# WACC and target rate of return for PSE4

A report for Wellington International Airport Ltd

July 2019

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## Disclaimer

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# Executive Summary

This report sets out our advice to Wellington International Airport Limited (WIAL) on the appropriate weighted average cost of capital (WACC) and the associated target rate of return to be applied to the prices of specified airfield and terminal services for price setting event four (PSE4).

We note that WIAL's proposed WACC and target rate of return will be assessed against the Commerce Commission's (Commission's) mid-point WACC estimate for airports and the standard error of that estimate.

Table 1 sets out our estimate of the Commission's mid-point WACC for airports and our estimate of the mid-point WACC for WIAL.

## Table 1: The Commission's airport and WIAL's mid-point WACC

| Parameter | Commission's WACC (1 April 19) | WIAL WACC (Forecast debt) |
|---|---|---|
| Risk-free rate | 1.77% | 1.77% |
| Debt premium | 1.24% | n/a |
| Leverage | 19% | 19% |
| Asset beta | 0.60 | 0.63 |
| Equity beta | 0.74 | 0.78 |
| Tax adjusted market risk premium | 7.00% | 7.00% |
| Average corporate tax rate | 28% | 28% |
| Average investor tax rate | 28% | 28% |
| Debt issuance costs | 0.20% | 0.20% |
| Cost of debt | 3.21% | 4.66% |
| Cost of equity | 6.46% | 6.72% |
| Mid-point vanilla WACC | 5.84% | 6.33% |
| **Mid-point post-tax WACC** | **5.67%** | **6.08%** |
| Commission's vanilla WACC percentile | 50% | 63% |
| **Commission's post-tax WACC percentile** | **50%** | **61%** |

In our opinion, there are two reasons why WIAL's WACC would differ from that estimated by the Commission for a benchmark airport, ie:

- WIAL's cost of debt is higher than the Commission's estimate because WIAL's expected actual cost debt over PSE4 differs from the Commission's benchmark; and

- WIAL's asset beta is likely to be higher than that for the Commission's group of comparator airports.

# Cost of debt

WIAL has a number of characteristics that differ from the Commission's benchmark airport operator, and affect its cost of debt, including that WIAL:

- has a credit rating of BBB+ rather than the assumed credit rating of A-;
- will enter the PSE4 with a number of different existing forms of debt finance, including:
    - > fixed rate corporate bonds;
    - > floating rate corporate bonds;
    - > swaps; and
    - > commercial paper; and
- will be required over PSE4 to raise new debt, to roll over any retiring existing debt and to fund its forecast capital program.

We estimate a WACC that has greater regard to the specific circumstances of WIAL. Specifically, we have incorporated a cost of debt that reflects the method that Auckland International Airport Ltd (AIAL) proposed which is a best estimate of cost of debt over pricing period.

Under the AIAL approach we estimate that WIAL's expected average yield on corporate debt over PSE4 is **4.66 per cent** (including benchmark debt raising costs). This average cost of debt has been estimated using WIAL's corporate model that specifies:

- the yields, term and quantum of WIAL's existing debt, plus debt benchmark debt issuance costs; and
- the anticipated timing and quantum of new fixed rate debt;

We have estimated the cost of fixed rate debt raised during PSE4, as:

- the estimated base 10-year rate at the time that new debt is raised; and
- the debt premium (yearly average to 31 March 2019) of five-year BBB+ debt, plus debt issuance costs, which we note is a conservative estimate.

# Asset beta

We find that WIAL's planned capital expenditure program will more than double its aeronautical asset values over the following two pricing periods (ie, PSE4 and PSE5). The magnitude of the increase in WIAL's aeronautical asset value is similar to that planned by AIAL for PSE3. This increase in aeronautical asset value will likely increase WIAL's relatively high operating leverage.

Increases in a business's operating leverage increases the volatility of its profits to changes in demand. The Commission has accepted that firms with higher operating leverage have higher systematic risk (ie, a higher asset beta) on the basis of this increased volatility in profits.[1]

> Conceptually, we agree that Auckland Airport's significant capital expenditure programme is likely to increase its operating leverage, and that this may increase its exposure to systematic risk.

