Mr Neil Cochrane
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Christchurch International Airport
PO Box 14001
Christchurch 8140
New Zealand

22 March, 2013

Dear Neil,

Subject: Advice on the weighted average cost of capital for Christchurch International Airport for pricing purposes

1. Introduction

1.1 Scope and context of our advice

You have requested a report that consolidates the advice we provided on the weighted average cost of capital (WACC) that Christchurch International Airport (CIAL) should apply when setting its 'priced' aeronautical services (that is landing and take-off and for use of the terminal). In undertaking this task, we refer where relevant to two previous reports on WACC parameters, being my reports dated 6 March 2012 ("first report"),[1] and 12 July, 2012 ("second report"),[2] although as requested this report has been drafted to be self contained.

The first report was our initial advice, and the second report took into account, amongst other things, of a report by Futures Consultants Limited (Futures) that was commissioned by the Board of Airline Representatives of New Zealand (BARNZ) and provided an updated estimate of the WACC. In this report, while the conclusions are conditioned by our consideration of Futures' arguments, we have only summarised the differences in our overall estimates and the contributors to this. Readers are referred to the second report referred to above for a summary of Futures' arguments and our detailed response.

As noted above, this report is a consolidation of earlier advice that CIAL factored into its pricing consultation and decision. Consistent with this, the WACC estimates presented reflect the prevailing market conditions as at the date of the second report. For the inputs that were linked specifically to prevailing market conditions, an averaging period spanning the month of March in 2012 was used.[3] We remain of the view that the earlier advice was appropriate, and so this report can be taken as both a reporting of the advice provided in 2012, and our current view of what would have been an appropriate estimate of the WACC for pricing purposes at that time. We also observe that the key issue identified for WACC estimation in the earlier reports – namely, whether conventional estimation approaches remain valid in light of the very low government interest rates – has been the subject of additional

[1] PricewaterhouseCoopers (2012), *Opinion on the regulatory weighted average cost of capital for Christchurch International Airport*, Report to Christchurch International Airport Limited, 6 March ("first report").
[2] PricewaterhouseCoopers (2012), *Advice on the weighted average cost of capital for Christchurch International Airport for pricing purposes – Review of Futures Consultants Report*, 12 July ("second report").
[3] As explained in the second report, this slightly earlier averaging period was used to facilitate comparability with the Futures report and the Commission's then latest views on the WACC.

research and consideration over the intervening period, and this material is introduced where relevant in this report.

1.2 Structure of this report

The remainder of this report is set out as follows.

- Section 2 sets out our recommended WACC and summarises the input assumptions underpinning this
- Section 3 describes the method and formulae that we have applied
- Section 4 addresses the key issue of the appropriate risk free rate for the cost of equity in the context of the current market conditions
- Section 5 sets out our reasoning on the tax adjusted market risk premium
- Section 6 sets out our reasoning on the asset beta
- Section 7 sets out our reasoning on leverage, and
- Section 8 sets out our reasoning on the cost of debt.

2. Summary of our advice

2.1 Recommended WACC

The estimate of the WACC presented in this report addresses each input parameter in isolation, as well as the interactions between parameters reflecting the need to maintain consistency in the overall approach that is taken. The parameters are then combined to estimate a WACC that is appropriate to apply when setting aeronautical charges.

It is noted at the outset that a key issue with estimating a WACC for pricing purposes in July 2012 and indeed at the current point in time is whether the historically low New Zealand government interest rates should be employed into the estimate of the WACC, or whether this would present a material inconsistency and warrant a modification. In my advice, we propose such a modification and also propose that the applicable regulatory precedent should be applied regarding the quantum of the adjustment to the risk free rate in this context, namely where a WACC estimate is being used as an input into a proposal or decision over prices that will remain in effect for an extended term.

In summary, based on the individual WACC parameters displayed in Table 1 below, we recommend that a WACC of 10.27 per cent when expressed on a 'vanilla' basis (that is, one that ignores the tax deductibility of interest) or **9.76 per cent** when expressed on a post tax basis (that is, one where the

benefit from the tax deductibility of debt is incorporated within the WACC) is appropriate to use for pricing purposes (noting the assumption that the WACC was settled in July 2012).[4]

Table 1: WACC parameters for Christchurch International Airport

Parameter	Value
Risk free rate	6.00%
Asset beta	0.70
Equity beta	0.95
TAMRP	7.5%
Average corporate tax rate	28%
Average investor tax rate	28%
Leverage	26%
Cost of equity	***11.41%***
Risk free rate - debt	4.31%
Debt risk premium	2.35%
Cost of debt (pre debt issuance costs)	6.66%
Debt issuance costs	0.35%
Cost of debt (including debt issuance costs)	**7.01%**
Vanilla WACC	10.27%
Post tax WACC	**9.76%**

2.2 Conclusions on individual WACC parameters

Our final conclusions on the various WACC parameters and methods are as follows:

- *Risk free rate for the cost of equity* – the use of the current spot government interest rates as the risk free rate (in our March 2012 averaging period as well as currently) in a conventional application of the Capital Asset Pricing Model will lead to a material understatement of the cost of equity, and a risk free rate drawn from "normal market" conditions will result in a materially better estimate of the cost of equity. There is considerable support in the theoretical and empirical finance literature for the proposition that the cost of equity does not move one-for-one with government interest rates. There is also considerable regulatory precedent in the UK and US for ignoring transitory movements in government interest rates when estimating costs of equity for regulatory purposes. We are also of the view that a 10 year term should be used when estimating the risk free rate as this is more indicative of the risk free alternative investment for investors in long lived infrastructure. However, this matter is only material if the cost of equity were to be estimated using current government interest rates as the risk free rate – historically in New Zealand, there has been little difference in interest rates between 5 and 10 year bonds (with the yield curve often slightly inverse).

- *Tax adjusted market risk premium (TAMRP)* – PwC applies a TAMRP of 7.5 per cent in all its valuation work, and has done so for some time. In the body of the report, we elaborate further upon our reasons for this assumption.

[4] We note that the different WACC values require a different definition for cash flows, and if combined correctly will deliver identical charges.

- *Asset beta* – an asset beta of 0.70 is appropriate for CIAL. This conclusion is based on a recent analysis of airport betas that we undertook for the New Zealand Airports Association, which indicates that an asset beta of 0.65 for the average New Zealand airport is appropriate.

- *Term for the cost of debt* – we are of the view that the appropriate term for the cost of debt for infrastructure assets is the long term, for which 10 years is an appropriate proxy. However, our analysis suggested that there was not a material increase in the debt risk premium for longer term debt (i.e., beyond 5 years) as at July 2012. Accordingly, we have assumed that the debt risk premiums at 5 and 10 years are identical.

- *Credit rating for the cost of debt* – we consider that an appropriate credit rating assumption for the average New Zealand airport is BBB+, reflecting the average stand-alone rating across the three major airports. While we remain of the view that the credit rating should reflect the circumstances of the actual airports – and that the circumstances of CIAL may justify a lower assumed credit rating than the average airport – we nonetheless have assumed that the credit rating that is appropriate for the average (large) New Zealand airport of BBB+ is appropriate for CIAL.

- *Debt raising cost* –we consider that a debt raising cost assumption of 0.35 per cent is not inappropriate for long term (10 year) debt, although a higher allowance would be appropriate for shorter term debt.

- *Leverage* – we have assumed a gearing level of 26 per cent (debt-to-assets), which reflects the average leverage in our preferred set of firms that we used to estimate the asset beta.

2.3 Comparison with the Futures report

Table 2 compares the individual parameters and post-tax WACC estimates that we have derived, with the estimates provided to BARNZ by Futures (albeit with one correction that we have applied).[5]

[5] We detected what appeared to be an inadvertent error in Futures' analysis and have corrected for this. Futures asserted that the Commission's estimated debt risk premium 2012 of 1.94 per cent for A- rated debt in the April 2012 WACC determination was the rate on a single day rather than an average over a month. We examined the spreadsheets that the Commission releases with its WACC decisions and confirmed that the Commission's figure is indeed the average over a month. Accordingly, we have replaced Futures' figure of 1.62 per cent with the Commission's reported figure of 1.94 per cent.

