Comment on "Further work on the Cost of Capital Input Methodologies. Commerce Commission invitation to provide evidence on the WACC percentile".

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1 Introduction

Auckland UniServices Ltd[1] has been engaged by the NZ Airports Association to comment on the Commerce Commission's ("Commission") consultation paper titled "*Further work on the cost of capital input methodologies: Process update and invitation to provide evidence on the WACC percentile*".

1.1 Background

The Commission has issued a notice of intention to do further work on the cost of capital methodologies that apply to electricity lines services, gas pipeline services and specified airport services regulated under Part 4 of the Commerce Act.

Specifically the Commission seeks to address the High Court's concerns regarding the use of the Commission's 75th WACC percentile estimate. The Commission notes the High Court questioned the use of the 75th WACC percentile estimate (rather than the 50th percentile or mid-point WACC) in the absence of empirical evidence and theoretical results, when setting regulated price-quality paths.

The Commission considers this to be of potential materiality and that it is important to resolve the uncertainty regarding the WACC percentile to be applied under the cost of capital input methodologies ("IMs").

1.2 Structure of this report

The purpose of this report is to:

- Briefly comment on the cost of capital range;
- Comment on the rationale for the Commission's 75th WACC percentile in setting electricity and gas pricing and seek further clarity on the extent that the Commission considers the WACC percentile may be intended to provide a buffer for asymmetric downside risks in addition to other factors; and
- Note other regulatory risk factors that may be relevant to the choice of a WACC percentile.

[1] References in this report to "we" or "our" refer to the opinions of Dr Alastair Marsden.

2 Cost of Capital Range

2.1 Establishing the Cost of Capital Range

In establishing the cost of capital range, the Commission's Input Methodologies (EDBs & GPBs) Reasons Paper (2010) acknowledged the prospect of error in the determination of the true cost of capital. This reflected both:[2]

- Model error arising from the choice of a particular model used to determine the cost of capital; and
- Parameter error arising from the uncertainty around the parameter inputs into a cost of capital model.

The Commission therefore sought to derive a plausible range of the WACC that reflected uncertainty around the parameter inputs into the cost of capital model. To account for model error the Commission sought to ensure its cost of capital estimates were reasonable and commercially realistic.

2.2 How broad is the cost of capital range?

Under any theoretical asset pricing both model and parameter error will exist. Thus, where the true WACC for any regulated entity, which is set in the market, is unobservable, any mid-point estimate of the WACC will invariably differ to the true WACC.

The Commission's WACC 25th to 75th percentile range for EDBs is circa minus/ plus 0.8% around the mid-point (50th percentile) WACC estimate.[3] For Airports, the Commission's WACC 25th to 75th percentile range is circa minus/ plus 1.0% around the mid-point.[4] In deriving these ranges we understand that the Commission has sought to ensure any allowance for potential errors should be reasonable in the circumstances, but without producing a range that is so broad to be meaningless and of no practical use.

To determine the WACC the Commission has applied the Brennan-Lally CAPM.

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[2] For example, see paragraphs H11.4 to H11.7 of the Input Methodologies (EDBs & GPBs) Reasons Paper, 22 December 2010.

[3] For example, see "Cost of capital determination for information disclosure year 2012 for Powerco Limited gas distribution services", [2014] NZCC 3, 3 February 2014. The mid-point estimate of post-tax WACC was 6.55%, with a range from 5.74% to 7.36%

[4] For example, see "Cost of capital determination for information disclosure year 2015 for specified airport services (March year-end) and electricity distribution services [2014] NZCC 10, 30 April 2014. The Commission estimated a mid-point estimate of post-tax WACC of 7.42% for the five year period commencing on the first day of disclosure year 2015 (i.e., 1 April 2014). The Commission also determined a post-tax WACC range from 6.44% to 8.40%, where the endpoints are the 25th and 75th percentile estimates respectively

Notwithstanding the usefulness of the CAPM and lack of practical alternatives, there is, however, a large amount of empirical evidence that the CAPM explains only a small proportion of the cross-sectional variation in stock returns. For instance, Fama and French (2004) argue the CAPM is not a model that is well able to empirically explain asset pricing.

