THE AER'S DRAFT WACC GUIDELINE: AN INTERNATIONAL PERSPECTIVE

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1.   INTRODUCTION

This paper is a perspective[1] from an international regulatory expert on the Australian Energy Regulator's (AER's) July 2018 draft WACC guideline.[2] The terms of reference that have been provided to me by the Energy Networks Australia ask that I consider how the AER's proposed estimate of the allowed return on equity compares to past, current and prospective thinking across the international regulatory community, focusing especially on the equity premium that regulators typically allow regulated firms over the risk-free rate.

The paper is organised into five main parts, as follows:

- section 2 contains a brief summary of key aspects of the AER's cost of equity calculations;

- section 3 compares the level of shareholder return under the AER's draft guideline to the returns factored by the UK energy regulator, Ofgem, into UK companies' price controls;

- section 4 extends the analysis to New Zealand, Europe and North America;

- section 5 attempts to isolate what is driving the pattern that emerges from these comparisons; and

- section 6 concludes.

2.   BACKGROUND

The 10 July 2018 draft guideline itemises the WACC parameters that the AER intends to use in its future regulatory decisions. The new guideline would broadly maintain the framework that the regulator set out in its previous 2013 guideline, but provides for updated estimates of several of the key parameters and would to lead to a circa 45 basis point step down in allowed returns in determinations that are to be made from 2019 onwards.

The main focus in this paper is on two parameters within the guideline: the market-risk premium (MRP); and beta. Combined together, these two parameters fix the additional return that providers of equity will be allowed over and above the risk-free rate, i.e.:

$$\text{Equity premium} = \text{CAPM cost of equity} - \text{risk-free rate}$$

$$= r_f + \beta \cdot (r_m - r_f) - r_f$$

$$= r_f + \beta \cdot \text{MRP} - r_f$$

$$= \beta \cdot \text{MRP}$$

where r_f is the risk-free rate, r_m is the expected return on the market portfolio, and β is the equity beta.

The AER's proposed values for the MRP and beta are set out in table 1.

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[1] I am a UK-based regulatory economist who has more than 20 years experience advising regulators, government and companies on the economic regulation of the utility and transport sectors.
[2] https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/review-of-rate-of-return-guideline/draft-decision

Table 1: Selected parameters in the AER July 2018 draft WACC guideline

Period	MRP	Equity beta	Premium over the risk-free rate
2019 onwards	6.0%	0.6	360 basis points

All of the values in table 1 sit lower than the figures specified in the AER's 2013 guideline. The AER is proposing to make a reduction of half a percentage point in the MRP from 6.5% to 6.0%. The AER's estimate of beta is to be reduced by 0.1 from 0.7 to 0.6. When combined together, these new numbers lead to a reduction in the premium in the cost of equity over the risk-rate from 455 basis points to 360 basis points, and account for nearly all of the proposed reduction in companies' overall return.

The main contribution that I try to make in this paper is to show how a 360 basis point premium compares to the premia that other regulators have included and/or are including in price control decisions elsewhere in the world.

3. COMPARISON OF AUSTRALIAN AND UK WACC ESTIMATES

3.1 Recent/current UK practice

Because I come from the UK, I start my analysis by comparing the return that the AER is proposing to allow in its draft guideline to the return that AER's British counterpart, Ofgem, has given, and is currently proposing to give, Britain's energy network companies.

The framework that we use in the UK to estimate a regulated company's cost of capital shares many similarities with the approach that the AER takes. In both cases, the Sharpe-Lintner CAPM plays a central role in framing regulators' estimates of the cost of equity. There is a broadly similar over-arching philosophy towards the estimation of the risk-free rate, the MRP and beta. And, at the time of writing, UK regulators are chewing over many of the same issues that are discussed in the AER's July 2018 consultation – e.g. how to reconcile backward- and forward-looking estimates of the market risk premium, how best to take a reading of beta from historical share price data, and so on (subjects which I cover in greater detail in section 5).

I focus below on the comparison between the AER's calculations of the cost of equity and Ofgem's calculations of the cost of equity for the 14 electricity distribution network operators (DNOs) in Great Britain.[3] Ofgem has historically published WACC calculations for these businesses at five-year intervals – i.e. in 1999, 2004, 2009 and 2014 for the periods 2000-05, 2005-10, 2010-15 and 2015-23 respectively. Although it does not have to make its next WACC determination until 2022, it has recently been consulting on its early thinking for the 2023-28 regulatory period as part of its early preparations for the RIIO-2 round of price reviews.

