WIAL's Weighted Average Cost of Capital:

Comparison with Commerce Commission's Information Disclosure Requirements

Report to BARNZ

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Futures Consultants Limited

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1. Introduction

Wellington International Airport Limited (WIAL) commissioned Sapere Research Group (Sapere)¹ to provide it with estimates of its weighted average cost of capital (WACC). WIAL has provided this report,² and two others, to its substantial customers. It has also published the reports on its webpage.

WIAL is seeking feedback on all three reports by 20th May 2011. To assist them in preparing their response the Board of Airline Representatives in New Zealand (BARNZ) has asked me to compare the estimates in the *Sapere WACC Report* with estimates derived using the approach sanctioned by the Commerce Commission (the Commission) for information disclosure purposes under Part 4 of the Commerce Act 1986. I have been asked to comment on whether there is any valid reason for departing from these methodologies when setting charges.

2. Comparison of WACC estimates

2.1 Same model

The Commission has very recently released its Determination for WIAL of the cost of capital for information disclosure year 2012, which started on 1 April 2011.³ This provides a very ready comparison between Sapere's and the Commission's estimates of WIAL's WACC.

Sapere and the Commission both use the same formulas for calculating two versions of WACC; a post-tax version and a vanilla version. The post-tax version is based on the assumptions that for the marginal investor determining the price of shares, capital gains taxes are zero and that there is perfect application of the tax imputation system. These are reasonable assumptions in the New Zealand context. The use of this model was supported by BARNZ and Air New Zealand at the Commission's Input Methodology conference relating to cost of capital. Virtually all other participants agreed with this conclusion.

The post-tax and vanilla versions of WACC differ only in that in the post-tax version the cost of debt is adjusted to reflect the tax deductibility at the corporate tax rate of interest expenses whereas, in the vanilla version, there is no adjustment for this factor. The WACC is higher in the vanilla version provided there is some debt, i.e. provided the leverage ratio (L) is not zero.

2.2 Summary table

¹ Sapere Research Group is the new operating name in New Zealand of Law and Economic Consulting Group (LECG). LECG were advisers to WIAL on economic matters for many years.

² Sapere Research Group, *Estimation of the Weighted Average Cost of Capital for Wellington International Airport Limited*, 15 April 2011. (Hereinafter "Sapere WACC Report").

³ Commerce Commission, Determination of the Cost of Capital for Information disclosure Year 2012 for Airport Services (March year-end) and Electricity Distribution Services Under Part 4 of the Commerce Act 1986, Pursuant to Decision 709 and 710: Decision 723, 27 April 2011. (Hereinafter, Decision 723).

	Sapere Estimates			Commerce Commission Estimates (2012)	
	Interval estimate	Midpoint estimate	Uncertainty adjusted estimate	Midpoint estimate	75 th percentile estimate
Leverage (L)	0.40	0.40	0.40	0.17	
Debt premium (p)	1.97%	1.97%	1.97%	1.39%	
Debt issuance cost (d)	0.54%	0.54%	0.54%	0.35%	
Risk free rate (r _F)	5.66%	5.66%	5.66%	4.66%	
Cost of debt (r _D)	8.17%	8.17%	8.17%	6.40%	
Asset Beta (β _A)	0.65 – 0.75	0.70	0.75	0.60	
Tax adj. market risk premium (TAMRP)	7.0 – 8.0%	7.5%	8.0%	7.0%	
Tax Rate – Corporate (T _C) and Investor (T _I)	28.0%	28.0%	28.0%	28.0%	
Cost of equity (r _E)		12.83%	14.08%	8.40%	
WACC ^{PT} (post tax)		10.0%	10.8%	7.75%	8.73%
WACC [∨] (vanilla)		11.0%	11.7%	8.06%	9.04%

	Sapere Estimates			Commerce Commission Estimates (2012)	
	Interval estimate	Midpoint estimate	Uncertainty adjusted estimate	Midpoint estimate	75 th percentile estimate
Modelling error adjustment (<i>me</i>)	0.5 – 1.0%	0.75%	1.0%	Not provided	
WACC ^{PT} (post tax) plus modelling error (<i>me</i>)		10.8%	11.8%	Not provided	
WACC [∨] (vanilla) plus modelling error (<i>me</i>)		11.7%	12.7%	Not provided	