Fama and French (1997) also conclude cost of equity estimates for industries are very imprecise with standard errors of 3.0% per year typical for both the CAPM and the Fama-French three factor model. These large standard errors reflect uncertainty about the true risk premiums and risk factors.[5] These risk factors may also be time-varying.

2.3 Implications of WACC range for setting prices and measuring returns

In determining the appropriate WACC percentile to set regulated price-quality paths or measure ex-post returns under information disclosure, in our view, the Commission should continue to recognise that some judgement is required in respect of the determination of the cost of capital and the parameters inputs into the WACC calculation. This means that:

- In using any estimate within its 25th or 75th WACC percentile range, there is still a significant chance that the true WACC is outside this range. The choice of a 50% confidence interval estimate is also below the usual levels for statistical testing of 90% or greater;
- The current 25th to 75th WACC percentile range for EDBs and Airports of minus/ plus 0.8% - 1.0% around the midpoint of the WACC may be too narrow and not fully reflect:[6]
    - Uncertainty with respect to all the parameter inputs into the WACC calculation; and
    - Uncertainty with respect to the measures of the standard errors of the input parameters used to calculate the WACC range.

In measuring ex-post profits relative to the Commission's estimate of WACC for Airports under an Information Disclosure regime, we also note that uncertainty around the WACC mid-point estimate and the appropriate percentile range means, in our view:

- Ex-post profits would need to exceed target returns or profits by a significant margin to reach a conclusion with any strong degree of confidence that excessive profits have been earned;
- For Airports the Commission will need to be cognisant that it sets an annual WACC for disclosure purposes, whereas ex-ante prices are typically set for a 5 year period based on the WACC at the start of the pricing period; and
- A multi-year analysis will be more meaningful than a single year analysis. In this respect it will also be necessary to ensure that any perceived over recovery is not due to expected under recovery in earlier periods.

[5] Fama and French (1997) state that for specific firms and projects the cost of equity capital estimate would be even more imprecise.
[6] Also see Auckland UniServices, 2010.

3 Commission's Rationale for the choice of the appropriate WACC Percentile

3.1 Factors that may impact on the appropriate WACC percentile

In its Input Methodologies (EDBs & GPBs) Reasons Paper (2010), (para. H11.54) the Commission noted the following factors that may influence the choice of the appropriate WACC percentile. These are:

- "*That the purpose of Part 4 is to promote the long term benefit of consumers, including:*
  - *i. ensuring suppliers of regulated services have incentives to invest and innovate, which will benefit consumers over time (s 52A(1)(a));*
  - *ii. ensuring suppliers of regulated services are limited in their ability to extract excessive profits (s 52A(1)(d));*
- *that in workably competitive markets the risks are borne by the party that is best equipped to manage these risks. That is not all risks can be passed on to the consumer and that firms will have to manage some of the risks themselves;*
- *the risk that the true (but unobservable) cost of capital is above the estimated mid-point WACC;*
- *the risk that CAPM and the simplified Brennan-Lally CAPM may underestimate the returns on low beta stocks;*
- *the risk that the use of a domestic CAPM (simplified Brennan-Lally) may lead to higher estimates of the cost of capital than the international CAPM and that international investors can be viewed as the key marginal investors;*
- *the impact on potential subsequent investment by service users and the potential impacts on dynamic efficiency; and*
- *considering the risk of error in estimating individual parameters of the simplified Brennan-Lally CAPM including beta and the TAMRP."*

We agree that the choice of the appropriate point-estimate WACC for pricing (and WACC range for measuring excess returns under information disclosure) requires more than just consideration of asymmetry of social consequences or ensuring suppliers have sufficient incentives to invest.