Table 2: WACC parameters for Christchurch International Airport – comparison of PwC and Futures advice

Parameter	PwC	Futures (corrected)
Risk free rate	6.00%	3.61%
Asset beta	0.70	0.65
Equity beta	0.95	0.78
TAMRP	7.5%	7.0%
Average corporate tax rate	28%	28%
Average investor tax rate	28%	28%
Leverage	26%	17%
Cost of equity	***11.41%***	***8.08%***
Risk free rate - debt	4.31%	3.61%
Debt risk premium	2.35%	1.94%
Cost of debt (pre debt issuance costs)	6.66%	5.55%
Debt issuance costs	0.35%	0.22%
Cost of debt (with debt issuance costs)	**7.01%**	**5.77%**
Recommended Post tax WACC[6]	**9.76%**	**8.43%**

The implication of the results in the table above is that virtually all of the difference in the WACC estimates of Futures and ourselves can be reduced to a difference of view as to whether the cost of equity should be assumed to have fallen in line with the precipitous recent decline in government bonds rates. Indeed, if our view of the risk free rate for equity was combined with all of Futures' other parameters (at least once the correction mentioned above is made), then a WACC estimate of 9.86 per cent would result. This is because while Futures' adopts a number of inputs that are different to ours (asset beta, tax adjusted market risk premium, cost of debt and gearing), this is offset by Futures acknowledging that allowance is required for parameter risk when regulators intervene in pricing matters, as noted already.

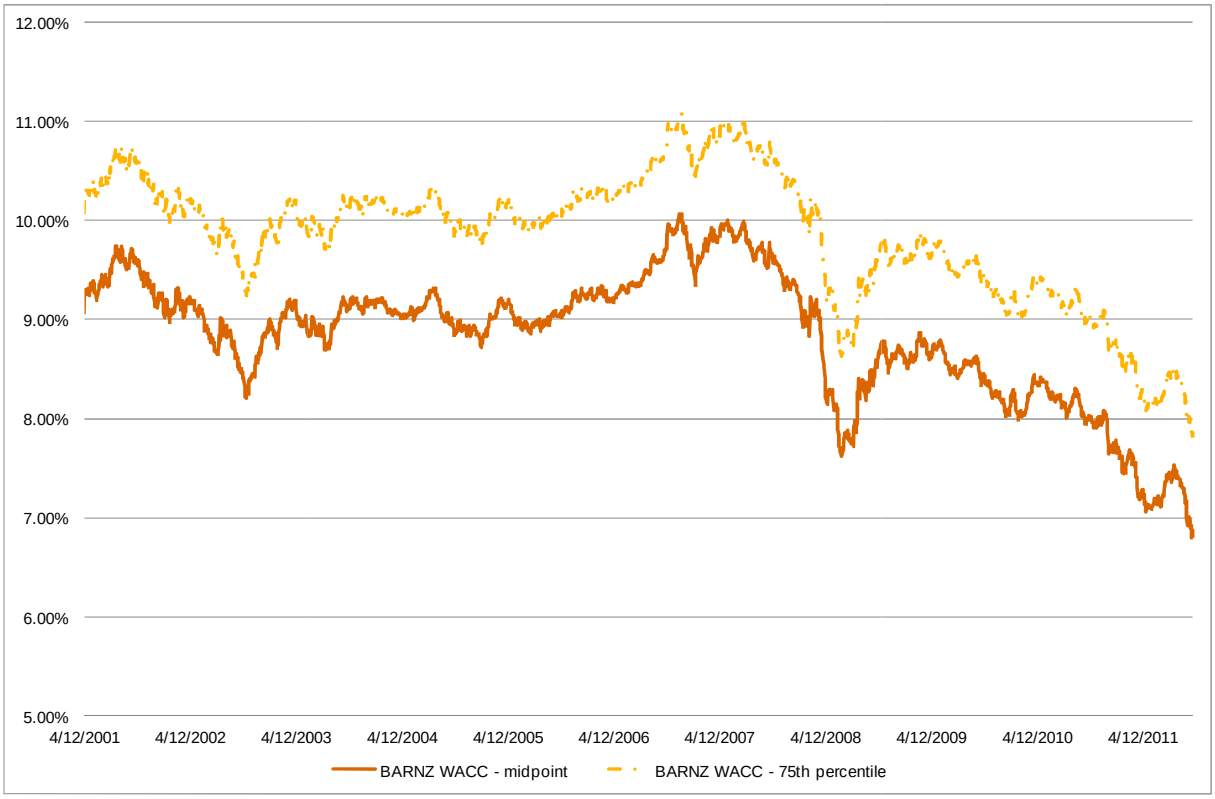
Futures commented somewhat colourfully that our advice not to use the current New Zealand Government bond rates when estimating the cost of equity is "another spurious attempt by advisers to justify *increased returns* for their monopoly clients" (emphasis added).[7] We note, however, that we are not in fact advocating an *increase* in the WACC, but merely that the WACC should not be assumed to have *decreased substantially* from the level at which it was prior to the GFC, which is the implication of Futures' advice. This point is illustrated in Figure 1, which shows a time series of the WACC that would be estimated using Futures' preferred parameters and methods for estimating the WACC.[8]

[6] Our recommended post tax WACC is the midpoint WACC, whereas the figure for Futures is the 75th percentile WACC, which includes an allowance of 1.01 percentage points for parameter uncertainty. We approached this matter from the point of view of a commercial negotiation, and so applied standard commercial techniques. Futures, on the other hand, approached the matter from the point of view of how a regulator would intervene in a pricing matter, and so adopted an approach for WACC estimation that was consistent with this.

[7] Futures Consultants Limited (2012), Op. Cit., p.8.

[8] This chart assumes an asset beta of 0.65, TAMRP of 7.0 per cent, a 5 year risk free rate, 5 year term for the debt risk premium and an A rating for debt. The risk free rate and cost of debt have been calculated using the Bloomberg fair value curves for the respective interest rates for simplicity, which is an approximation to Futures' method.

Figure 1 – Time series of the post tax WACC calculated using the Futures / BARNZ approach



The average of the "midpoint WACCs" that are calculated for the period prior to the GFC is 9.12 per cent (period ending 30 June 2007) or 9.22 per cent (period ending 31 August 2008), which translate into 75th percentile figures of **10.13 per cent** and **10.23 per cent**, respectively. These averages exceed our estimate of 9.76 per cent by a material margin, and indeed the daily estimates of the Futures WACCs presented above in the period prior to the GFC exceeded 9.78 per cent on more than 90 per cent of occasions. Thus, when judged against a period when capital market conditions were normal, the post tax WACC that we have proposed (9.76 per cent) would be deemed to lie within the bounds of what Futures would have considered reasonable.

3. Formulae applied

We have applied the Brennan-Lally version of the Capital Asset Pricing Model to estimate the cost of equity in line with our previous advice to CIAL on the WACC to be applied for pricing purposes. That formula is as follows:

$$R_e = R_f.(1 - T_I) + \beta_e.TAMRP$$

where:

R_e = the cost of (or required return on) equity

R_f = the risk free rate of return

β_e = the equity beta

$TAMRP$ = the tax adjusted market risk premium, and

T_I = the investor tax rate.

I have then estimated two forms of the WACC, the first being the post tax WACC, which is as follows:

$$WACC = R_e.\frac{E}{V} + R_d.\frac{D}{V}.(1 - T_c)$$

and the vanilla WACC, which is as follows:

$$WACC = R_e.\frac{E}{V} + R_d.\frac{D}{V}$$

where:

R_d = the cost of (or required return on) debt

E/V = the assumed share of equity in the financing of the asset

D/V = the assumed share of debt in the financing of the asset, and

T_c = is the corporate tax rate.

The cost of debt can also be expressed as a premium over the risk free rate, as follows:

$$R_d = R_f + DRP$$

where:

DRP = the debt risk premium

and the other variables are as defined above.

However, as highlighted in the executive summary and discussed more fully in the report, for the cost of equity, I have used an average of New Zealand Government Bond rates over an extended period as the risk free rate of return (rather than the prevailing rate) in order to obtain a risk free rate that is more consistent with the TAMRP (which itself has been derived primarily with reference to the long term premium to equity). In contrast, for the cost of debt, the premium that is currently required for relevant corporate debt can be estimated, which would need to be added to the prevailing New Zealand Government Bond rate for consistency. This means that one risk free rate is being used for the cost of equity and a second risk free rate for the cost of debt. Thus, in order to avoid confusion, we refer separately to the risk free rate for equity and the risk free rate for debt.