2.3 Differences in parameter estimates

2.3.1 Leverage (L)

Leverage is the ratio of debt to debt plus equity in the capital structure of the firm. The leverage parameter is used in two places in estimating the cost of capital. One use is to adjust the asset beta into an equity beta (and vice versa). The second use is to weight the estimates of the cost of debt and the cost of equity to derive the weighted average cost of capital (WACC).

At the Commission's Input Methodology conference relating to the cost of capital, BARNZ and Air New Zealand recognised the preferred model in New Zealand for calculating WACC leads to an implausible relationship between leverage and the cost of capital; as leverage rises the cost of capital rises, or, in other words, the greater the reliance on debt funding the greater the cost of capital. The expected result in the context which most closely reflects New Zealand conditions of no capital gains tax, a comprehensive tax imputation system and equal marginal investor and corporate tax rates is for the cost of capital to not vary with the level of leverage.

The Major Electricity Users Group (MEUG) argued, on the basis of the implausible relationship, that the leverage rate should be set to zero. BARNZ and Air New Zealand accepted that firms typically do use some debt funding and this means it is unrealistic to assume leverage is zero. They argued, however, that the Commission

should bear in mind this issue when making its overall assessment and that a high leverage rate would not be desirable. BARNZ and Air New Zealand also pointed out at the Input Methodology conference that to base permitted leverage on the actual leverage of firms would provide an incentive to increase the proportion of debt they employ so as to raise the WACC the Commission would accept. Increasing reliance on debt financing would increase the risk of default and financial distress, which, at some point, would not be of long term benefit of consumers. The purpose statement of Part 4 of the Commerce Act, under which input methodologies are required to be set, is about promoting the long term benefit of consumers, so using a firm's own leverage ratio would be incompatible with this purpose.

In its final decision, the Commission accepted this argument and decided to set the leverage ratio on the basis of average leverage of a group of airports. This ratio was 0.17 or 17%.

Sapere has continued to argue, as LECG did at the conference, that "the level of leverage adopted for the calculation of WACC should simply be the firm's target level of leverage."⁴ On this basis, Sapere has used 0.40 or 40% because this is the target level advised to it by WIAL.⁵

The argument that the firm's actual or target level of leverage should not be used in the New Zealand context because this will give an incentive for the firm to increase its leverage beyond the optimal level in order to raise its accepted WACC, and this is unlikely to be of long-term benefit to consumers is valid. In my opinion, there are no specific factors that justify WIAL adopting a different leverage ratio from the Commission's 0.17 or 17%.

2.3.2 Debt premium (p)

The debt premium parameter relates to the premium over the risk free rate which the firm can be expected to pay. It is added to the risk free rate when estimating the cost of debt.

Sapere derived its debt premium for WIAL of 1.97% by taking the mean of the most recent estimates available to it of the debt premiums for BBB⁺ rated utility companies by the Commission.⁶ WIAL has a BBB⁺ rating. At the time Sapere prepared its report the Commission's most recent publication was its determination of the cost of capital for the 2011 year. Since then, the Commission has released its determination for electricity distributors and WIAL for the 2012 year. The mean debt premium for the BBB⁺ rated utilities in this publication is 1.52%.⁷ So even if Sapere's methodology were accepted, a reduction in its estimate from 1.97% to 1.52% would be justified.

The Commission's most recent debt premium estimate for WIAL is, however, 1.39%. This is based on the interpolation for a five year maturity of the observed debt premiums at 1 April 2011 for Auckland International Airport Limited (AIAL) bonds,

⁴ Sapere WACC Report, p. 4.

⁵ Sapere WACC Report, p. 4.

⁶ Sapere WACC Report, p. 5.