Thus, in our view, the Commission should consider all relevant factors that may impact on its appropriate WACC percentile as part of its further work on the cost of capital methodologies that apply to electricity lines services, gas pipeline services and specified airport services regulated under Part 4 of the Commerce Act. As noted later in this report, at a practical level, the appropriate WACC percentile applied by the Commission may also reflect an allowance or some buffer for asymmetric risks (where there is no adjustment for these risks through other mechanisms).

3.2 Incentives to Invest and Asymmetric Social Consequences

In its Input Methodologies (EDBs & GPBs) Reasons Paper (2010), (para. H11.65), the Commission notes it is a matter of judgement as to what is the appropriate percentile of the cost of capital to be applied when considering DPPs, CPPs and IPP. Three reasons were noted as reflecting the Commission's adoption of the WACC 75th percentile or cost of capital range. These were ((para. H11.65):

- *"The Part 4 Purpose (the long term benefit of consumers);*
- *The uncertainty in estimating the true cost of capital; and*
- *That in workably competitive markets not all risks can be passed on to the consumer in the form of higher prices. Instead, in workably competitive markets firms have to manage some risks."*

The Commission's choice of a cost of capital estimate that is above the mid-point WACC in its Input Methodologies (EDBs & GPBs) Reasons Paper (para. H11.62) also reflected its concerns that:

> *"…… under Part 4 a cost of capital estimate that is above the mid-point is that it considers the costs from the point of view of consumers associated with underestimation of the cost of capital in the Part 4 regulatory setting, are likely to outweigh the short-term costs of overestimation. That is, the Commission acknowledges that where there is potentially a trade-off between dynamic efficiency (i.e. incentives to invest) and static allocative efficiency (i.e. higher short-term pricing), the Commission, under Part 4, generally favours outcomes that promote dynamic efficiency."*

If a WACC is too low consumers benefit at the expense of the service provider, subject to the service provider continuing to invest. However, there is a risk of under-investment, which may disadvantage consumers in the longer-term. On the other hand if the WACC is too high, firms can earn excess profits and may over invest or gold-plate investments.

To address the concerns of the High Court, we understand the Commission will consider the use of "loss functions" and other empirical and analytical evidence as part of its determination of an appropriate WACC percentile to ensure suppliers have sufficient incentives to invest.

An examination of loss functions is outside the scope of this report.

3.3 Should the appropriate WACC percentile incorporate asymmetric risks?

3.3.1 Asymmetric risks

In the IMs the Commission splits asymmetric risks into:[7]

- Type I risks, i.e. infrequent events that can produce large losses. The risk of extreme events is predominantly negative and costs are usually borne by suppliers with little or no benefits when the gains are positive.[8] The types of asymmetric risks may also be supplier specific; and
- Type II risks, i.e. risks such as the threat of competitive entry or asset stranding from technical innovations, etc.

Asymmetric risks are not fully captured in the Brennan-Lally CAPM, which is adopted by the Commission to determine the cost of equity capital and WACC.

3.3.2 Mechanisms to deal with asymmetric risks

The approaches to deal with or recognise asymmetric risks could take the form of a combination of:

- For Type I risks, determination of an actuarially-fair insurance premium and modelling this cost into the cash flows. Certain Type II risks may also be modelled into the cashflows by way of an accelerated depreciation charge;[9]
- Ex-post protection;[10] or
- Adding an increment to the WACC.

3.3.3 The Commission's approach to deal with asymmetric risks

Approach in the IMs

In its IMs, the Commission made no transparent adjustment to the cost of capital for asymmetric risks. Rather the Commission considered that it may be appropriate to deal with asymmetric risks through some other forms of adjustment or mechanisms.[11]

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[7] See for example, Input Methodologies (EDBs & GPBs) Reasons Paper (2010), para H12.4

[8] The Christchurch earthquake is a clear example of a Type 1 risk eventuating in recent years.

[9] For real options Guthrie (2009) also proposes an uplift to the regulatory asset base as an alternative adjustment mechanism.