Lastly, we have assumed that the average corporate tax rate and the average investor tax rate are both 28 percent. As this assumption is seldom a contentious issue, we have not addressed it further in this report.

4. Risk free rate for the cost of equity

4.1 Defining the risk free rate

When deriving the risk free rate, the key issues to be addressed are the choice of instrument that is to be used as the proxy for the risk free rate, and the term that is to be adopted. It is common practice amongst financial market practitioners to use government bonds as the proxy for the risk free instrument. In addition, while the appropriate term is often debated in the academic literature, the dominant practice amongst Australian and New Zealand finance practitioners is to adopt a 10 year term, which is recommended in this report (this is the standard practice in valuations work by both PwC Australia and PwC New Zealand). I note that if a different term were to be adopted for the risk free rate (for example, very short term interest rates, which I understand to be preferred by some finance practitioners) then an adjustment is required to the tax adjusted market risk premium.

4.2 Relationship between the TAMPR and the risk free rate

The key issue at the present time in New Zealand is whether the currently very low government interest rates should be accommodated into the estimation of the WACC that is used to set prices, or whether an adjustment should be made. In particular, there is a risk of error if the (tax adjusted) market risk premium (TAMRP) and the risk free rate are not estimated using data that relates to the same time period, and this risk is exacerbated when interest rates are materially different to their long term average values.

There is considerable support in the theoretical and empirical finance literature for the proposition that the cost of equity does not move one-for-one with government interest rates. For example, Lettau and Ludvigson (2001) found that equity risk premiums tended to move in the opposite direction to the de-trended government bond rate.[9] The Australian Energy Regulator's consultant, Professor Kevin Davis (2011), recently also made the point that "there is nothing in the [CAPM] model which implies that the parameters of the model will be the same in different time periods."[10] In Australia, it has been shown using data based on the methodology applied by AMP Capital Investors, that:[11]

- The estimated required return on equity for the market has been relatively constant since 1993 (spiking up for the GFC and more recently for the European sovereign debt crisis); and
- For the same period there has existed a strong negative correlation between the market risk premium and the risk free rate.

The TAMRP that we propose to apply has been estimated primarily with reference to the long term historical average return to equities over the then prevailing bond rate. In contrast, the current global

[9] Lettau, Martin, and Sydney Ludvigson (2001), 'Consumption, Aggregate Wealth and Expected Stock Returns,' *Journal of Finance*, Vol. 56 (3), pp. 815-849.
[10] Davis, Kevin, (2011), *Cost of Equity Issues: A Report for the AER*, January, p.4.
[11] See CEG (2012), *Internal consistency of risk free rate and MRP in the CAPM*, Report prepared for Envestra, SP AusNet, Multinet and APA, March, p. 18.

capital market events arising from the 'EU crisis' have caused government interest rates in New Zealand (and in Australia) to be unusually low compared to their historical levels. The risk exists that pairing the TAMRP (reflecting long term averages) with today's government interest rates will understate materially the cost of equity. This issue has been considered in regulatory matters in Australia. Professor Robert Officer, a renowned expert on WACC issues in Australia, described the risk for error when the MRP and risk free rate are not set over the same time period as follows:[12]

> If MRP is set at an 'average or normal level' which is representative of a long run mean or expected value over the long term and Rft is at a low level, such as exists at the moment, this will under-estimate the return to equity E(Re,t) and penalize the regulatory entity, and conversely when Rf is at a 'high level'. Therefore, setting the parameters on the basis of different time periods when one is set at the current time may lead to greater error than if they were both set on the basis of the current same or 'normal' time period even though this is not representative of the current period. [paragraph 25]

Professor Officer describes three outcomes for the cost of equity based on the way the MRP and risk free rate are estimated.

> Noting the comments above, in estimating the parameters of the CAPM and having regard to the evidence of current MRP and Rf, there are three possible outcomes:
>
> > a) if the MRP and the Rf were both estimated in current market conditions, then the estimated cost of equity would reflect the likely cost of equity over the next regulatory period and is likely to be much higher than the long term average – this is the implication of the JFCP analysis referred to above;
> >
> > b) if the MRP and the Rf are both estimated over the a long term, or reflect, a more "normal" period, then they will result in a cost of equity that is comparable to the long run cost of equity, which I believe is below the current required return to equity. This approach appears to be what Dr Hird is proposing;
> >
> > c) **if the MRP is based on a long term average and the Rf is set reflecting current conditions where Rf are at abnormally low levels then the resulting cost of equity will be set below average or normal market conditions and well below what is likely to be required in the current market for returns on equity.** This appears to be the approach adopted by the AER in the Draft Determination." [paragraph 33, emphasis added]

Professor Officer went on to say:

> Regarding my conclusion in paragraph (c) above, I do not consider that such an estimate is likely to provide an unbiased value for the current cost of capital for a company. I do not think that current market conditions are requiring a below average cost of capital, in fact, quite the reverse when we look at the discount being required for rights and similar attempts at raising equity capital. [paragraph 34]

The intuition that an error may arise from using a currently very low risk free rate in the standard CAPM equation (with a fixed TAMRP) is also solid. One of the reasons often hypothesised for the fall in government interest rates is because increasingly risk averse investors are selling out of risky assets and purchasing risk free assets instead. To the extent that the cost of equity had changed, then it would

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[12] R.R.Officer, (16 February, 2009), *Expert Report prepared in respect of certain matters arising from the AER'sNew South Wales Draft Distribution Determination 2009-10 to 2013-14*, Prepared for EnergyAustralia.

be expected to have increased – and yet if the low government interest rate is inserted into the CAPM with a fixed TAMRP, the CAPM predicts a material decline in the cost of equity. This has been amongst the most significant regulatory issues in Australia in recent times regarding the estimation of the WACC, and has gained some regulatory support, which is discussed next.

4.3 Regulatory precedents

4.3.1 Australian regulatory precedent

The Independent Pricing and Regulatory Tribunal of NSW (IPART) has recognised that current events in world financial markets are affecting Australia's Government bond market, and have depressed the risk free rate relative to the longer term average. In its decision on the Sydney Desalination Plant (SDP), IPART determined a WACC that reflected its long term view of the input parameters (principally the risk free rate). This decision implied using a WACC that was 80 basis points higher than what it would have estimated using the current interest rates, and amounted in effect to adding a 160 basis points uplift to the risk free rate that was used to estimate the cost of equity:[13]

> We determined the values for the parameters of the WACC based on market conditions over the 20 days to 28 October 2011. The risk free rate and debt margin have been affected by market volatility and the prolonged weak market following the credit crisis of 2008. The change in these factors has potentially created a disparity between these parameters (for which we use short term average data) and the market risk premium (for which we use long term average data). However, the effects of this disparity are mitigated by our decision to use a point estimate of 6.7%, which is 80 basis points higher than the midpoint of our estimated WACC range. In doing so, we had strong regard to the calculated WACC using longer term averages for market parameters.

IPART has more recently reiterated this concern at more length in a discussion paper that it released as part of its review of the method it applies to estimate the WACC. IPART observed the following:[14]

> Since the GFC, the WACC estimated using our current methodology has declined…the midpoint of the feasible range for the real post-tax WACC established by this method declined from more than 6.0% in early 2011 to less than 3.5% in November 2012. This is primarily due to a reduction in the estimated cost of equity.
>
> In our report on our determination for Sydney Desalination Plant in 2011 (and in subsequent reports) we expressed concern that the actual cost of capital may not have declined by this much…
>
> We consider that the reason our current method underestimates the WACC in post-GFC market conditions is that data used to estimate the cost of debt reflects current market conditions, while the data used to estimate the cost of equity reflects historic market conditions. In particular, we:
>
> - Estimate the cost of debt using short-term average data for both the risk-free rate and debt margin, but
> - Estimate the cost of equity using long-term average data for the MRP [market risk premium] (and a short-term average data for the risk-free rate).