WIAL's earnings before interest and tax (EBIT) operating leverage averaged 8.96 over the FY2013 to FY2017 period. This is substantially above both the median of the Commission's comparator group (ie, AIAL's EBIT operating leverage of 1.91) and the mean of the Commission's comparator group (ie, 3.47). While WIAL's adjusted operating leverage averaged 2.85 which is above both AIAL's EBIT operating leverage and the median of the Commission's comparator group, but below the mean of the Commission's comparator group.

Further WIAL's adjusted operating leverage for the most recent year FY2018 is 6.67, which is substantially above both the median and mean of the comparator group. Given WIAL's substantial capital expenditure program over PSE4 we would expect that its operating leverage would continue to increase.

In our opinion, demand for WIAL's services by domestic passengers is likely to be more highly correlated to variations in gross domestic products (GDP) (and so non-diversifiable risk) than the average airport in the Commission's sample of international airports.

This expectation is reinforced by our 'proxy beta' analysis of international and domestic passenger demand at WIAL and real GDP which finds the proxy beta for WIAL for:

- domestic passenger demand was 0.94; and
- for international passenger demand was 0.74.

While there are a number of other factors likely to affect the sensitivity of WIAL's revenues to domestic GDP shocks (such as the mix of business and leisure traveller) our analysis strongly suggests that WIAL is exposed to higher systematic risk than the Commission's sample of 26 international airports.

We calculate a proxy beta for WIAL of 0.92 (that has a standard error that conforms with conventional levels of statistical significance) which is:

- a little below the 1.08 proxy beta for CIAL calculated by Incenta; and
- substantially higher than the average proxy beta of the Commission's sample of comparable airports, which Incenta calculated had an average proxy beta of 0.67.

We note that the passenger numbers and GDP data for 1999 includes only nine months of data, since WIAL changed from reporting on a '30 June' financial year to a '31 March' financial year. We therefore remove two observations (1999 and 2000) to assess whether the inclusion of the truncated years has a material impact on our analysis. We find that it does not, with the proxy beta falling from 0.92 to 0.90 and continuing to have statistical significance at conventional levels.

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[1] Commerce Commission of NZ, *Review of Auckland International Airport's pricing decisions and expected performance (July 2017 – June 2022) | Draft decision*, 26 April 2018, para X19.

Our analysis supports the adoption by WIAL of an **asset beta of 0.63**, which is consistent with the implied asset beta charged by AIAL – an outcome welcomed by the Commission.[2]

## Target rate of return

The Commission's Input Methodologies (IM) reasons paper on the WACC percentile for airports explicitly acknowledges that an airport may target an overall rate of return that differs from its own estimate of the WACC.

A potential reason for a divergence between an airport's WACC and its ex-ante overall target rate of return is the need to provide for the costs associated with any material asymmetric risks faced by the service provider.

A potential source of asymmetric risk to WIAL is the possibility of an exogenous event that caused passenger numbers using WIAL to fall substantially. WIAL's is exposed to asymmetric downward forecasting risk because passenger numbers over PSE4 are determined on a 'most likely' (best) basis and so does not explicitly take account of any unknown, one-off risk events.

WIAL's risk register identifies and quantifies a number of potential downward passenger risks that would result in the closure of WIAL, for example, a natural disaster, terrorist event or terminal damage.

WIAL's risk register indicates there is a six per cent chance that one of the above events would occur in any given year. WIAL has business interruption insurance that limits its exposure to these events subject to a deductable period.

We calculate that the impact of negative passenger events will require WIAL to target a rate of return of 6.10 per cent to have an expected post-tax WACC of 6.08 per cent over PSE4.

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[2] Commerce Commission, media release entitled *Auckland Airport's pricing response welcomed*, 28 March 2019.

# 1. Introduction

Wellington International Airport Limited (WIAL) is preparing to consult with its substantial airline customers on its detailed pricing proposal before determining its aeronautical prices to apply for the forthcoming pricing period.

The consultation process is undertaken in the context of the regulatory framework for airport pricing, which is governed by:

- the Airport Authorities Act (AAA), which requires WIAL to provide airlines with a detailed pricing proposal for comment, by them or their own advisers, and for feedback from them to be fully considered by WIAL before final prices are determined; and

- Part 4 of the Commerce Act 1986, which requires:

  > disclosure to the Commerce Commission (Commission) by the airport of the rationale for its pricing decision, including explanation of the input methodologies applied in reaching that decision; and

  > in turn, the Commission to scrutinise and report on that decision, by reference to the Input Methodologies (IM) framework.