[10] That is when, or if, the adverse event occurs, the cost is reimbursed by the customer. In respect of ex-post protection, assets owned by regulated firms typically have long expected asset lives and any contract for ex-post protection would need to be binding on the parties (including the regulator) and of long-term duration. In the case of Airports, ex-post protection may be problematic given the potential for changes in the airlines that operate at each airport.

The Commission appears to reiterate this position in its Revised Draft Reset of the 2010-15 Default Price Quality Paths of August 2012 (para. L34), where it stated in the context of any claw-back associated with under- or over-recovery:[12]

> *"We note that it is unlikely to be appropriate to apply the 75th percentile estimate of the cost of capital when determining the present value of the amount to be clawed back. This is because the rationale behind applying a 75th percentile estimate is to address the asymmetric risk of regulatory error, which cannot be reduced through other means, and could affect incentives for future investments. In our view, the effect on incentives is not a primary consideration in this instance, because claw-back applies to over- or under-recovery that has already occurred."*

Commission's view in the Orion CCP Application

The Commission's final decision in the case of the Orion CPP[13] application, however, suggests that the Commission's choice of the 75th WACC percentile for EDBs and GPBs may also reflect a buffer for asymmetric risks. In this decision (paragraph C25) the Commission states, in response to submissions, where Vector and other submitters suggest that the 75th WACC percentile do not include an allowance for the costs of catastrophic events:[14]

> *"We disagree with these submissions. Although the IMs do not make any explicit adjustments to the cost of capital (or provide additional cash flow allowance) for asymmetric risk, the practical effect of using the 75th percentile WACC is to provide a buffer for catastrophic events."*

In our view, adding an increment (or buffer) to the discount rate is more common commercial practice as opposed to providing for asymmetric risks in the "cashflow" expectations. This recognises modelling any asymmetric risks in the expected cashflows is often not well adopted or accepted in practice.[15]

Size of any increment to WACC for asymmetric risk

In its Final Reasons paper on the Orion CPP application, the Commission considered:

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[11] See for example, Input Methodologies (EDBs & GPBs) Reasons Paper (2010), para H12.1. As noted above, this could include adjustments to regulatory cash flows; for example, through the use of flexible depreciation profiles in the event that asset stranding becomes apparent.

[12] Commerce Commission, Revised Draft Reset of the 2010-15 Default Price Quality Paths, 21 August 2012.

[13] Commerce Commission, Setting the customised price-quality path for Orion New Zealand: Final Reasons paper, 29 November 2013.

[14] In the Final Reasons Paper for the Orion CPP application, the Commission also stated at paragraph C23.3: *"Under the IMs the 75th percentile WACC is used for setting price-quality paths. Although the IMs did not "make any adjustments to the cost of capital for asymmetric risk" some allowance for the risks of catastrophic events is inherent in the IM-based WACC. While we did not decide to apply the 75th percentile because of catastrophic risk, a consequence is that suppliers receive a return which is above the best estimate of a normal return (ie, the mid-point WACC)"*

[15] A parallel type "example" may be the case of Venture Capital ("VC") companies. Anshuman et al. (2012) note that VCs recognise that the cash flows projected by entrepreneurs seeking funding are biased upward and accordingly inflate the discount rate to offset this optimism bias.

- That the 75th percentile WACC provides sufficient incentives for future investment, without needing to provide any additional compensation for the risks of catastrophic events (paragraph C27);
- In using the 75th percentile, when considering compensation for the risks of catastrophic events, in workably competitive markets not all risks can be passed on to the consumer in the form of higher prices. Instead, firms have to manage some risks (paragraph C29); and.
- In any event, catastrophic events are expected to have a relatively minor impact, when compared to the observed cost of capital (paragraph C31). In paragraph C31 (referring to the Commission's draft decision) the Commission also stated (drawing on the evidence noted in this paragraph) the impact on cost of capital from earthquakes and cyclone wind damage would be almost certainly much less than 0.1% per annum. This compares to an increase in the WACC by greater than 0.7% per annum using the 75th percentile.