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[3] Ofgem also makes separate estimates of the electricity transmission, gas transmission and gas distribution costs of capital. For various reasons, these estimates have tended in recent years to include small uplifts to the electricity distribution cost of equity (e.g. due to the scale of the transmission companies' 2013-21 investment programmes). An Australian electricity distribution to UK electricity distribution comparison is therefore a look-across to the lowest point in Ofgem's cost of capital range.

Table 2 picks out the cost of equity premium that Ofgem has historically allowed over the risk-free rate, as well as Ofgem's initial thinking on the likely range for the 2023-28 period.[4]

Table 2: Selected components in Ofgem's cost of equity calculations

Period	MRP	Equity beta	Premium over the risk-free rate
2005-10	4.5%	1.0	450 basis points
2010-15	not stated	not stated	470 basis points
2015-23	5.0%	0.9	450 basis points
2023-28 (early range)	6.75% to 7.1%	0.71 to 0.80	480 to 570 basis points

The same information is presented graphically in figure 1 alongside the return that Australian distribution networks have historically been allowed and can currently expect from 2019 onwards.

Figure 1: Premium in the allowed cost of equity over the risk-free rate (basis points)
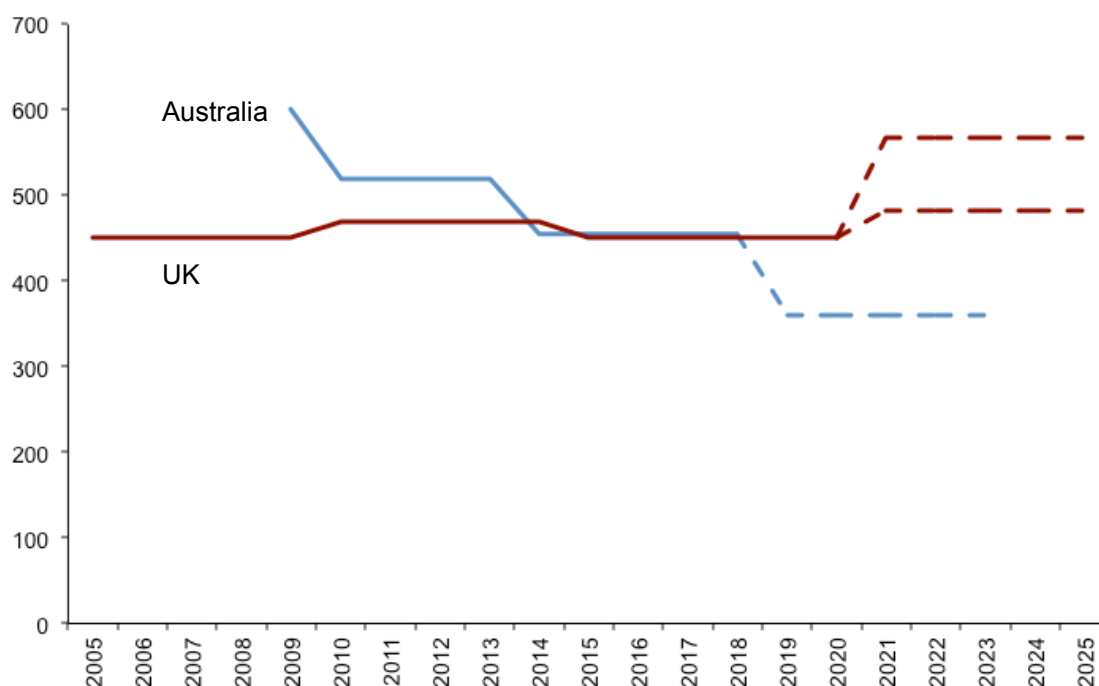
The table shows that the premium over the risk-free rate in Ofgem's cost of equity calculations has in recent times been quite stable at around 450 basis points. Going forward, Ofgem's early analysis suggests that this premium will increase to at least 480 basis points from 2023. This is mainly a function of a likely change in Ofgem's estimate of the MRP and a view from Ofgem that recent reductions in the risk-free rate of return have been offset in part by an increase in the

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[4] These are the published Ofgem figures. I have not made any adjustments for gearing (Ofgem's gearing assumptions have been in the range 50% to 65%) or for the use of a real rate of return.

MRP (meaning that the lower risk-free rate has not translated one-for-one into a reduction in the cost of equity capital).