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[13] IPART (2011), *Review of water prices for Sydney Desalination Plant Pty Limited: Final Report, December*, p.80. IPART in effect added 160 basis points to the risk free rate applied when estimating the cost of equity because the cost of debt was the same in both its short term and long terms scenarios.
[14] IPART (2012), *Review of Method for Determining the WACC*, December, pp.14-15.

> The rationale for using long-term average data to estimate MRP is that such an estimate provides a proxy for current expectations about the premium. This approach served well from early 2000 to 2008, when interest rates were fairly stable in Australia. But since the GFC, we have witnessed substantial dislocations in financial markets that have affected interest rates and investor perceptions of risk and required return on equity.
>
> …In equity markets, there was a substantial reduction in share prices. Given forecast dividends and an assumption of a return to "normal" growth in dividends in future years, this implied a substantial increase in equity risk premium. It suggests that the GFC may have altered investors' perceptions of the risk of equity investment, and hence they require a higher return on equity. Since the initial spike, the MRP has fallen, but it does not appear to have returned to pre-GFC levels in Australia.
>
> There was also a substantial fall in yields on Government bonds, which we use as a measure of the risk-free rate. There is no indication if and when yields will revert to more normal levels.

It is noted for completeness, however, that IPART's view has not found universal support amongst regulators. In particular, the Australian Energy Regulator (AER) has rejected arguments on several occasions that the cost of equity is understated when conventional techniques are applied when government bond rates are very low. Having said that, the prescriptive rules within which the AER makes decisions have implied that it is not clear that this issue has been required to be considered fully on its merits.

4.3.2 UK regulatory precedent

Unlike in Australia, the standard regulatory practice that has developed in the UK is to ignore transitory movements in government interest rates when estimating costs of equity for regulatory purposes.

The UK economic regulators some time ago sought the advice of Smithers & Co, a firm of asset allocation specialists, on various methodological issues with estimating the the WACC. On this matter, Smithers & Co's advice was that the best estimate of the cost of equity would be obtained by an assumption that any rise/fall in the risk free rate would be fully offset by a corresponding fall/rise in the return required for bearing risk:[15]

> Given our preferred strategy of fixing on an estimate of the equity return, any higher (or lower) desired figure for the safe rate would be precisely offset by a lower (or higher) equity premium, thus leaving the central estimate of the cost of equity capital unaffected.

UK regulators accepted the advice of Smithers & Co (which largely reflected past practice), and continued to apply long term estimates of the real risk free rate. For example, in its 2005 decision, Ofwat, the UK water regulator, noted that:[16]

> The proposed range is consistent with regulatory precedent. Recent regulatory determinations have placed little weight on low gilt rates [i.e. UK Government bond rates]. The Competition Commission, e.g. BAA plc (2002), has also noted that the current yields should be used with caution when estimating the risk free rate because of market

[15] Smithers & Co. (2003), A Study into Certain Aspects of the Cost of Capital for Regulated Utilities in the UK. A report commissioned by the UK economic regulators and the Office f Fair Trade, February, p.49.
[16] Ofwat (2005), Future water and sewerage charges 2005-2010 – Final determinations, Appendix 5, Cost of Capital.

> volatility. The Smithers & Co. Study (February 2003) undertaken on behalf of the regulators concludes that a reasonable assumption for the [real] risk-free rate is 2.5%.

Similarly, Ofgem commented as follows in March 2011:[17]

> 3.69. Market measures of the real risk-free rate, such as the yield on ILGs, have risen slightly since the data cut-off point for EE's December report. However, they remain near historical lows, partly due to the Bank of England's official interest rate being held at 0.5 per cent and the impact of Quantitative Easing. We, therefore, do not consider it appropriate to rely on spot rates or short-term averages to set the risk-free rate. …
>
> 3.70. Our revised range for the risk-free rate is, therefore, 1.7-2.0 per cent. The lower bound matches the 10-year average yield on 10-year ILGs, while the upper bound corresponds to regulatory precedent in the UK.

The market level of the Index Linked Gilts reported in the Europe Economics (EE) report referred to in the quote above was approximately 0.4 per cent, materially lower than even the lower bound of the range that Ofgem considered.

4.3.3 US regulatory precedent

In the United States regulators do not generally apply the CAPM to estimate a cost of capital for regulatory purposes. Instead, they estimate the cost of equity using the dividend growth model (DGM), which is a wholly forward looking methodology that relies on observation of the current dividend yield per share and the current forecasts of dividend growth. It is noteworthy that in US regulatory decisions between 2005 and 2011, while the risk free rate declined from over 4 per cent to 2 per cent (by the 4th quarter of 2011), the rate of return on equity for regulated electricity businesses was consistently between 10 per cent and 10.5 per cent.[18] Indeed, the Commission was provided – and quoted – very similar evidence of the inverse relationship between the market risk premium (as implied by US regulatory decisions) and the risk free rate during the review of Input Methodologies, which is reproduced as Figure 2 below.[19]

The Commission dismissed this evidence on the basis that the standard model used by US regulators is the dividend growth model, which the Commission said "buffers" regulated businesses from changes in the risk free rate. I disagree with this interpretation of the information. As the dividend growth model provides an estimate of the cost of equity that is far less dependent on theoretical and other assumptions than the CAPM, the more reasonable conclusion from this evidence is that the true cost of equity is reasonably stable over time, and so applying the CAPM with a spot risk free rate and a constant market risk premium will overstate the volatility in the cost of equity. The approach that is proposed in this report – namely to combine a constant market risk premium with a normal market risk free rate – is a means of creating the stability that the dividend growth model estimates suggest is present in the true cost of equity.

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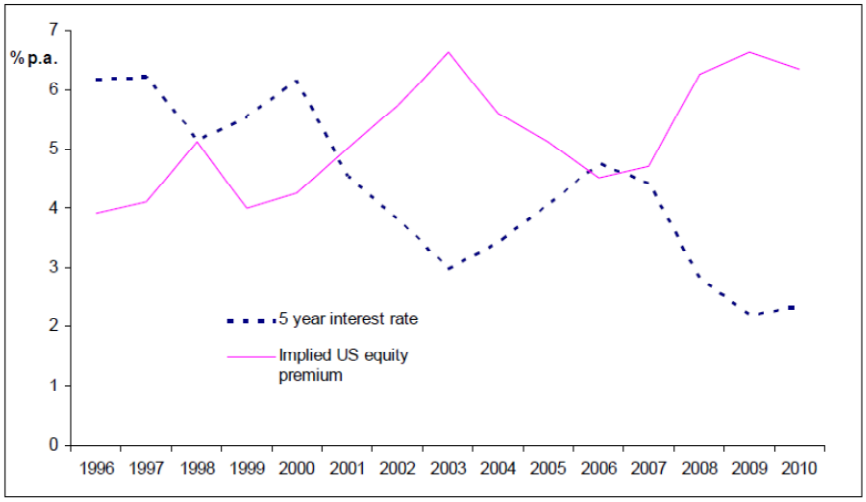
[17] Ofgem (2011), Decision on strategy for the next transmission and gas distribution price controls - RIIO-T1 and GD1 Financial issues, pp.32-33.
[18] See CEG (2012), Op. Cit., pp. 37-38.
[19] Commerce Commission, 2010, Input Methodologies for EDBs GDBs – Reasons Paper, p.600.

Figure 2 – evidence before the Commission on inverse relationship between MRP and risk free rate

Figure H15 US interest rates and the implied US equity premium in rate-setting cases



H13.91 The graph clearly illustrates that the implied US equity premium assumed under regulation is currently at historically high levels, whilst US interest rates are at very low levels of around 2%.[1335]

4.4 Standard commercial practice with respect to cost of equity estimation

With respect to commercial practice, we note that the standard practice of valuation experts has recently changed in response to accommodate the current extraordinary conditions. In particular, when valuing the assets that are being exchanged in mergers and takeovers, it has been an almost universal practice for the leading independent experts to apply an upward adjustment to the cost of equity that is estimated from a conventional application of the CAPM when using the discounted cash flow (DCF) methodology.