⁷ Vector (1.62%), Genesis Energy (1.42%) and Mighty River Power (1.52%).

which are publicly traded and have a credit rating of A⁻. In the opinion of the Commission the estimate derived in this way most closely matches the Commission's Input Methodology Decision on the appropriate basis for estimating debt premiums.⁸

The Commission indicates in *Decision 723* that it gives no weight in its estimate to the observed debt premium for WIAL because it "appears anomalous as it is above the debt premium for other bonds rated BBB⁺."⁹

The Commission has set a WIAL specific debt premium. In my opinion, there is nothing to justify WIAL adopting a different debt premium from the figure of 1.39% the Commission has determined is appropriate for WIAL.

2.3.3 Debt issuance cost (d)

The debt issuance cost parameter relates to annualised costs which the firm can be expected to pay to issue debt. Like the debt premium, it is added to the risk free rate when estimating the cost of debt.

Sapere estimates the debt issuance cost parameter for WIAL to be 0.54%, whereas the Commission's estimate is 0.35%. Sapere's figure is made up of two components. The first component is 0.30%, which Sapere claims WIAL has confirmed is the cost of issuing retail bonds. The second component is 0.24% to reflect the costs to "maintain debt facilities, above issued debt, as a liquidity margin to preserve [WIAL's] financial rating and thus avoid a higher cost of debt."¹⁰ The 0.24% uplift for debt facilities has been derived by multiplying the bank's charge for facilities (0.9% per annum) by the proportion of WIAL's total debt covered by the facilities (26%).¹¹

In its Input Methodology decision the Commission allowed 0.35% for debt issuance costs on the basis of data provided to it by suppliers.¹² It described this allowance as generous "as many regulated suppliers make extensive use of bank loans which would generally have an all-up cost below the all-up cost of public bond issues (though bank debt may have more onerous covenants)."¹³

The Commission also reports in its *Reasons Paper* that in 2010 it undertook a survey of issuance costs for publicly traded bonds, the results of which were that issuance costs averaged 0.22% per annum. It concluded "this implies the 0.35% allowance for

⁸ *Decision* 723, paras 31-3.

⁹ Decision 723, para. 34. In Decision 723 the Commission set the debt premium for electricity distribution and gas pipeline businesses at 1.70%. When making its decision for these regulated firms the Commission had regard to: the debt premium for Vector (1.62%), which it considered should be a floor; and, the debt premiums of BBB-rated debt issued by Powerco (1.75%) and Contact Energy's (1.80%). The Commission gave less weight to the debt premiums of AIAL (1.39%) and Telstra (1.29%) as these companies are not electricity distribution or gas pipeline businesses. See Decision 723, paras. 18-21.

¹⁰ Sapere WACC Report, p. 5.

¹¹ Sapere WACC Report, p. 5. $0.9 \times .26 = 0.234$. rounding accounts for Sapere using 0.24 or 24%.

¹² Commerce Commission, *Input Methodologies (Airports): Reasons Paper*, December 2010, para. 6.3.37. (Hereinafter, *Reasons Paper*).

¹³ Reasons Paper, para. 6.3.38.

debt issuance costs in the [Input Methodology Determination] is appropriate, if not generous in favour of suppliers."¹⁴

In my opinion, there is no reason to justify WIAL adopting a figure greater than the 0.35% debt issuance allowance estimated by the Commission. As the Commission identifies, this figure is generous and BARNZ and the airlines would be justified in arguing that the 0.22% estimate the Commission derived from its 2010 survey would be a more appropriate figure.

2.3.4 Risk free rate (r_F)

The risk free rate, r_F , is the rate of return on a riskless investment and is usually approximated by the return on government bonds. The risk free rate plus the debt premium plus the debt issuance costs equals the cost of debt in the model used by Sapere and the Commission.

Sapere adopted for the risk free rate the yield on 10-year government bonds (corrected for semi-annual compounding), averaged over 1 month prior to the pricing date. It estimated a 5.66% risk free rate based on yields in March 2011.¹⁵ It chose a 10-year rate on the basis that "it is accepted financial management practice to match the term of debt financing to the life of the entity's assets." Since WIAL's assets have a life far in excess of 10 years, it chose the longest term for which government bonds are available in New Zealand.