We have been asked by WIAL to advise on the appropriate weighted average cost of capital (WACC) and the associated target rate of return to be applied in its decision on the prices to apply for airfield and terminal services provided over the period, which is referred to under the Commission's framework as price setting event four (PSE4).

The Commission's December 2016 review of its IM[3] framework retained the same general approach to determining an airport's WACC that previously applied, but stopped reporting 25th and 75th percentile WACC estimates. It placed the onus on airports to publish:[4]

- their own estimate of WACC;

- the effective rate of return targeted in determining the aeronautical and terminal prices, ie, the new forward-looking profitability indicator;

- an explanation for any difference between the Commission's estimate of WACC and their own WACC; and

- an explanation for any difference between their own WACC and their target rate of return.

Our report is structured as follows:

- section 2 reports the Commission's WACC for airport services as at 1 April 2019;

- section 3 identifies reasons that may cause WIAL's WACC to differ from that of an average airport and provides a central estimate of WIAL's cost of capital;

- section 4 identifies reasons as to why it may be appropriate for WIAL's aeronautical and terminal prices to reflect a target rate of return over PSE4 that differs from a central estimate of its cost of capital; and

- section 5 summarises our conclusions on WIAL's WACC and target rate of return.

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[3] Commerce Commission, *Input methodologies review final decision*, 20 December 2016.

[4] Commerce Commission, *Input methodologies review decisions | Topic 6: WACC percentile for airports*, 20 December 2016, p 22.

# 2. The Commission's airport WACC

The IM for airport services sets out the Commission's preferred method for calculating WACC for airports and so establishes the framework against which it will assess the WACC adopted by WIAL for the pricing of airfield and terminal services for PSE4.

The IM states that the Commission will calculate both a vanilla and post-tax WACC according to the formulae:[5]

- vanilla WACC:

$$WACC_{vanilla} = r_d L + r_e(1 - L); \text{ and}$$

- post-tax WACC:

$$WACC_{post-tax} = r_d(1 - T_c)L + r_e(1 - L)$$

   where:

   $L$         is leverage, which is fixed at 19 per cent;

   $r_d$        is the cost of debt, which is estimated according to the following formula:

   $$r_d = r_f + p + d$$

   $r_e$        is the cost of equity estimated using the Brennan-Lally CAPM, ie:

   $$r_e = r_f(1 - T_i) + \beta_e TAMRP$$

   $T_c$        is the average corporate tax rate, which is currently 28 per cent;

   $T_i$        is the average investor tax rate, which is currently 28 per cent;

   $R_f$        is the risk-free rate, calculated in accordance to clause 5.3;

   $p$         is the average debt premium, calculated in accordance to clause 5.4;

   $d$         is the debt issuance costs, which is fixed by the IM at 0.2 per cent;

   $\beta_e$        is the equity beta of an average airport, which is fixed by the IM at 0.74 (based on an asset beta of 0.6); and

   $TAMRP$ is the tax adjusted market risk premium, which is fixed by the IM at 7.0 per cent.

Table 2 sets out the WACC calculated for WIAL by the Commission for price setting event 3 (PSE3) and PSE4.

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[5] Commerce Commission, *Input methodologies review final decision*, 20 December 2016, clause 5.1 and 5.2.

## Table 2: The Commission's WACC for PSE3 and PSE4

| Parameter | 1 June 2014 | April 2019 |
|---|---|---|
| Risk-free rate | 4.09% | 1.77% |
| Debt premium | 1.18% | 1.24% |
| Leverage | 17% | 19% |
| Asset beta | 0.60 | 0.60 |
| Equity beta | 0.72 | 0.74 |
| Tax adjusted market risk premium | 7.00% | 7.00% |
| Average corporate tax rate | 28% | 28% |
| Average investor tax rate | 28% | 28% |
| Debt issuance costs | 0.35% | 0.20% |
| Cost of debt | 5.62% | 3.21% |
| Cost of equity | 8.01% | 6.46% |
| Mid-point vanilla WACC | 7.60% | 5.84% |
| **Mid-point post-tax WACC** | **7.33%** | **5.67%** |
| Post-tax WACC (67th percentile) | | 6.31% |
| Post-tax WACC (75th percentile) | 8.62% | 6.66% |

# 3. WIAL's weighted average cost of capital

In this section we identify reasons that may cause WIAL's WACC to differ from the Commission's estimate of that for an average airport and to provide a central estimate of WIAL's cost of capital.