We note for completeness, however, that while there seems to be a consensus that the currently very low government bond rates cause a "problem" with the conventional application of the CAPM, a consensus has not as yet emerged of how best to respond to this matter, and some further evolution of thought and practice within the profession could be expected. We also observe, however, that WACC estimates arguably have more significance when being used as an input into prices that will be set for an extended period than is the case when the WACC is being used in a standard corporate valuation exercise. This is because, in the valuations field, discounted cash flow (DCF) valuations are typically considered alongside valuations using other methodologies (such as valuations provided by various multiples), whereas there is no obvious comparable alternative method that can be used to 'sense check' proposed prices. This suggests that regulatory precedent on this matter may provide more of a guide as to how to respond to the "problem".

Notwithstanding the caveat above, the independent expert reports that have been released since the substantial reduction in bond rates provides strong support for the existence of a problem with a conventional application of the CAPM and some insight into the appropriate response. For example, in the recent report on Hastings Diversified Utilities Fund (HDUF), the Australian market leading

independent expert Grant Samuel raised a number of points to support its view that 'the selected cost of capital should incorporate a margin over the calculated WACC range:[20]

> Alternative approaches for estimating the cost of equity such as the Gordon Growth Model suggest higher rates than the 7.5-8.1% implied by the CAPM. Analysis of the entities most comparable to Epic Energy (i.e. APA Group, DUET Group and Envestra) using the Gordon Growth Model costs capital in the range of 9.5-12% (yields mostly around 7.5% and growth of 2.0-3.0%) with a median of around 10.5%.
>
> Anecdotal information suggests that equity investors have substantially repriced risk since the global financial crisis (notwithstanding the uplift in equity markets since March 2009) and that acquirers are pricing offers on the basis of hurdle rates well above those implied by theoretical models… while long term interest rates have fallen by approximately 150-200 basis points over the past 12 months there has been no corresponding lift in earnings multiples, suggesting investors have offset this reduction with an increase in their risk premium and/or a reduction in long term earnings growth rates. In this regard, an increase in the market risk premium of 1% (i.e. from 6% to 7%) would increase the calculated WACC range to 6-7.2%.
>
> Global interest rates, including long term bond rates, are at very low levels by comparison with historical norms… We do not believe this position is sustainable and, in our view, the risk is clearly towards a rise in bond yields. Conceptually, the interest rates used to calculate the discount rate should recognise this expectation (i.e. they should be forecast for each future period) but for practical ease market practice is that a single average rate based on the long term bond rate is generally adopted for valuation purposes. Some academic/valuation practitioners consider it to be inappropriate to add a 'normal' market risk premium (e.g. 6%) to a temporarily depressed bond yield and therefore a 'normalised' risk free rate should be used. On this basis, an increase in the risk free rate to (say) 5% would increase the calculated WACC range to 7.2-7.9%.
>
> Analysis of research reports on Australian entities involved in gas transmission operations (i.e. HDUF, APA Group, DUET Group and Envestra) indicates that brokers are currently adopting costs of equity capital in the range 9.1-12.0%, with a median of 10.6% and WACC in the range 7.3%-8.8%, with a median of 7.8%.

In PwC Security's independent expert's report on the proposed merger of Whitehaven Coal Limited, the dilemma faced by a valuation expert in the current era of depressed risk free rates was expressed as follows:[21]

> While lower equity market values in recent years reflect investor assessments of likely future cash flows, the current state of equity markets is not consistent with the view that the significantly lower Government Bond rates have fed through into a significantly lower cost of equity… Accordingly, we consider that it s not necessarily appropriate to use the observed spot Government Bond rate in conjunction with the long term estimate of equity market risk premium of 6% for the Australian market at 31 December, 2011.
>
> In terms of adjustment to reflect the abnormally low level of Government Bond yields, this could arguably be made by:
>
> - Adding an amount to the spot measure of Rf; or

[20] Grant Samuel (3 August, 2012), *Hastings Diversified Utilities Fund – Independent Expert's Report in relation to the takeover offer by Pipeline Partners Australia Pty Limited*, p.8.
[21] PwCS (March, 2012), *Aston Resources Limited – Independent Expert's Report on the proposed merger with Whitehaven Coal Limited*, p.88.

- Adjusting the measure of EMRP used to reflect an additional short term component of risk over and above the depressed measure of Rf.

For the purposes of estimating the cost of equity, we have added an amount to Rf and retained the long term measure of EMRP.

Table 3 provides a summary of the assumed risk free rate, and other inputs adopted in recent Australian independent expert reports. A number of the reports reference the use of a risk free rate other than the current spot risk free rate due to the current lower-than-normal level of the Australian government bonds. In one instance a market risk premium of 7 per cent has been adopted (which converts to a tax adjusted market risk premium of about 8.5 per cent, assuming a normal-market risk free rate). The median premium to the observed risk free rate applied by Australian independent experts during this period was 0.69 per cent (average 0.64 per cent).

Table 3 – Risk free rate and other inputs adopted in Independent Expert Reports (October 2011 to March, 2012)[22]

Entity	Date of report	Author	10 year Govt. bond rate	Implied or Adopted Rf	Implied premium above spot rate	MRP	Premium to CAPM
Aston Resources	Mar-12	PwCS	4.00%	5.10%	1.10%	6.0%	1.10%
Gloucester Coal	Apr-12	Deloitte	4.39%	4.44%	0.05%	7.0%	1.05%
Ludowici	Apr-12	Grant Thornton	4.06%	4.60%	0.05%	6.0%	0.05%
oOh!media Group	Jan-12	Grant Thornton	3.83%	5.00%	1.17%	6.0%	1.17%
Brockman Resources	Dec-11	Deloitte	3.86%	4.10%	0.24%	6.0%	0.24%
AUSTAR	Dec-11	Grant Samuel	3.92%	4.50%	0.58%	6.0%	0.58%
Murchison Metals	Jan-12	KPMG	3.90%	4.80%	0.90%	6.0%	0.90%
Bow Energy	Nov-11	Grant Samuel	4.07%	4.50%	0.43%	6.0%	0.43%
Fosters Group	Oct-11	Grant Samuel	4.38%	4.50%	0.12%	6.0%	0.12%
Coal & Allied Industries	Oct-11	Lonergan Edwards	4.20%	5.00%	0.80%	6.0%	0.80%
Average to May 2012			**4.06%**	**4.65%**	**0.54%**	**6.1%**	**0.64%**
Median to May 2012			**4.03%**	**4.55%**	**0.51%**	**6.0%**	**0.69%**

Source: Company filings, RBA statistics

Later in 2012, after the Commonwealth bond rate had fallen further, the rate of compensation applied by independent experts also increased. After assessing 17 independent expert reports issued during 2012, Ernst & Young concluded:[23]

[22] The market risk premium figures are consistent with a classical CAPM. Approximately 1.5 percentage points needs to be added to convert the figures to a Brennan-Lally CAPM-compatible tax adjusted market risk premium.

> The average implied market cost of equity based on the 17 reports issued in 2012 is 10.7%. This is 1.2 percentage points higher than the implied average market cost of equity of 9.5% which would result if the implied market cost of equity in each of these 17 reports were to be estimated by applying the methodology adopted by the AER.

Hence, standard practice among leading valuation experts has been influenced by the current extraordinary conditions. We emphasise again, however, that discounted cash flow estimates are not relied upon unquestionably in commercial valuations exercises in any event, but rather are considered together with the results of other valuations techniques, including valuations obtained with comparisons to observed "multiples".

4.5 Estimating the 'normalised' risk free rate for New Zealand

Figure 3 below shows the level of the New Zealand Government 10 year bond yields from the start of 2000 to the end of March 2012. It also displays the average yield from the start of that period to the beginning of the global financial crisis (which is defined here as 1 September 2008, shortly before the collapse of Lehman Brothers). That average is 6.31 per cent, which compares to the average yield over the month of March 2012 of 4.36 per cent.

There are two potential solutions to overcome the problems associated with applying unusually low interest rates as a risk free rate (the problem being an underestimate of the cost of equity).

- The first is to use a TAMRP that is today's forward looking value, which the discussion above suggests would be higher than its historical average.

- The second is to use a risk free rate that is more consistent with the long term average TAMRP market risk premium. The logic is that the long term average market risk premium reflects a normal market environment and that a risk free rate should be taken from a similar normal market environment.

The first option is difficult because the TAMRP cannot be estimated precisely on a forward-looking basis – indeed, the reason for using long term averages is because of such difficulties. My preference would be to adopt the second option as it applies more identifiable data. However, it is noted that any adjustment to the observed data is subjective, and that while this is a matter that is currently vexing financial market practitioners in both Australia and New Zealand, there is no agreed method of response.

