnote-ref-42)
43. AER, 2013, Rate of Return Guidelines – Explanatory Statement, December 2013, p88 [↑](#footnote-ref-43)
44. Note that the DBP challenge, still remaining undecided, focuses directly on this issue of bias, because the ERA’s position has changed from one which recognised the bias and the need to do something about it more transparent than that of the AER to a clear statement that bias does not exist. [↑](#footnote-ref-44)
45. Australian Competition Tribunal, 2016, Applications by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1 [↑](#footnote-ref-45)
46. Though it arguably overstates the AER’s recognition of this when the full quotation from pages 11 and 12 of the Appendices to the Explanatory Statement is considered. [↑](#footnote-ref-46)
47. Note that I have not sought to capture precisely when the first time was that the AER made a particular argument; it tends to copy and paste decisions from one business to another. The examples quoted are just from decisions with which I am familiar. [↑](#footnote-ref-47)
48. AER, 2015, Final Decision - Jemena Gas Networks (NSW) Ltd, Access Arrangement 2015–20: Attachment 3 − Rate of return, p67 [↑](#footnote-ref-48)
49. AER, 2015, Preliminary Decision: United Energy Determination 2016 to 2020: Attachment 3 − Rate of return, October 2015 pp288. See also AER, Draft Decision Multinet Gas Access arrangement 2018–2022: Attachment 3 – Rate of return, July 2017, pp184-5, where the AER notes, somewhat incongruously, that the purpose of the paper was to explain the low-beta anomaly associated with the CAPM but that this (systematic) anomaly was not an indication of bias, nor an indication of a failure of the CAPM, nor a recommendation for regulatory action. [↑](#footnote-ref-49)
50. Partington G & McKenzie M, 2013 Report to the AER: Risk, Asset Pricing Models and WACC, June 2013, p17 [↑](#footnote-ref-50)
51. And if the AER’s views on the Fama-French Model are any indication, it seems likely that the short answer will be that it finds no persuasive evidence that any risks are consistently priced. [↑](#footnote-ref-51)
52. AER, 2015, Final Decision - Jemena Gas Networks (NSW) Ltd, Access Arrangement 2015–20: Attachment 3 − Rate of return, p251. Subsequent to this quote, the AER essentially repeats the same findings summarised in the main text from the UED Preliminary Decision a few months later. [↑](#footnote-ref-52)
53. Note that the finding of a negatively sloped security market line is actually quite common in the literature; Fishwick, Mujisson and Satchell (2014) find evidence of it, and DBP (Submission 26: Response to Issues Paper, June 2015, p16) list a number of other empirical papers which make the same finding. [↑](#footnote-ref-53)
54. AER, 2015, Final Decision - Jemena Gas Networks (NSW) Ltd, Access Arrangement 2015–20: Attachment 3 − Rate of return, p464 [↑](#footnote-ref-54)
55. AER, 2015, Preliminary Decision - United Energy Determination 2016 to 2020: Attachment 3 − Rate of return, October 2015 pp287-8 [↑](#footnote-ref-55)
56. Partington G and Satchell, S, 2016, Report to the AER: Cost Of Equity Issues - 2016 Electricity And Gas Determinations, April 2016, pp45-6 [↑](#footnote-ref-56)
57. See [105] to [107] of the ERA’s submission to the Tribunal on equity, filed on 7 December 2016, available from <http://www.competitiontribunal.gov.au/current-matters/tribunal-documents/act-9-2016>. [↑](#footnote-ref-57)
58. Partington G and Satchell, S, 2015, Analysis of the Criticisms of the 2015 Determinations, October 2015, p20 [↑](#footnote-ref-58)
59. Partington G and Satchell, S, 2016, Report to the AER: Cost Of Equity Issues - 2016 Electricity And Gas Determinations, April 2016, p8-9 [↑](#footnote-ref-59)
60. See Partington, G and Satchell, S, 2015, Return on Equity and Comment on Submissions in Relation To JGN, May 2015, p12. [↑](#footnote-ref-60)
61. By way of one example amongst thousands, when Satchell and his co-authors found that changes in interest rates could describe and correct for the low beta bias issue, his co-authors turned the research finding into a product and went on a roadshow to sell it to investors (see http://www.northinfo.com/documents/612.pdf. Their basic message? “Don’t use the CAPM, we all know that is wrong, but we understand why it is wrong and have prepared this model you should use instead”. [↑](#footnote-ref-61)
62. Multinet, 2016, Supporting Submission 16.1: Rate of Return Overview, December 2016, p16 [↑](#footnote-ref-62)