The Commission adopted a risk free rate of 4.66%. This "reflects the linearlyinterpolated, annualised, bid yield to maturity on New Zealand government bonds with a five year term to maturity." The calculation uses the data of actual yields reported in the month of March 2011.

The key difference between Sapere and the Commission is that Sapere uses the 10year government bond rate whereas the Commission uses the five-year rate. The Commission favours the five-year rate because, in its opinion, "the term of the riskfree rate should match the length of the pricing period because if the term ... is longer ... and there is a positive yield curve, regulated suppliers will be compensated for risks they do not bear. Conversely, if there is an inverse yield curve, regulated suppliers will be under-compensated if the term of the risk-free rate is longer than the pricing period."¹⁶

The Commission rejected the submissions of suppliers that a long term rate like 10years should be used to reflect the long-lived nature of the assets and that some firms borrow for longer than five years. It did this on the grounds that these arguments do not take account of the ability of regulated suppliers to reset their WACC if the risk free rate should change and the widespread use of interest rate swaps to alter the duration of interest rate risk exposures.¹⁷

¹⁴ *Reasons Paper*, para. 6.3.39.

¹⁵ Sapere WACC Report, p. 7.

¹⁶ Reasons Paper, para. 6.3.6.

¹⁷ Reasons Paper, para. 6.3.9.

The risk-free rate is not a firm specific parameter and there is no justification for WIAL adopting a figure different than the Commission.

2.3.5 Cost of debt (r_D)

The cost of debt is the sum of the risk free rate, the debt premium and the debt issuance cost.

2.3.6 Asset beta (β_A)

Beta is a measure of the expected volatility of a firm's returns relative to the market. It reflects the level of systematic risk faced by investors in the firm. Systematic risk is related to the market as a whole and cannot be diversified away hence investors need to be compensated to bear it. Un-systematic risk is firm specific and can be diversified away by holding a portfolio of investments, so in a competitive market investors cannot expect to be compensated for this risk. The asset beta of a firm is calculated from its equity beta by adjusting for the leverage ratio.

Sapere estimates the asset beta for WIAL to lie in the range of 0.65 - 0.75 and adopts a midpoint estimate of 0.70 and an "uncertainty adjusted estimate" of 0.75. It calculates these figures using the set of 25 airport companies identified by the Commission in its *Reasons Paper*. However, the Commission reported beta estimates for the 25 companies calculated using both weekly and monthly data and averaged across the two sets to estimate a midpoint asset beta of 0.65.

The Commission considered this estimate to be an upper bound of the asset beta for regulated activities on the grounds that the airport companies from which it derived the estimate generally included both regulated and unregulated activities, and the latter was more risky than the former.¹⁸ The Commission gives "primary consideration" to: the most recent beta estimates for overseas airports; the difference in beta estimates for regulated and non-regulated activities at airports in the United Kingdom; and, the extensive unregulated activities at New Zealand airports. As a result it decides to drop its midpoint estimate of asset beta from 0.65 to 0.60.

Sapere has, however, used only the monthly data the Commission used as it considers these "a more suitable basis for estimation by the pure play method."¹⁹ The pure play method requires estimates of betas to be adjusted to reflect differences in leverage between firms. Sapere calculates the standard deviation of the implied asset betas it uses is 0.22 and applies this to its midpoint estimate of 0.70 to produce its interval estimate of 0.7 ± 0.05.

The logic of why monthly data better reflects a "pure play" estimate, as Sapere claims, escapes me. Moreover, Sapere's approach makes no allowance for its sample including airport firms with both regulated and unregulated activities, which the Commission considers is necessary.

The only potential argument as to why WIAL's asset beta should be above the 0.60 estimate of the Commission I can identify is that WIAL's revenue mix is less

¹⁸ Reasons Paper, appendix E.93.