The chart then shows that there has been a shift over time in the positioning of Ofgem's estimates vis-à-vis the estimates made by the AER. In the 2000s,[5] when the AER first took over responsibility for access regulation in the National Electricity Market, the equity return on offer to Australian investors was higher than the return that was available to shareholders in UK regulated companies. This differential as good as disappeared when the AER's 2013 WACC guideline came into force. And, interestingly, equity returns in Australia would in future sit quite markedly below returns in Great Britain if the AER and Ofgem were to go ahead and implement their latest proposals.

3.2   Risk and return

Before placing too much weight on such comparisons, it is important to consider the possibility that differences in risks may be driving differences in returns.

In annex 2 to this paper, I compare the overall regulatory frameworks that the AER and Ofgem use when setting price controls. I find that the risks borne by equity investors are very similar. In particular:

- most networks have fixed revenue entitlements, irrespective of the volumes they serve, giving companies' negligible exposure to revenue/volume risk;

- there are some small differences in the shares that companies take of under- and over-spending against opex and capex allowances – typically 30% in Australia vs ~55% in the UK – but not to the extent that shareholders' end up having a noticeably different exposure to systematic risk (given that cost risk is not usually considered to be systematic in nature); and

- there is nothing in the sizing of companies' investor capital bases, regulatory asset bases, expenditures or revenues that makes the GB networks particularly different from Australian networks.

These things mean that it is difficult to mount the argument that equity returns should naturally be higher in one country compared to the other due to differences in exposure to risk. Instead, it is much more likely that the investor community would look at Australian and UK networks as similar types of infrastructure investments.

If I were to have to distinguish the two geographies, I think it is possible that the MRP and, hence, the cost of equity capital could be slightly *higher* in Australia due to broader country factors. I note that backward-looking, historical estimates of the realised return on equity investments and forward-looking survey evidence both put the market premium in Australia a little above 1 percentage point higher than in the UK.

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[5] The same pattern was apparent prior to the AER's creation. See NERA (2001), International comparisons of utilities' regulated post tax rates of return in North America, the UK and Australia, for comparisons of WACC estimates during the early 2000s.

Table 3: MRP estimates

	Australia	UK
Historical (1900-2016, DMS arithmetic average)	6.6%	4.9%
Forward-looking, Fernandez et al survey average	6.6%	5.5%

The argument might be that the kinds of country figures that we see in table 3 feed through into a higher cost of equity for Australian networks. It is not within the scope of this paper to examine this proposition in any great detail, but I would suggest that the preconception a priori in many practitioners' minds is that realised/expected returns are normally slightly higher in Australia than in the UK. It is, at the very least, noteworthy that figure 1 is poised to tell the opposite story in the specific case of the regulated networks.

I therefore disagree with the blunt assertion in the AER's explanatory paper that international comparisons are invalid "because of the issues surrounding differences in regulatory procedures and tasks". If the AER is coming up with a lower cost of equity premium than Ofgem, despite the basic similarities in the regulatory regimes and despite similarities in companies' exposures to risk, this is an unexpected result that is worthy of further attention.

4.   COMPARISON OF AUSTRALIAN AND OTHER INTERNATIONAL WACC ESTIMATES

The UK is just one data point and it is certainly not outside the realms of possibility that the picture that comes through in section 2 is a function first and foremost of UK regulatory error. In order to give a proper sense-check to the AER's draft guideline, I can widen the scope of the analysis to include other international regulatory regimes.

4.1   New Zealand

The next most obvious point of comparison is New Zealand. Most of the electricity distribution networks in New Zealand are regulated by the Commerce Commission via default price-quality paths. These paths are effectively five-year revenue caps which impact companies in a very similar fashion to Australian and UK price control arrangements.

Table 4 records the values of the MRP[6] and equity beta (restated to 60% gearing)[7] in the Commission's most recent input methodologies. Figure 2 plots the same information alongside the level of return that the AER has allowed Australian electricity distribution networks.

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[6] The Commerce Commission's documents report the value of the tax-adjusted MRP (TAMRP), which incorporates an allowance for investor taxes. I have adjusted the published numbers to remove the tax adjustment. See annex 3.

[7] The Commission's published WACC calculations have been for companies with gearing of less than 45%, rather than the 60% gearing that the AER assumes in its guideline. I have adjusted the Commission's asset beta using the formula $\beta_e = \beta_a / (1 - g)$.