In our view, even where firms may have to self-manage downside asymmetric risks (e.g., through a self-insurance scheme), this is still a cost to the business that the firm will seek some return or compensation for incurring these risks.

In addition, different regulated industries likely face (i) different asymmetric risks, which include risks other than earthquake and cyclone damage; and (ii) differing exposure to the degree or level of asymmetric risks.

For example, in the case of Airports, asymmetric risks may include extreme events such as SARs, Bird Flu, terrorist attacks and natural disasters such as volcanic eruptions, which may disrupt air travel from cloud ash. Some of these risks may be very difficult to insure against other than through a self-insurance scheme.

A report by Air Transport Action Group (2012) titled "When the system stops working: an analysis of the impact of the 2010 Icelandic volcano" noted (page 43).[16]

> *"On 14 April 2010, Iceland's Eyjafjallajokull volcano erupted with an ash plume that rose over three kilometres and, with the help of winds, blew across much of Europe's airspace. Safety concerns over the negative effects of volcanic ash on aircraft engines caused an interruption in global air traffic to an extent not seen since 11 September 2001 and the largest disruption to European civil aviation since World War II. The closure of large portions of European air space for a week between 15 April and 21 April impacted global travel, trade and business demonstrating the integral role of air transport in society and commerce.* (and)
>
> *Oxford Economics has quantified the economic impact of the disruption to air travel, including direct, indirect (via the supply chain), induced (due to the lost spending of employees) and catalytic (via reduced international trade and lost output due to workers being stranded) effects.*

[16] Source: http://aviationbenefits.org/media/21253/When-the-system-stops.pdf

- *Around 10 million passengers were disrupted during the entire period of disruption;*
- *Over 100,000 flights were cancelled during the first week of ash cloud disruption;*
- *Total disruption at its peak meant just under a third of total global air traffic capacity was affected;*
- *313 airports representing 80% of European airport capacity were impacted."*

The impact of the Icelandic volcano was, however, smallest in Asia, (page 44 of the Report).:

> *"The global effects of the disruption on GDP were the smallest in Asia at $517million equivalent to around 0.16% of the region's GDP for the week. With the fewest travellers affected (less than 250 million), the net aviation impact in Asia was $216 million"*

Agriculture is also a significant component of NZ's economy. In the outbreak of foot and mouth disease during 2001 in the UK, the agriculture and food industries and tourism suffered large losses. According to the National Audit Office (2002) report:

> "*Tourism suffered the largest financial impact from the outbreak, estimated by the Department and the Department for Culture, Media and Sport to have been between £4.5 and £5.4 billion. Businesses directly affected by tourist and leisure expenditure are estimated to have lost between £2.7 and £3.2 billion; and there was a further impact of between £1.8 and £2.2 billion on industries and services that are supported by tourism.";* (paragraph 1.28) and
>
> "*One element of the loss, the net effect of which is estimated at over £400 million, resulted from a drop in foreign visitors (Figure 18). Between March and May 2001 there was a fall of around 15 per cent in holiday visits to Britain by overseas residents. Thirty per cent of domestic visitors also changed their travel plans as a direct result of the outbreak. Rural Cumbria, Devon and Northumbria were hit worst, but the overall impact masks significant variations both between localities and between different businesses. Some domestic tourist expenditure was redirected to market towns and coastal resorts, and abroad. Precautionary closure of many rights of way meant that rural bed and breakfast enterprises were particularly hard hit."* (paragraph 1.29).

NZ very likely has better monitoring, contingency and response plans than the UK in 2001 to deal with a foot and mouth outbreak. However, based on the UK experience, the downside impact to the NZ tourism industry, at least over the short-term, may still be significant.[17]

Conclusion

Pursuant to the Orion CPP decision, it appears that the Commission considers an appropriate WACC percentile estimate can (in addition to those other factors that may influence the choice of the percentile): (i) provide sufficient incentives for future investment; (ii) reflect uncertainty in estimating the true cost of capital; and (iii) at a practical level, provide a buffer

[17] In addition a significant outbreak of foot and mouth disease in NZ could also be such a large event, so as to constitute a systemic event with wider impacts on the whole market.

for some asymmetric risks (albeit in workably competitive markets firms have to manage some risks).