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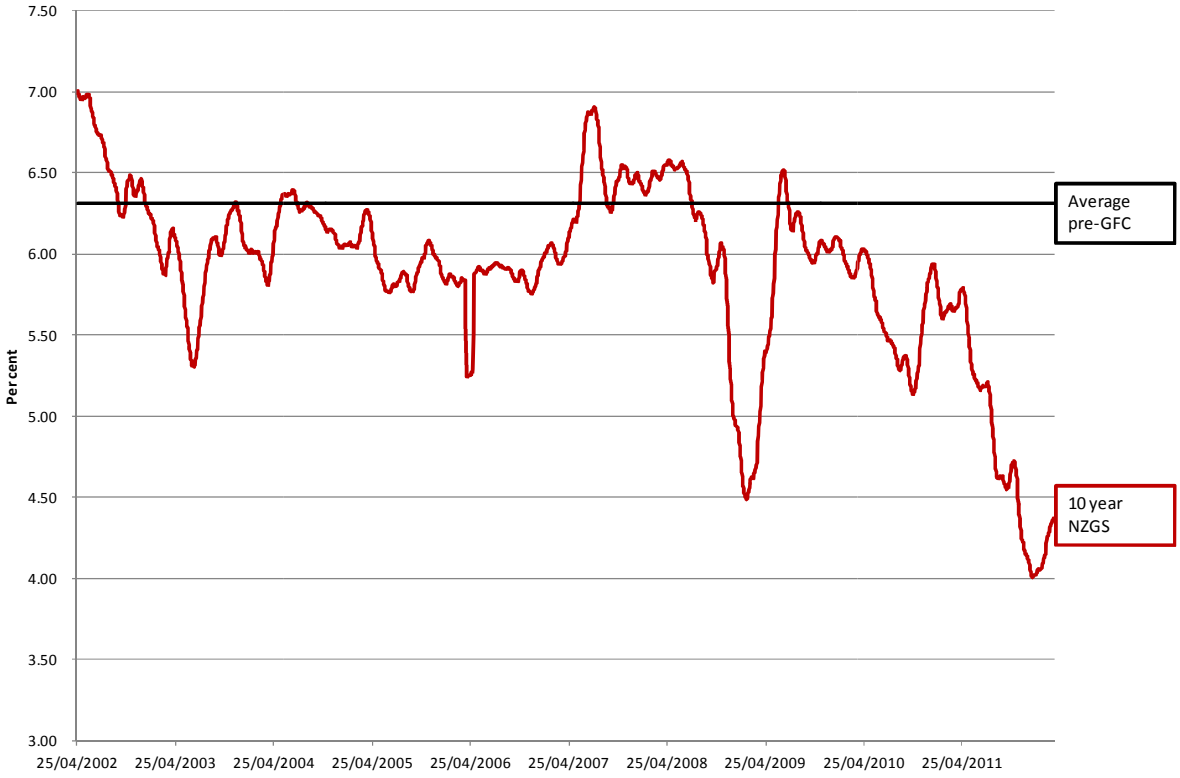
[23] Ernst & Young, (8 November, 2012), Market evidence on the cost of equity – Victorian Gas Access Arrangement Review 2013-2017, p.16.

Figure 3: Yields on 10 year New Zealand Government Securities



Source: Bloomberg

Table 4 below displays the long term risk free rate estimate that is obtained by averaging the yield on 10 year New Zealand Government Securities over various periods between the start of January 2000 up to the end of March 2012, as well as for periods that end just prior to the commencement of the global financial crisis.

Table 4: Average yield on 10 year New Zealand Government Security based on period of measurement vs spot rate (20 day average)

Nominal risk free rate	Value (%)
Averages to the current period	
Spot rate (average over March 2012) [24]	4.36
Previous year to 31 March, 2012	4.70
Previous 2 years to 31 March, 2012	5.15
Previous 5 years to 31 March, 2012	5.71
Previous 10 years to 31 March, 2012	5.89
Averages prior to the global financial crisis	
Spot rate (20 business days to 31 August, 2008)	6.23
Previous year to 31 August, 2008	6.43
Previous 2 years to 31 August, 2008	6.30
Previous 5 years to 31 August, 2008	6.14
Start of January 2000 to 31 August, 2008	6.31

Source: Bloomberg

This analysis shows that the spot rate of 4.36 per cent (average over the month of March, 2012) is materially lower than all of the averages over extended periods. Moreover, it also shows that the average over the period prior to the commencement of the global financial crisis was very stable, hovering just over 6 per cent.

For the purposes of this advice, I have used 6 per cent as the risk free rate for equity. This rate is approximately the average rate over the ten years to 31 March 2012 of 5.89 per cent (which I note includes the period of the global financial crisis and subsequent EU crisis) and it is lower the averages that exclude the period of the crises, but not materially so. Accordingly, I conclude that a risk free rate of 6 per cent is a reasonable estimate of a long term average or 'normal market' risk free rate, and hence one that is consistent with the TAMRP that is employed in this advice.[25]

4.6 Conclusion on the risk free rate

In summary, we are of the view that use of the current spot government interest rates will lead to a material understatement of the cost of equity, and that a risk free rate drawn from "normal market" will result in a materially better estimate of the cost of equity. Accordingly, we have used a long run average value for this input as a proxy for a "normal market" value, which we take to be 6 per cent.

[24] This figure is slightly higher than the spot risk free rate that has been used for the cost of debt (4.31 per cent). The bond yields in Table 3 are based on Bloomberg's fair value yields for 10 year bonds, which we have applied for simplicity. In contrast, the figure that used for the cost of debt reflects the Commission's method for deriving a risk free rate (adjusted to reflect a term of 10 years), which was to interpolate the yield between the bonds on issue with terms that most closely straddle the target term. The fact that the different methods to lead to small differences in results is to be expected, but is not material.

[25] I note for completeness that the averages of the 5 year risk free rate over the same periods prior to the global financial crisis were systematically higher than the averages for the 10 year risk free rate.

5. Tax adjusted market risk premium

5.1 PwC's views on the TAMPR

In PwC's submission to the Commerce Commission's Revised Draft Guidelines in 2009, we undertook a detailed investigation of appropriate TAMRP to apply in conjunction with the Brennan-Lally version of the CAPM model.[26] It was noted in that discussion, that PwC had in 2002 established a policy to apply a 7.5 percent market risk premium based on analysis of long term data for New Zealand.[27] PwC's existing assumption of a 7.5 percent tax adjusted market risk premium was recommended even though there was evidence that the premium was now likely to be higher due to the more volatile conditions being experienced during the global financial crisis.

During the Commission's Input Methodologies Review, PwC New Zealand provided updated estimates of the historical market risk premium in New Zealand and updated evidence from surveys of market practitioners (which is a method that is subject to bias and interpretation difficulties and should be used only to test the results of other methods). These methods provide clear support for a tax adjusted market risk premium of at least 7.5 per cent, even before consideration is given to whether a higher premium may be relevant today (which has not been proposed in this advice).

A difference of opinion exists over the relevance and reliability of other estimation methods. Professor Lally's practice is to take a grand average of a range of different methods, including the Cornell method and the Siegel method. PwC NZ expressed its expert view that these other methods were unreliable and ad hoc. The only response of the Commission (mirroring Professor Lally) was that as PwC NZ had suggested that an increment could be added to the market risk premium during the GFC, which was branded as "ad hoc", and as a consequence the Commission was equally entitled to use other "ad hoc" models to estimate the market risk premium. There is no logic to the Commission's argument – the two issues were not in any way linked.

We remain of the view that the Siegel, Merton and Cornell methods should not be used to estimate the market risk premium (or at least provided equal weight), and that a tax adjusted market risk premium of 7.5 per cent is supported by the evidence. The PwC NZ valuations practice continues to use a tax adjusted market risk premium of 7.5 per cent in its commercial valuations work. It is also observed that the PwC Australia valuations practice uses a market risk premium in a classical CAPM of 6 per cent, which is consistent with the New Zealand figure once the tax adjustment is made (and a normal-market risk free rate is assumed).