¹⁹ Sapere WACC Report, p. 8.

concentrated in non-regulated activities than AIAL's and so the 0.05 point downward adjustment made by the Commission for this factor for all three New Zealand airports is more than should be applied to WIAL. Against this, however, it can be noted that WIAL has disclosed in its own information disclosure statements asset betas between 0.45 and 0.60 since 2003. Although asset betas vary over time, why it believes it has recently risen to be outside this range is something it should be required to explain.

2.3.7 Tax Adjusted Market Risk Premium (TAMRP)

The market risk premium (MRP) represents the additional return, over and above the risk-free rate, that investors require to compensate them for the risk of holding the market portfolio, which is the average risk portfolio. Given the Capital Asset Pricing Model (CAPM) favoured in New Zealand, the MRP needs to be adjusted for the tax faced by investors on investments in the risk free rate;²⁰ hence a Tax Adjusted Market Risk Premium (TAMRP) parameter is used to derive the cost of equity.

The TAMRP is a forward looking concept and cannot be directly observed in the market. A range of approaches are used in the literature to estimate MRP and hence TAMRP. Some consider historical data and others forward projections.

Sapere estimates the range for the TAMRP parameter to be between 7.0% and 8.0% with a midpoint of 7.5% and an "uncertainty adjusted estimate" of 8.0%. Sapere reaches this conclusion because it considers the most acceptable approach to estimation is the extrapolation of the historical margin between the return on equities and the risk free return over a very long term as pioneered by lbbotson. Sapere recognises that long term extrapolation is not appropriate using New Zealand data because of the high degree of control of capital markets in the country before the mid-1980s. It therefore uses lbbotson-type estimates of MRP produced in 2010 by Dimson, Marsh and Staunton for Credit Suisse. These cover the developed economies of the United States, United Kingdom, Europe and Australia and produce figures of around 6.0%. The equivalent TAMRP is 7.5%. To this, in order to determine an interval estimate, Sapere applies $\pm 0.5\%$ as its own judgement to reflect the variability of MRP.

After considering the wide range of estimates for TAMRP derived by the various means that have been employed, the Commission reaches the view that "the best estimate of the likely future long-term TAMRP for the NZ market is 7%."²¹ Its reasons are that: 7.0% best reflects the range of evidence available; is considered by the Commission's panel of experts on the cost of capital to be reasonable; and is consistent with the range of TAMRP estimates used by New Zealand market participants, including New Zealand investment banks.²²

The TAMRP is not a firm specific parameter; it is a market specific parameter. There is no justification for WIAL adopting a different figure from the Commission.

 $^{^{20}}$ TAMRP = MRP plus the risk free rate times the investor tax rate.

²¹ Reasons Paper, para. 6.5.15.

²² Reasons Paper, para. 6.5.15.

2.3.8 Tax rate: Corporate (T_C) and Investor (T_I)

When calculating a post-tax WACC, the corporate tax rate is used to adjust the cost of debt to arrive at a post-tax cost of debt and the investor tax rate is used to adjust the risk free rate in the calculation of the cost of equity.

Both the Commission and Sapere estimate both parameters to be 28%, the actual corporate tax rate in New Zealand from 1 April 2011. The Commission set the investor tax rate equal to this figure because this also reflects the maximum rate under the Portfolio Investment Entity (PIE) regime. The Commission recognises that the tax rates faced by individuals as a result of their circumstances are not what should be used for calculating the WACC. The market will not compensate individual investors for bearing more taxation than they need to because they fail to rearrange their affairs to reduce their liability.²³

2.3.9 Cost of equity (r_E)

The cost of equity is calculated by combining the estimates of the asset beta, TAMRP and the investor tax rate.

2.3.10 Weighted Average Cost of Capital (WACC)

WACC is a weighted average of the cost of equity and the cost of debt with the weights being the shares of equity and debt in the firm's total funding. To estimate a post-tax WACC, the cost of debt is adjusted downwards to reflect that interest is a deduction from corporate taxation. To estimate a vanilla WACC no adjustment for tax deductibility is made.