In our view:

- The Commission should recognise that asymmetric risks can differ between industries, both in the type of asymmetric risks and the level of exposure.
- A WACC point-estimate above the 50th percentile would be appropriate where considering asymmetric downside risks only (i.e. when no consideration is given to promoting investment incentives and no consideration is also given to other factors that may determine the appropriate WACC percentile). This is subject to no specific allowance for asymmetric risks in the cash flows or via other mechanisms.
- The Commission appears to accept that the choice of the WACC percentile may provide some buffer for asymmetric risk (among other things), but has not attempted to precisely quantify that buffer itself (in the context of the Orion CPP decision). If the Commission confirms that it agrees with the principle that asymmetric risk is relevant to the choice of the percentile (in the absence of other adjustment mechanisms), then in our view, the Commission should consider when determining its appropriate WACC percentile, in a robust manner as possible, the different types and quantum of asymmetric risks for EDBs, GPBs and Airports.

We also recognise that the Commission is looking to regulated firms to provide further empirical evidence to quantify the level of asymmetric risks. In our view, some guidance from the Commission on the type of evidence that the Commission considers necessary to more precisely quantify these asymmetric downside risks would be helpful.

4 Other factors that may influence the choice of a WACC percentile

4.1 Regulatory Risk

We consider another factor that may justify the adoption of an estimate greater than the WACC 50th percentile for regulatory pricing and information disclosure is the potential for asymmetric regulatory risk and how this may impact on cost of capital and investment decisions by regulated suppliers.

The presence of "regulatory risk" has the potential to constrain new investment by increasing the hurdle rate that firms apply in their investment decisions. For example, asymmetric regulatory risk may arise where the regulator only imposes penalties when ex-post returns are above expectations in any one regulatory period, but with no compensation if prior or current losses are incurred.

In our view there is also a risk of "regulatory error" if the Commission were to reach any final decision on the appropriate WACC percentile before it had fully:

- Considered the complexity of all the issues;
- Recognised that significant differences on the appropriate WACC percentile may exist between EDBs, GPBs, Transpower and Airports; and

- Concluded (having regard to as robust evidence as possible) that any review of the WACC percentile can be properly addressed outside of any review of other aspects of the IMs.

5 Conclusion

In summary, we conclude:

- The cost of capital estimate is imprecise and uncertainty exists around all the points in the WACC range;
- The choice of the appropriate WACC percentile for pricing (and WACC range for measuring excess returns under information disclosure) requires consideration of a number of factors, which are wider than just consideration of asymmetry of social consequences or ensuring suppliers have sufficient incentives to invest;
- Asymmetric downside risks are likely to differ between industries, in both the level and quantum of asymmetric risks. At a practical level, the choice of a WACC point estimate greater than the 50% percentile can provide some buffer for asymmetric risk, in the absence of any cash flow allowance or other adjustment mechanisms;
- The Commission appears to accept that the choice of the WACC percentile may provide some buffer for asymmetric risk. If the Commission confirms that it agrees with the principle that asymmetric risk is relevant to the choice of the percentile (again in the absence of other adjustment mechanisms), then in our view, the Commission should consider when determining its appropriate WACC percentile, in a robust manner as possible, the different types and quantum of asymmetric risks for EDBs, GPBs and Airports;
- We recognise that the Commission is looking to regulated firms to provide further empirical evidence to quantify the level of asymmetric risks. However, we consider it would also be helpful if the Commission clarifies in more detail how it would respond to asymmetric downside events for all regulated firms (including Airports) and provide some guidance on the type of evidence that the Commission considers necessary to more precisely quantify these asymmetric downside risks.

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