5.2 Conclusion on the TAMPR

PwC New Zealand continues to consistently apply a 7.5 percent tax adjusted market risk premium in its own corporate advisory valuation work, and adoption of this value is recommended in estimating a WACC appropriate for setting prices for CIAL's aeronautical services.

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[26] PwC (August, 2009), pp.14-25.
[27] PwC (September, 2002), New *Zealand Equity Market Risk Premium*.

6. Asset beta

In August 2010 PwC undertook a review of airport asset betas for the New Zealand Airports Association.[28] That review was sufficiently recent and comprehensive for its conclusions to be applied to estimate the asset beta that is relevant to CIAL's aeronautical services.

6.1 International evidence of airport asset betas

Table 5 shows that using monthly data for PwC's preferred sample of 8 firms based in Western countries, and whose business is dominated by airport operations, had an average (median) asset beta of 0.68 (0.71).

Table 5: Asset betas for international airports – last 5 years (to 2010) for PwC's preferred sample

Airport	Observations	Equity Beta	Leverage	Asset Beta
SAVE SpA	60	0.97	12%	0.86
Aeroports de Paris	47	0.95	26%	0.70
Auckland International Airport	84	0.96	25%	0.72
Copenhagen Airports A/S	84	0.51	21%	0.40
Flughafen Wein	84	0.87	15%	0.74
Flughafen Zuerich AG	84	1.19	48%	0.61
Fraport AG	84	0.88	16%	0.74
MAP Group	84	1.15	46%	0.62
Mean		**0.94**	**26%**	**0.68**
Median		**0.95**	**23%**	**0.71**

Source: Bloomberg

In Table 6, we show the results of estimating asset betas using the wider samples that were found in the Bloomberg database. These results show that in the wider samples that include both Western firms, and firms in emerging markets, asset betas are higher. However, when longer periods than 5 years are used to estimate beta, the asset betas are lower for the preferred sample (sample 3). We consider that long periods of time are less relevant than the last 5 years, which is more likely to reflect current market conditions, and tends to be the standard period that is used in beta estimation. In our report for the New Zealand Airports Association we took a balanced view of the evidence and concluded that an asset beta of 0.65 was appropriate. This was lower than the estimates observed for the preferred sample over the last 5 years, but higher than the estimates made with the longest available data.

Table 6: Airport asset betas: alternative samples and time periods

Sample	N	5 yrs Mean	5 yrs Median	N	All data Mean	All data Median
Sample 1.All, where airport operations dominate	19	0.77	0.72	19	0.76	0.70
Sample 2. Western airports	10	0.63	0.69	10	0.61	0.61
Sample 3. PwC preferred sample	8	0.69	0.71	8	0.62	0.62

Source: Bloomberg

[28] PwC (3 August, 2010), *Analysis of airport asset betas*, report to the New Zealand Airports Association.

One matter that I have addressed at length in previous advice is whether the observed asset betas – which relate to the total airport activities – should be adjusted when estimating the asset beta for aeronautical activities. In the last pricing consultation, the argument was put to CIAL that non-aeronautical activities tend to have a higher level of systematic risk than aeronautical activities and hence the airport asset beta should be revised downward to arrive at an asset beta for aeronautical activities.[29] In that advice I noted that such an adjustment was not warranted, noting that:

- Some non-aeronautical activities that are material at some airports clearly have a lower level of systematic risk than aeronautical activities, the key example being long term leasing of land.

- Empirical estimates of asset betas for high-end retailers in Australia – which was used as a proxy for commercial activities – were presented, which were not dissimilar to the average of the airport-wide asset betas. This suggests that commercial activities were unlikely to be pulling up the average airport asset beta.

Accordingly, I remain of the view that it is appropriate to apply observed airport asset betas to estimate the WACC associated with aeronautical activities.

6.2 Influence of airport traffic on asset beta

In relation to CIAL in particular, we note that there are reasons to believe that its risk will be higher than the samples considered above and when compared to that of the average New Zealand airport. In particular, CIAL has a high exposure to the leisure market, which is likely to be more price sensitive (and more responsive to final incomes) than business travel.

6.2.1 International regulatory decisions

In both the United Kingdom and Australia, regulators have recognised that the composition of traffic at an airport (particularly the proportion of discretionary leisure traffic) will have a significant effect on its asset beta. Hence, both the UK regulators (the Civil Aviation Authority (CAA) and the Competition Commission (CC)) and the Australian Competition and Consumer Commission (ACCC) have allowed higher asset betas for airports with traffic characteristics displaying higher co-variability with the economy and market.

In Australia in 2001, the ACCC provided Launceston Airport a beta of 0.80 with a debt beta of 0.13, equivalent to a beta of 0.71 with a zero debt beta, based on traffic analysis showing a higher proportion of discretionary passengers at Launceston compared with other Australian airports. The ACCC concluded as follows:[30]

> In relation to the asset beta, APAL submits it has undertaken an analysis of its traffic composition similar to that undertaken by Melbourne Airport. APAL submits that the analysis shows that Launceston Airport's traffic is more correlated with domestic GDP than either Melbourne or Canberra. APAL states this is generally the result of a far greater proportion of discretionary travel either by residents of north eastern Tasmania or tourists from the mainland... It proposes an asset beta of 0.80 as compared with 0.70 for Melbourne Airport and 0.75 for Canberra Airport... In this instance the Commission does not object to the WACC parameters proposed by Launceston airport.

[29] Balchin, J, (2008), *CIAL Airside Pricing Proposal – Response to NZIER (Asset Valuation) and Professor Bowman (WACC),* December.
[30] ACCC (September 2000), *Northern Territory Airports Pty Ltd – New Investment Decision*, p. 29.

In its recent decisions on UK airports, the UK Civil Aviation Authority applied an asset beta 9 and 14 points higher for Stansted Airport relative to Gatwick and Heathrow Airports respectively, to reflect Stansted's much higher proportion of charter group travel, which the Authority accepted experiences greater co-variability with the economy than the flow of traffic at Gatwick and Heathrow airports.[31] Charter travel represents leisure travel that is relatively low cost, and highly discretionary. The CAA's adviser, Europe Economics, found that the key distinguishing factor between Stansted on the one hand, and London and Gatwick on the other, was the variability in passenger growth rates in response to economic shocks.[32] While Heathrow, as the premier entry point to the United Kingdom, would always run at or near capacity, irrespective of the state of the market, when subjected to economic downturn, Stansted could only maintain its passenger numbers through substantial discounting.[33]

6.2.2 Composition of passengers using Christchurch International Airport.

Table 7 displays statistics for purpose of visit at New Zealand's major airports for international travellers during the twelve months to 30 June, 2011. The table shows that, compared with Auckland and Wellington, Christchurch has a significantly greater exposure to the leisure markets, and significantly lower exposure to business, conference, education and other purpose of visit. This suggests a greater vulnerability of Christchurch's revenue to an economic downturn, as it is a well established fact that leisure travel has a higher income elasticity of demand compared with other travel.

Table 7: New Zealand Airports – Purpose of Visit – 12 months ending 30 June 2011

Purpose of visit	Christchurch	Auckland	Wellington
Holiday / Vacation	55%	42%	31%
Visiting Friends and Family	29%	33%	42%
Subtotal leisure	**84%**	**75%**	**73%**
Business	8%	13%	16%
Conference / education / other	8%	12%	11%
Total	**100%**	**100%**	**100%**

Source: CIAL.

The nature of passenger demand at Christchurch also has other distinguishing characteristics relative to Auckland and Wellington airports, which could be expected to raise its relative asset beta. Auckland is a major international hub in the south Pacific, which provides it with greater resilience to variations in economic activity compared with Christchurch. Regarding Wellington, as the seat of the New Zealand Government, traffic at Wellington will be more resilient to economic downturns than Christchurch, owing to the capital city airport's significant government related business travel.