Table 4: Commerce Commission cost of equity calculations

Period	MRP	Equity beta (at 60% gearing)	Premium over the risk-free rate
2010-11	5.67%	0.85	482 basis points
2011-16	5.57%	0.85	474 basis points
2016-	6.23%	0.875	545 basis points

Figure 2: Premium in the allowed cost of equity over the risk-free rate (basis points)
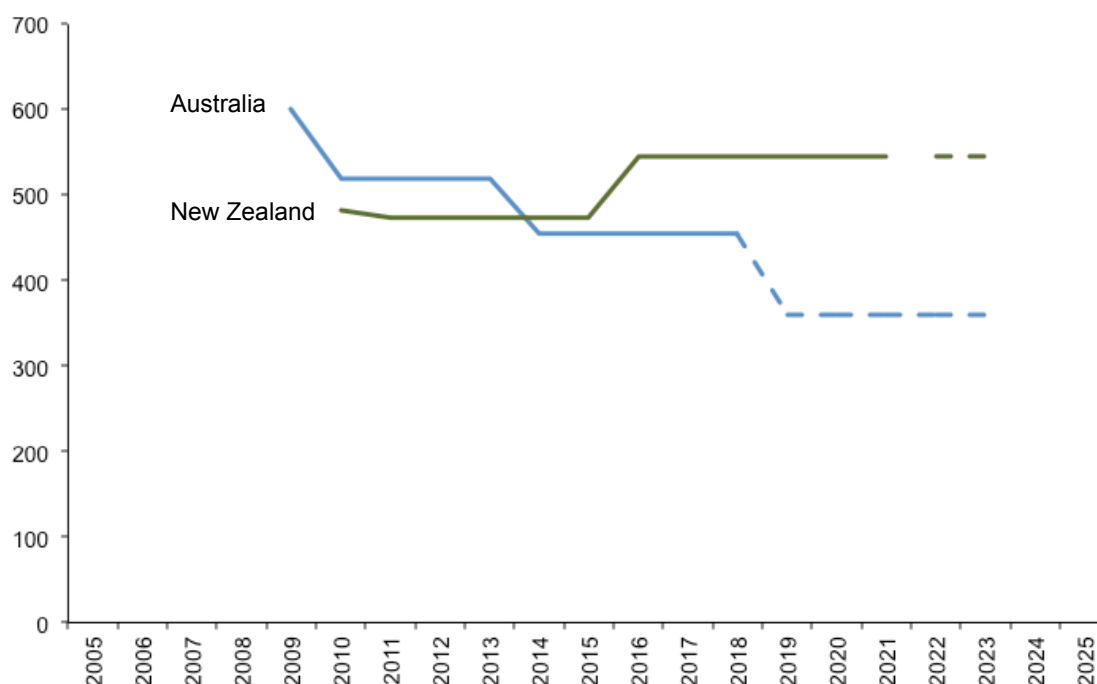
The chart shows an almost identical picture to figure 1. During the 2000s and early 2010s, equity returns in Australia were higher than in New Zealand. The AER's 2013 WACC guideline then brought about a closer alignment of returns across the two countries, but the Commerce Commission has since moved its estimate of the MRP upwards (because in 2016 it left the TAMRP unchanged in spite of a fall in the risk-free rate), whereas the AER's July 2018 draft guideline would result in a significant cut in the Australian equity premium.

Unlike in the UK, there is not any clear sense at the time of writing as regards where the Commerce Commission might set the allowed cost of equity for electricity distribution networks at its next reset – the Commission is required to review its input methodologies at least every seven years, meaning that new WACC values may not be determined before 2023. But we can say, once again, that the AER's draft guideline will have Australia departing from what has in the past been a position of consensus.

4.2   Europe

Charges levied by electricity distribution networks in Europe are nowadays regulated more and more often via price controls. Some caution is needed when looking at any individual regulator's WACC determination since, in this large and diverse sample, there can sometimes be country-specific factors which result in an unusual or atypical set of figures. However, my experience has been that the overall picture that emerges from across the European regulators can often be instructive.

Figure 3 plots European regulators' calculations of the premium in the cost of equity over the risk-free rate for distribution networks with 60% gearing.[8] The source data for this table is given in annex 3.