63. Partington G and Satchell, S, 2016, Report to the AER: Cost Of Equity Issues - 2016 Electricity And Gas Determinations, April 2016, p40. [↑](#footnote-ref-63)
64. Partington G and Satchell, S, 2016, Report to the AER: Cost Of Equity Issues - 2016 Electricity And Gas Determinations, April 2016, p40-1 [↑](#footnote-ref-64)
65. Partington G and Satchell, S, 2016, Report to the AER: Cost Of Equity Issues - 2016 Electricity And Gas Determinations, April 2016, p43 [↑](#footnote-ref-65)
66. Partington G and Satchell, S, 2016, Report to the AER: Cost Of Equity Issues - 2016 Electricity And Gas Determinations, April 2016, p52 [↑](#footnote-ref-66)
67. Partington G and Satchell, S, 2016, Report to the ERA: The Cost Of Equity And Asset Pricing Models, May 2016, p7 [↑](#footnote-ref-67)
68. Partington G and Satchell, S, 2016, Report to the ERA: The Cost Of Equity And Asset Pricing Models, May 2016, p15 [↑](#footnote-ref-68)
69. Partington G and Satchell, S, 2017, Report to the AER: Discussion of Submissions on the Cost of Equity, June 2017, p16 [↑](#footnote-ref-69)
70. Partington G and Satchell, S, 2017, Report to the AER: Discussion of Submissions on the Cost of Equity, June 2017, p17. Note that some examples of long periods of “disequilibrium” are presented on pp28-9 [↑](#footnote-ref-70)
71. Partington G and Satchell, S, 2017, Report to the AER: Discussion of Submissions on the Cost of Equity, June 2017, p19 [↑](#footnote-ref-71)
72. Partington G and Satchell, S, 2017, Report to the AER: Discussion of Submissions on the Cost of Equity, June 2017, p20 [↑](#footnote-ref-72)
73. Whether Partington and Satchell would have made this concession if not challenged by Multinet is an open question. [↑](#footnote-ref-73)
74. Partington G and Satchell, S, 2017, Report to the AER: Discussion of Submissions on the Cost of Equity, June 2017, p30 [↑](#footnote-ref-74)
75. Both these two points could assist in the ERA Guidelines process where the ERA has assumed (see below) that it must work to an expected equilibrium) [↑](#footnote-ref-75)
76. The Electranet and Murraylink decisions came later, in October of 2017, but the AER has removed from these much of the key bits of discussion, particularly on “equilibrium expected return” and many of the issues raised by Multinet. It has not reversed (or refined) its position from Multinet, but has rather simply removed some text. The AER will doubtless attempt to characterise the Multinet Draft Decision as a response to particular issues raised by one service provider (moreover, issues which were not raised again in response to the Draft Decision), which can be safely ignored. As with the beta evidence (again from Multinet) we should resist this, as the Multinet Draft Decision leaves the AER exposed on a number of key fronts which we can use in the forthcoming Guidelines process. [↑](#footnote-ref-76)
77. AER, Draft Decision Multinet Gas Access arrangement 2018–2022: Attachment 3 – Rate of return, July 2017, pp61-62. [↑](#footnote-ref-77)
78. AER, Draft Decision Multinet Gas Access arrangement 2018–2022: Attachment 3 – Rate of return, July 2017, p183 [↑](#footnote-ref-78)
79. AER, Draft Decision Multinet Gas Access arrangement 2018–2022: Attachment 3 – Rate of return, July 2017, p61 [↑](#footnote-ref-79)
80. AER, Draft Decision Multinet Gas Access arrangement 2018–2022: Attachment 3 – Rate of return, July 2017,p62 [↑](#footnote-ref-80)
81. 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. [↑](#footnote-ref-81)
82. AER, Draft Decision Multinet Gas Access arrangement 2018–2022: Attachment 3 – Rate of return, July 2017,p65 [↑](#footnote-ref-82)
83. AER, Draft Decision Multinet Gas Access arrangement 2018–2022: Attachment 3 – Rate of return, July 2017,p65 [↑](#footnote-ref-83)
84. AER, 2017, Final Decision APA VTS Gas Access Arrangement 2018 to 2022: Attachment 3 – Rate of Return, p60 [↑](#footnote-ref-84)
85. The non-inclusion of the approach of simply estimating it and incorporating properly is omitted deliberately. It would be naïve to think the AER is going to be in any way genuine on this issue. [↑](#footnote-ref-85)
86. ERA, 2013, Rate of Return Guidelines, December 2013, p27. DBP’s approach, now the subject of challenge, was a response to this proposal by the ERA; it was thus not a simple ambit claim in opposition to the ERA’s Guidelines. [↑](#footnote-ref-86)