2.3.11 Model error (me)

Sapere claims that the Capital Asset Pricing Model (CAPM) that lies behind the estimation of the costs of equity used in the model favoured by the Commission to calculate WACC does not fully capture the true costs facing a company when making investment decisions. It claims the model has errors that justify allowing a margin over the CAPM based estimates of WACC. The errors it claims to identify include:

- Market frictions, which impose additional costs and constraints on raising capital and should be reflected in the cost of equity;
- The loss of timing flexibility that a decision to invest results in for a firm; and
- The impacts of the limitation on the availability of capital to firms that mean a decision to invest in one alternative will preclude a range of other (real) options previously open to the firm.

Sapere makes a qualitative judgement that an *ad hoc* adjustment upwards of between 0.5% and 1.0% to WIAL's WACC to account for modelling errors from these sources "would be appropriate." It, therefore, derives a midpoint estimate of modelling error of 0.75% and an "uncertainty adjusted estimate" of 1.00%. Sapere

²³ *Reasons Paper*, paras 6.5.27-28.

are of the view that it is the "uncertainty adjusted estimate" of WACC against which its expected returns should be judged. These estimates include not only an upward adjustment to cover "model error" but also higher parameter estimates to cover "parameter error".

The Commission, after considering all the submissions it received, reached the view that "the Commission does not consider it is appropriate to make ad hoc adjustments for model error and the [Input Methodology Decision] does not provide for any ad hoc adjustments for model error."²⁴

The Commission requires for information disclosure purposes that the 25th and 75th percentile estimates of WACC be provided in addition to the 50th percentile or midpoint estimate. However, the Commission is also of the view that "in assessing profitability for the Airports an appropriate starting point for any assessment is the 50th percentile (mid-point) on the range."²⁵

3. Conclusions

1. In deriving its WACC estimates for WIAL, Sapere has taken very little notice of the Commission's Input Methodology decisions in relation to the estimation of the parameters. It has, however, adopted the same basic model as the Commission uses when deriving its estimates.

2. As a result of it adopting different parameter estimates, Sapere's estimates of WIAL's cost of debt, cost of equity and WACC are all significantly above those derived by the Commission.

3. In every instance, Sapere's parameter estimate is either the same as the Commission's or such that it will yield a higher estimate of WIAL's WACC. The following is a summary of the differences between the Sapere's preferred parameter estimates and the Commission's:

- Higher leverage ratio (0.40 compared with 0.17);
- Higher debt premium (1.97% compared with 1.39%);
- Higher debt issuance costs (0.54% compared with 0.35%);
- Ten-year risk free rate instead of five-year (5.66% compared with 4.66%);
- Higher asset beta (0.75 compared with 0.60);
- Higher TAMRP (8.0% compared with 7.0%); and
- Need for a model error factor (1.0% compared with 0%)

4. The numerically most significant difference are in the cost of equity; 14.08% for Sapere compared with 8.40% for the Commission. Sapere's higher asset beta of 0.75 compared with the Commission's 0.60 and its higher TAMRP of 8.0% compared with the Commission's 0.7% are the major contributors to this difference in the cost of equity.

²⁴ *Reasons Paper*, para. 6.4.23.

²⁵ *Reasons Paper*, appendix E11.2.

5. The Commission determines the mid-point estimates for WIAL's WACC to be 7.75% for the post-tax variant and 8.06% for the vanilla variant. It is of the view that these estimates are the starting point for any assessment of WIAL's profitability.

6. Sapere favours its "uncertainty adjusted estimates", which include uplifts for both parameter errors and model errors, as the basis for profitability comparisons. Its estimates of these are 11.8% for the post tax variant and 12.7% for the vanilla variant. Sapere's estimates respectively 52% and 58% more than the estimates the Commission considers appropriate.

7. In my opinion, there is no justification for WIAL adopting when setting charges parameter estimates different from the Commission has set for WIAL for information disclosure purposes. Should WIAL use Sapere's WACC estimates in order to set charges for its regulated services, without making offsetting adjustments in one or more of the other components it uses for this purpose, it will be seeking very significant excess returns compared with the level the Commission considers to be appropriate.