Figure 3: Premium in the allowed cost of equity over the risk-free rate (basis points)
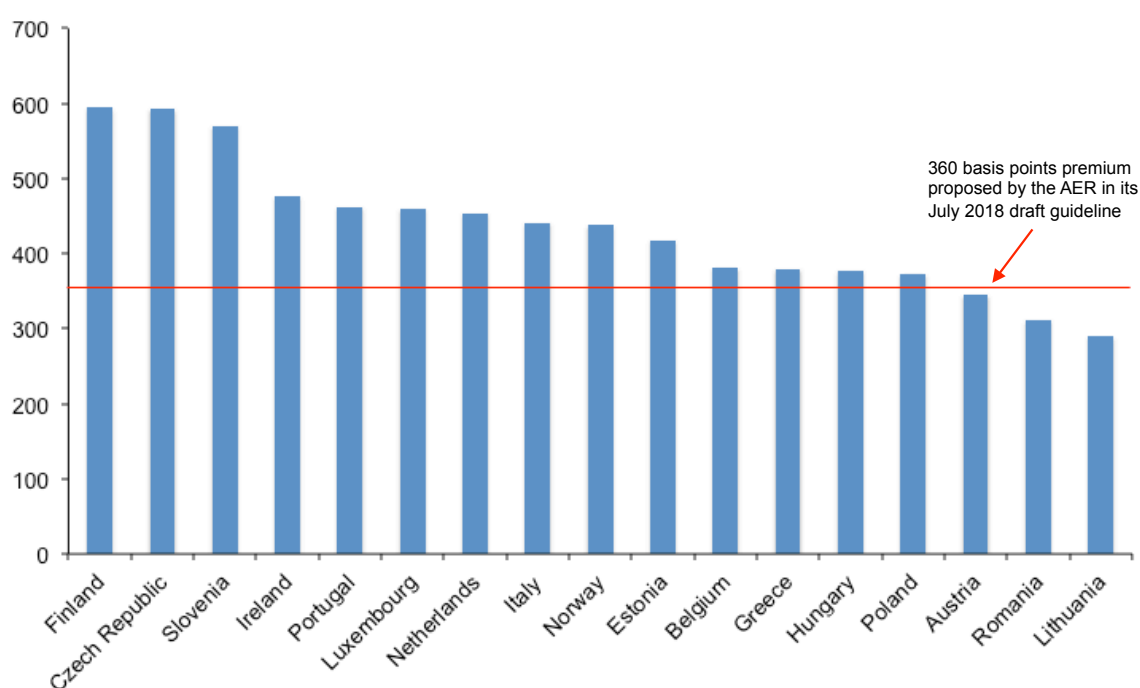
The chart shows that Europe's regulators have a range of views on the values of MRP and betas. At one end of the spectrum are the regulators in Finland and the Czech Republic, which have allowed for a premium over the risk-free rate of nearly 600 basis points. At the opposite end of the scale, Lithuania sets the lower bound in the chart with a premium of 289 basis points.

My takeaway from this survey is that the AER's proposed 360 basis points (the red line in figure 3) would position Australia at the very right-hand edge of the chart. The only countries in which regulators have previously been willing to set lower returns are Austria, Romania and Lithuania. Countries with the most established regulatory frameworks, like Ireland and the

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[8] I include only decisions made since 2012. Several of the European data points are for companies whose gearing is markedly below 60%. To give a like-for-like comparison, I convert the regulators' published cost of equity estimates to a common basis using the published values for asset beta and the regulators' preferred asset beta to equity beta conversion formula.

Netherlands, tend to be positioned towards the left-hand side and have generally been allowing for returns which are in the same range as the UK and New Zealand.

4.3   US and Canada

The rates charged by electricity distribution companies in North America are regulated at a local level under a variety of different approaches. In recent years, there has been a growing preference for price cap regulation and fixed regulatory lags, with regulators increasingly borrowing from regulatory methods that they have seen applied successfully internationally.

Table 5 reproduces the results of a recent survey of the allowed return on equity in US and Canadian regulatory decisions from the last three years.

Table 5: Regulators' authorised return on equity

Country	Year of decision	Average return on equity	Long-term risk-free rate	Average premium over the risk-free rate
US	2015	8.45%	2.84%	561 basis points
	2016	8.43%	2.60%	583 basis points
	2017	8.50%	3.04%	546 basis points
Canada	2015	8.73%	2.19%	654 basis points
	2016	8.63%	1.92%	671 basis points
	2017	8.67%	2.36%	631 basis points

The table shows that regulatory decisions made during the most recent year for which data is available provided on average for premia over the risk-free rate of 546 basis points in the US and 631 basis points in Canada.

A second key feature of the table is that the allowed return on equity in North America has been quite stable, even as the risk-free has changed over time. This has been the position for at least the last decade – i.e. regulators generally left allowed equity returns unchanged as the return on government bonds fell in the aftermath of the global financial crisis; and as the risk-free rate has started to creep up once again, regulators have shown no inclination to revise up previously agreed rates of return.