6.2.3 Conclusion on influence of airport traffic on beta

Based on international precedents, and the differences in the mix of passengers at Christchurch relative to Auckland and Wellington, it is reasonable to adopt an asset beta of 0.70 (with zero debt beta) for CIAL, which is higher than the 0.65 asset beta that we have recommended for New Zealand

[31] CAA (11 March, 2008), *Economic Regulation of Heathrow and Gatwick Airports*.
[32] Europe Economics (24 November, 2006), *Cost of capital – estimating separate costs of capital for Heathrow and Gatwick, Supporting paper XIII, CAA's initial price control proposals for Heathrow, Gatwick and Stanstead Airports*, pp. 45-46.
[33] Europe Economics (24 November, 2006), p.50.

airports as a whole. The higher asset beta for Christchurch is supported by the international evidence for airports, and by the analysis of passenger type relative to other New Zealand airports.

6.3 Conclusion on the asset beta

Having reviewed the evidence once again, we remain of the view that an asset beta for the average New Zealand airport of 0.65 is appropriate. We also consider that a slightly higher figure is appropriate for CIAL in light of its heavier dependence on the leisure market, which we consider means that an asset beta for CIAL of 0.70 is appropriate.

7. Leverage

A leverage assumption is required to convert the asset beta into an equity beta (and so estimate the cost of equity) and is also required assumption for the estimate of the cost of debt for the entity (through its effect on the credit rating). Finance theory is indeterminate about the impact of leverage on the WACC and hence upon whether there is an optimal capital structure. It has been shown that leverage has no effect on the WACC in a world of tax neutrality and no transaction costs. In the real world where neither assumption applies it is more complex.

7.1 Estimating benchmark leverage

One approach for leverage would be to use CIAL's target gearing level of 40 per cent and actual stand alone credit rating (BBB) that is related to that gearing level in estimating its cost of debt and WACC. This is the approach we took in our first report, which assumes that CIAL's target gearing level is the best available approximation for the optimal capital structure.

An alternative approach is to link the gearing level that is assumed to what was observed in the set of comparable entities that were used to derive the asset beta. The motivation for this method is to minimise the exposure to the formulae that are used to adjust betas for differing levels of gearing. Table 8 sets out the leverage levels (book value of net debt to net debt plus market value of equity) that were observed for international airports that were included in PwC's preferred sample in our report for the New Zealand Airports Association referred to earlier. The median leverage level for these 8 businesses over the 5 years to 2010 was 23 percent, while the mean was slightly higher, at 26 percent. Applying this different level of gearing compared to CIAL's own target, but holding all else constant, would reduce the estimated post tax WACC, albeit arguably by an immaterial amount in the context in the general estimation error with respect to the WACC.[34]

[34] The vanilla WACC changes by more than the post tax WACC; however, the latter correctly takes account of the fact that with lower leverage, less interest is available to be used as a tax deduction.

Table 8: Leverage and credit rating for international airports - PwC's preferred sample

Airport	Leverage
SAVE SpA	12%
Aeroports de Paris	26%
Auckland International Airport	25%
Copenhagen Airports A/S	21%
Flughafen Wein	15%
Flughafen Zuerich AG	48%
Fraport AG	16%
MAP Group	46%
Mean – full sample	**26%**
Median – full sample	**23%**
Mean for rated businesses	**30%**
Median for rated businesses	**26%**

Source: Bloomberg Note: average leverage for 5 years to 2010

While we advocated the use of CIAL's target gearing in our first report, we accept that adopting a leverage assumption that is consistent with the leverage that is observed in the firms that give rise to the asset beta estimate has theoretical appeal. We have therefore adopted this principle, which we have taken as implying a leverage assumption of 26 per cent (being the mean of the sample).

7.2 Conclusion on leverage

We have adopted a leverage assumption of 26 per cent to be consistent with our asset beta estimate.

8. Cost of debt

8.1 Term and credit rating assumed

We are of the view that 10 year fixed rate debt is the appropriate benchmark assumption for the type of debt that a prudently financed infrastructure firm would issue. The reasons for this are as follows.

- First, a stand alone, prudently financed infrastructure firm would be expected to issue long term debt in order to minimise refinancing risk, which is the behaviour that is indeed observed for such firms.

- Secondly, the Commission argues that a firm that is subject to a five year price reset would use interest rate swaps so that the term premium on the underlying interest rate is only borne for a five year period (implying, in effect, a 10 year debt risk premium on a 5 year base rate). This line of argument relies upon there being a very strong and direct link between costs and prices such that an efficient firm would alter its financing strategy. Irrespective of how relevant this is to the price controlled businesses, this argument is not compelling for airports where prices are set with reference to cost, but also with reference to a consideration of competition from other transport modes and destinations.

Turning to the credit rating, we have assumed a credit rating of BBB+, which reflects the average of the three major New Zealand airports (which we note is also CIAL's present headline credit rating). While we had earlier advocated using CIAL's own stand-alone credit rating of BBB, we acknowledge the

benefits of the credit rating assumption not being tied too closely to the actions of the entity being regulated.

8.2 Estimation of the benchmark cost of debt

While we have often used the Bloomberg fair value curve for corporate bonds as the starting point for estimating the debt risk premium (both in Australia and in New Zealand), we note that the Commerce Commission has been publishing its view on the prevailing debt risk premium for different credit ratings and for terms up to five years. Futures expressed a strong preference to use the Commerce Commission published figures for the debt risk premium where such figures are available. As a general matter, we would not recommend accepting the Commission's estimates without further analysis as the Commission's method for deriving the debt risk premium leaves it with a large degree of judgement to be exercised. Having said that, the Commission's debt risk premium estimates for April 2012 (reflecting values averaged over the month of March) are in line with what would have been estimated by using the Bloomberg fair value curve as the starting point, and so we have used the Commission's debt risk premium estimates for April in this advice.

The Commission determined a 5 year BBB+ debt risk premium for April 2012 (averaged over the month of March) of 2.35 per cent, which is the base for our revised estimate. This figure is for a 5 year term, and so a term premium needs to be considered to convert this figure into a debt risk premium for 10 year debt.

In Australia at the present time, the debt risk premium increases by approximately 8 basis points per annum for lower rated debt beyond terms of five years.[35] If applied in New Zealand, this would imply an approximate addition to the 5 year debt risk premium of 40 basis points. However, in the work we undertook in our first report, we observed that the debt risk premium that was implied by the Bloomberg fair value curve for A rated bonds was approximately constant between 5 and 8 years at the end of 2011 (8 being the last point that Bloomberg publishes), and indeed the premium declined slightly with term. In view of this, we have assumed that the debt risk premium is approximately constant between 5 and 10 years, implying that the debt risk premium for 10 year BBB+ debt is also approximately 2.35 per cent. We consider this to be a conservative assumption, however, particularly in view of the contrary experience in Australia.[36]

Our risk free rate for the cost of debt (4.31 per cent) reflects the average of the New Zealand Government bonds for the month of March 2012, where the rates on the bonds with a closest term to 10 years have been interpolated to derive a 10 year rate. We have calculated this figure by modifying the spreadsheet model that the Commission released with the April 2012 cost of capital estimates, and so employed an identical method (with the exception of the term) to that of the Commission.

8.3 Debt issuance cost

To the cost of debt estimated above we have added an allowance for the cost of debt raising (a transaction cost) of 0.35 per cent.

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[35] PwC (2012), Estimating the benchmark debt risk premium, Report for Multinet, Envestra, SP AusNet and APA, march, p.23 (available at www.aer.gov.au).
[36] The small number of corporate bonds on issue in New Zealand means that the predicted change in the debt risk premium is susceptible to differences in the composition of the sample at different terms.

We consider that this allowance is in line with the evidence from the New Zealand market. We note that analysis performed by PwC NZ showed that for a 10 year bond issue, the largest businesses would face a debt issuance cost of 0.37 per cent per annum, which we have rounded to 0.35 per cent. We note that this figure would be 0.63 per cent per annum if a term of debt of 5 years was adopted.[37]

8.4 Conclusion on the cost of debt

We have assumed that a benchmark firm issues 10 year fixed rate debt and has a credit rating of BBB+, for which we estimate a benchmark cost of debt of 7.01 per cent. This is comprised of the 10 year risk free rate (for debt) of 4.31 per cent, a debt risk premium of 2.35 per cent, and a benchmark allowance of 0.35 per cent per annum for debt issuance costs.

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Yours sincerely,

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[37] PricewaterhouseCoopers (2010), Submission on the Cost of Capital parameter estimates in the Commerce Commission's Draft Electricity Distribution Services Input Methodology Determination: a report prepared for Electricity Networks Association, August, p.36.