87. It appears that this was very much a last-minute by the ERA, which is why its Final Decision for DBP can be very hard to read (see, in particular [264]-[300] of Appendix 4 of the DBP Final Decision, which where most of the ERA’s analysis lies); reports from the ERA’s own consultants dated a month before the Final Decision was released still refer to the ERA’s approach as being one where the textbook CAPM is adjusted to capture its flaws by adjusting beta. DBP was given no opportunity to respond to this entirely new approach by the ERA, which is why a challenge to the Tribunal was its only option. [↑](#footnote-ref-87)
88. Available from <http://www.competitiontribunal.gov.au/current-matters/tribunal-documents/act-9-2016> [↑](#footnote-ref-88)
89. See [435] to [438] of Appendix 4 of the ERA’s Final Decision for DBP. [↑](#footnote-ref-89)
90. This conclusion will be influenced by the current DBP appeal, which is focussed on precisely this point [↑](#footnote-ref-90)
91. ERA, 2016, Final Decision on Proposed Revisions to the Access Arrangement for the Dampier to Bunbury Natural Gas Pipeline 2016 – 2020: Appendix 4 Rate of Return, [436]. See also [437] [↑](#footnote-ref-91)
92. ERA, 2016, Final Decision on Proposed Revisions to the Access Arrangement for the Dampier to Bunbury Natural Gas Pipeline 2016 – 2020: Appendix 4 Rate of Return, [267]. See Also [286]-[293]; especially [293]. [↑](#footnote-ref-92)
93. Brav, A, Lehavy R and Michaely R, “Using Expectations to Test Asset Pricing Models”, Financial Management, vol. 34, no.3, 2005, pp 31-64 [↑](#footnote-ref-93)
94. See, for example, Ang JA and Peterson DR “Return, Risk, and Yield: Evidence from Ex Ante Data,” Journal of Finance, 40, 1985, pp537-548, Botosan CA and Plumlee MA “Assessing Alternative Proxies for the Expected Risk Premium,” Accounting Review, 80, 2005, pp21-54, Shefrin H and Statman M “The Style of Investor Expectations,” The Handbook of Equity Style Management, Thomas Coggin and Frank Fabozzi, (ed), John Wiley & Sons,2003, pp195-218, Easton P, "Estimating the Cost of Capital Implied by Market Prices and Accounting Data." Foundations and Trends in Finance. 2(4), 2009, pp241-364, Gebhardt WR, Lee CMC and Swaminathan B,"Toward an Implied Cost of Capital", Journal of accounting Research, 39, 2001, pp135-176, Guay WR, Kothari SP and Shu S, "Properties of Implied Cost of Capital Using Analysts’ Forecasts", Australian Journal of Management, 36(2),2011, pp125-149, Lee C, Ng D and Swaminathan B, "Testing International Asset Pricing Models Using Implied Cost of Capital", Journal of Financial and Quantitative Analysis, 44(2), 2009, pp307-35. [↑](#footnote-ref-94)
95. Partington G and Truong, G, Alternative Estimates for the Cost of Equity Capital for Australian Firms, 20th Australasian Finance and Banking Conference Paper, September 2007. [↑](#footnote-ref-95)
96. Note that, if the “expected equilibrium hypothesis” were true, or at least believed to be true by some portion of the market, then these investors would believe that alpha were zero. If analysts have a positive alpha, and even some part of the market listens to their recommendations, then the weighted average alpha for the market as a whole must be above zero. This is not theory, it is just arithmetic. [↑](#footnote-ref-96)
97. See, for example, Ramnath, Rock, S and Shane, PB, "Financial Analysts’ Forecasts and Stock Recommendations: A Review of the Research", Foundations and Trends in Finance, 2(4), 2006, pp311-421, who cite some 250 papers in 9 major journals on this topic between 1992 and 2005. [↑](#footnote-ref-97)
98. See, for example Franck A and Kerl A, "Analyst Forecasts and Suropean Mutual Fund Trading", Journal of Banking and Finance, 37, 2013, pp2677-2692, Rebello, M and Wei KD, "A Glimpse Behind a Closed Door: The Long-Term Investment Value of Buy-Side Research and Its Effect on Fund Trades and Performance", Journal of Accounting Research, 52(3), 2014, pp775-815, Brown, LD, Call, AC, Clement, MB and Sharp, NY, Skin in the Game: The Inputs and Incentives that Shape Buy-Side Analysts’ Stock Recommendations, November 2014, available from https://www.bc.edu/content/dam/files/schools/csom\_sites/accounting/Call%20Paper.pdf, [↑](#footnote-ref-98)
99. See, for example, Brav A, and Lehavy R, "An Empirical Analysis of Analysts' Target Prices: Short-term Informativeness and Long-term Dynamics", Journal of Finance 58, 2003, pp1933-1968,Asquith P, Mikhail MB, and Au AS, "Information Content of Equity Analyst Reports", Journal of Financial Economics 75, 2005, pp245-282. [↑](#footnote-ref-99)
100. AER, 2016, Final Decision - Jemena distribution determination 2016 to 2020: Attachment 3 – Rate of return, p229 [↑](#footnote-ref-100)