4.4   Conclusions

The widening of the analysis in this section 4 corroborates and adds to the picture that I presented in section 3. Based on the evidence, I am able to say with some confidence that the combination of the AER's proposed 6.0% MRP and 0.6 equity beta would give a level of equity return to investors in regulated electricity distribution networks that is almost without parallel anywhere else in the world.

This does not automatically mean that the calibrations in the AER's draft guideline are wrong. Like most regulatory practitioners, I recognise that WACC estimation is an imprecise science and that mainstream thinking about methodologies and numbers is constantly marching on. In my view, the material set out above does, however, raise questions and challenges the AER to confirm that the evidence it has assembled in its review really does take it to an end point that

the likes of Ofgem, the Commerce Commission and numerous other regulators have not previously countenanced.

5. OBSERVATIONS ON THE AER's DRAFT GUIDELINE

The purpose of this paper is not to give a lengthy appraisal of the reasoning that underpins the draft guideline. However, it might be helpful if I try to pinpoint the factors that are leading the AER to what appears, on the basis of the evidence set out in sections 3 and 4, to be an unusually aggressive estimate of the cost of equity for a regulated company.

5.1 MRP

The MRP is arguably the most challenging of the inputs within the CAPM framework to put a value on. The additional return that investors expect to earn when they put their money into the market portfolio, rather than riskless assets, is not something that can be directly observed from market data, nor is it is a figure that anyone can ever claim with certainty to 'know'. A regulator that requires an estimate of the MRP therefore has to infer where investor expectations sit using a range of imperfect data points. These will typically include:

- observations of the returns that stock markets have historically given to investors;
- calculations of the discount rate that might underpin current stock market valuations, given reasonable inferences about future dividend payments; and
- survey evidence.

The explanatory statement that accompanies the AER's draft guideline contains a detailed review covering each of these perspectives. Several of the AER's conclusions mirror points that have been made by other economic regulators – e.g. the view that dividend discount models are imprecise and highly sensitive to users' input assumptions. Others I consider more subjective, but understandable – e.g. as regards the weight that should be placed on survey evidence. However, there is one aspect of the discussion which really sticks out: the AER's view that the expected market return is likely to sit at a fixed premium above the risk-free rate, even as the risk-free rate moves up and down over the economic cycle.

We have probably spent more time in the UK during the last 18 months talking about the relationship between the risk-free rate, the MRP and expected return than we have about any other cost of capital issue. The AER correctly references the spectrum of views that there are on this matter. At one end, there is the view that the MRP is a constant, unchanging number. At the other extreme, there is a school of thought that says that investors' expected returns are fairly stable over time, and that the MRP moves up whenever the risk-free rate moves down and vice versa.

The view from the UK is that the truth probably lies between the two extremes – a stance that is consistent with soundings that UK regulators have taken from outside of the regulatory community.[9] New regulatory decisions are thus allowing for lower equity returns than in previous price controls, but are stopping short of factoring recent reductions in the risk-free rate one-for-one into the allowed WACC. As one (representative) illustration, Ofgem has been

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[9] For example, the Bank of England: "the post-crisis fall in interest rates has not been accompanied by anything like the same reduction, it appears, in the cost of equity" (speech by Martin Taylor, 25 May 2016).

talking this year of a reduction in its estimate of the risk-free rate of more than 2 percentage points, but is also allowing for an increase in the MRP to offset much of this change (see table 2).

The discussion in its explanatory note suggests that the AER has heard much the same views as the UK regulators have encountered. But its conclusion is an extreme one: the AER's draft conclusion is that every basis point change in the risk-free rate, now and in the next five years, has fed and will feed through one-for-one into a change in the cost of equity capital. The AER is thus choosing a position that is right on the boundary of admissible opinion and is apparently dismissing – i.e. it is placing zero weight on – a large body of contradictory evidence from respectable, expert voices in the academic and financial community. This stands out as an odd position to take in a situation where it is impossible to objectively show that one view is right and other views are wrong.

5.2   Beta

Unlike the MRP, regulators often do have direct empirical observations of regulated firms' betas. These estimates may not always relate to pure-play regulated businesses, and they necessarily come with fairly wide confidence intervals, but it is almost always possible to gain at least a basic level of insight into investors' perceptions of risk from available share price data.

The key point of difference that I see when I compare the AER's approach to estimating beta and the approaches being elsewhere concerns the weight(s) that a regulator ought to place on short-term versus long-term data. In its draft guideline, the AER expresses a strong preference for looking at empirical beta estimates over very long time horizons. The AER states that:

> We give most weight to estimates from the longest estimation period because short term estimates can be influenced by factors such as one-off events (for example, the Global Financial Crisis), shocks and interest movements.

This is not a standard approach. Elsewhere in the world, regulators tend to be much more inclined to draw information from recent share price data and positively want to understand if investor perceptions of risk have been affected by events, shocks and the macroeconomic conditions of the day.

In the UK, for example, regulatory practice typically involves giving greatest weight to empirical estimates of beta over the latest available five-year period. In New Zealand, the Commerce Commission collates evidence from the two most recent five-year periods, but with a weighting towards the most recent five years. As in Australia, there is usually a recognition that empirical beta estimates can be 'noisy', and that it is therefore important to come at beta estimation from a number of different directions (e.g. using multiple comparators, a range of sampling frequencies, etc.) so as to minimise the scope for error. But other regulators would pay attention to and would not normally downplay data which shows that regulated firms' betas have been trending up or trending down in recent years or months.

Practice in this area is, of course, not set in stone. In the UK, a recent study commissioned by the regulators has highlighted the possibility that regulators' faith in high-frequency, short-horizon beta estimates is misplaced. This has triggered a further round of work in which some of the economic regulators, including Ofgem, are investigating alternative sampling methods and new econometric techniques. However, at the time of writing, none of the UK's regulators has gone

as far as the AER has gone in its draft guideline and come out so strongly in favour of very long-term estimates of beta.

6.   CONCLUDING OBSERVATIONS

The picture that emerges from the above discussion is one in which the AER is repeatedly taking extreme positions in its draft WACC guidelines. I am always very hesitant to say that one approach to WACC estimation is definitively 'right' and another approach is definitively 'wrong' and it is not my intention to take any such position in this paper. However, I do think it is important for regulators to be 'in the pack' with expert opinion, and yet it appears that the AER's draft guidelines on the cost of equity, taken as a package, are pushing right to the very boundary of what until now could have been regarded as mainstream regulatory thinking.

In this regard, the contrast between the 2018 draft guidelines and the previous 2013 guidelines is quite stark. In the space of five years, there has not been a huge shift in the evidence base – if anything, the data is pointing towards there having been a small increase in the cost of equity capital relative to the return on riskless assets.[10] I would therefore characterise the move from a 455 basis point premium over the risk-free rate to a premium of only 360 basis points as a switch from a middle-of-the-road reading of the evidence to a very stretching, possibly over-stretched, take on the cost of equity.

This suggests to me that the AER may wish to move to a more moderate position in December. This might involve:

- giving more credence to the possibility that the MRP is not a fixed number, but can move higher when the risk-free rate is relatively low; and
- placing more weight on the latest empirical estimates of regulated network betas, as an up-to-date indicator of investor perceptions of risk.

The net effect of such changes is that the 360 basis points referred to above would increase to a number which is more easily recognisable as the premium that investors require when they make equity capital available to regulated firms.

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[10] I note, for example, that the AER's July 2018 explanatory paper identifies that empirical estimates of beta have increased since 2013.

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ANNEX 1: JOHN EARWAKER SUMMARY CV

I am a UK-based economist with more than 20 years of experience advising regulators, government, companies and investors on the full range of economic and financial issues that are encountered in economic regulation.

I am currently a director at the UK economic consultancy First Economics. In this role, I have worked on cost of capital matters with the likes of the Competition & Markets Authority, the Civil Aviation Authority, the Northern Ireland Authority for Utility Regulation, National Grid, Cadent, UK Power Networks, Thames Water and Royal Mail. I have also worked internationally on cost of capital projects in Ireland, New Zealand, Malaysia, the Philippines and Singapore.

I was previously a Senior Civil Servant at one of the UK's economic regulators.

ANNEX 2: RELATIEVE RISK IN AUSTRALIA AND THE UK

A1.   Preliminaries

Any comparative assessment of the riskiness of networks in Australia and other countries must, as a minimum, factor in:

- the exposure that firms have to –
  - volume/revenue risk;
  - expenditure risk;
  - interest rate risk (as the three most significant sources of potential systemic volatility in return); and
- the sensitivity that returns exhibit when these risks crystallise.

For regulated businesses in mature regulatory regimes, provided that there is continued confidence in the regulatory framework, the first three items in the list are principally a function of regulatory design.

When regulators set a cap on aggregate revenue (a "revenue cap"), they deliberately shield companies from exposure to changes in volumes and customer numbers. Conversely, when regulators set a cap on unit charges (a "price cap"), they consciously provide for firms to earn higher revenues and higher profits when volumes unexpectedly grow and to earn lower revenues and lower revenues when volumes unexpectedly shrink.

In the case of expenditure risk, regulators are able to choose the period of time for which companies retain the benefit of out-performance (or suffer the financial consequences of under-performance) before price controls are reset into line with actual costs. Alternatively, regulators may state explicitly that companies will take x cents in the dollar of any unexpected under- or over-spending.

Finally, interest rate risk may be allocated solely to companies for the duration of each regulatory period using fixed cost of debt allowances. Or a regulator may choose to index the cost of debt in line with prevailing market rates and in doing so pass interest rate risk on to customers.

Investors' final exposure to revenue and cost risk after the application of the above regulatory mechanisms must then be assessed by reference to the size of a business's investor capital base relative to the revenue and expenditure that it is managing. Companies that have a small investor capital base relative to their revenues and costs will see a relatively large impact on returns when risks amount crystallise. By contrast, companies that have a large investor capital base will see returns vary much less when they encounter risks which have the same percentage impact on revenues and costs.

A2.   The riskiness of Australian and UK electricity distribution networks

Table A1 compares the characteristics of the electricity distribution companies operating in Australia and companies operating in Great Britain.

Table A1: Riskiness of Australian and UK electricity distribution network operators

	Australian DNOs	GB DNOs
Revenue risk	Low – companies have revenue caps	Low – companies have revenue caps
Expenditure risk	Low to medium – companies take a 30% share or under- and over-spending against regulatory allowances	Medium – companies typically take a 55% share of under- and over-spending against regulatory allowances
Interest rate risk	Low – the allowed cost of debt adjusts on an annual basis in line with prevailing market rates	Low – the allowed cost of debt adjusts on an annual basis in line with prevailing market rates
Sensitivity of returns to risks	Low – companies' RABs are typically worth 4-9 times annual revenues and4-13 times annual expenditure	Low – companies' RABs are typically worth 5 times annual revenues and 6 times annual expenditure

A comparison between the two columns in the table suggests that there are no obvious grounds for differentiating the Australian and GB electricity distribution networks.

Both sets of companies first of all face negligible revenue risk.

They also nowadays face low levels of interest rate risk following the AER's and Ofgem's introduction of cost of debt indexation mechanisms.

The raw exposure to day-to-day expenditure risk is slightly lower in Australia due to the AER's selection of a lower company share of under- and over-spending against regulatory allowances. However, it is difficult to see that this exposes UK networks to a materially higher degree of systematic risk, given that costs are not generally seen as moving in a particularly pro-cyclical fashion.

Finally, the structure of the GB networks' RABs, revenues and costs is 'in the pack' with the Australian networks (NB: there is a particularly good read-across to the Victorian distribution companies).

ANNEX 3: NEW ZEALAND MRP CALCULATIONS

The New Zealand Commerce Commission's estimates of the TAMRP can be converted to estimates of the MRP using the formula:

MRP = TAMRP – r_f x investor tax rate

The computations for the periods, 2010-11, 2010-16 and 2016- are as follows. In each case, I have taken the values of r_f and the investor tax rate from the Commission's published input methodologies reports.

Table A2: New Zealand MRP calculations

	TAMRP	r_f	Investor tax rate	MRP
2010-11	7.1%	4.76%	30%	5.67%
2011-16	7.0%	4.76%	30%	5.57%
2016-	7.0%	2.74%	28%	6.23%

ANNEX 4: EUROPEAN COST OF EQUITY CALCULATIONS

Table A3: European regulators' MRP, beta and cost of equity premia estimates

Country	MRP	Equity beta at 60% gearing	Premium over the risk-free rate
Finland	5.0%	1.19	594 basis points
Czech Republic	5.0%	1.19	593 basis points
Slovenia	5.0%	1.14	570 basis points
Ireland	4.75%	1.00	476 basis points
Portugal	6.25%	0.74	462 basis points
Luxembourg	4.8%	0.96	459 basis points
Netherlands	5.05%	0.90	454 basis points
Italy	5.0%	0.80	441 basis points
Norway	5.0%	0.88	438 basis points
Estonia	5.0%	0.84	418 basis points
Belgium	5.01%	0.76	381 basis points
Greece	4.0%	0.95	380 basis points
Hungary	4.3%	0.88	377 basis points
Poland	4.2%	0.89	372 basis points
Austria	5.0%	0.69	345 basis points
Romania	5.0%	0.62	311 basis points
Lithuania	4.02%	0.72	289 basis points

Notes: the table includes only instances of WACC decisions made since 2012. The regulators' equity betas have been re-geared using the respective regulators' preferred formulae.