In this report we outline two principal reasons why WIAL's WACC would differ from that estimated by the Commission for a benchmark airport, ie:

- WIAL's cost of debt is higher than the Commission's estimate because WIAL's expected actual cost debt over PSE4 differs from the Commission's benchmark; and

- WIAL's asset beta is higher than the Commission's group of comparator airports.

We explain the reasons for these differences and their implications below.

## 3.1  WIAL's cost of debt

The Commission's amended IM decision for airport services, published in December 2016, specifies that it will estimate benchmark cost of debt as the sum of:

- a prevailing risk-free rate ($r_f$) over a three-month window, prior to the start of the pricing period, ie, the period immediately prior to 1 April 2019;

- a debt issuance cost ($d$) of 0.20 per cent; and

- a historical trailing average debt premium ($p$), where:

  > the debt premium is the difference between the estimated yield on a New Zealand dollar denominated five-year bond, issued by a publicly listed airport with an A- credit rating, and the contemporaneous yield on five-year New Zealand government bonds; and

  > the trailing average is the simple arithmetic average of the debt premium values estimated over the five years preceding the start of the pricing period.

This cost of debt benchmark is predicated on the Commission's assumption that debt is used to finance 19 per cent of airfield and terminal assets.

The Commission's cost of debt allowance implicitly assumes that a benchmark average provider of airport services raises debt by:

- exclusively issuing New Zealand dollar denominated corporate debt with a five-year term and a credit rating of A-;

- periodically issuing floating rate debt (or issuing fixed rate debt and immediately purchasing swaps so as effectively to convert the debt to floating rate debt);

- purchasing swaps to fix the underlying base rate (ie, the risk-free rate component of the cost of debt) of all debt immediately before the start of the pricing period; and

- refinancing all retiring debt, during the regulatory period, with floating rate debt carrying the same debt premium as the retiring debt.

While this debt financing strategy is internally consistent it does not reflect either:

- a reasonable estimate of the average yield on WIAL debt over PSE4; or

- a benchmark debt cost, given WIAL's actual BBB+ credit rating.

In our opinion, adopting a WACC that allows WIAL to either recover a reasonable estimate of its actual cost of debt or uses a debt benchmark that reflects WIAL's actual credit rating would be consistent with outcomes produced in a competitive market.

### 3.1.1 WIAL's actual cost of debt

The Commission's benchmark cost of debt substantially underestimated WIAL's estimated cost of debt over PSE4.

This section sets out our best estimate of WIAL's cost of debt over PSE4, that considers WIAL's specific circumstances and forecasts the cost of future debt by reference to a variety of bonds by other issuers. We note that this approach was proposed by AIAL in its PSE3, while the Commission did not adopt this approach, they did state that:[6]

> Auckland Airport's estimate of the cost of debt is, for the most part, reasonable.

There are a number of aspects that WIAL's circumstances that cause its cost of debt to differ from the Commission's benchmark average airport operator, including that WIAL:

- has a credit rating of BBB+ rather than the assumed credit rating of A-;
- anticipates utilising a number of different forms of debt finance during PSE4, including:
  - > fixed rate corporate bonds;
  - > floating rate corporate bonds;
  - > swaps; and
  - > drawdowns on bank facilities.
- issues corporate debt with a term at issuance of between seven and 12 years.

WIAL has provided us with details of its current debt and a schedule of expected new issues of debt, from which we have estimated its expected weighted average cost of debt over PSE4. Table 3 summarises our approach to estimating the cost of existing and future debt over PSE4.

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[6] Commerce Commission, *Review of Auckland International Airport's pricing decisions and expected performance (July 2017 – June 2022)*, 1 November 2018, para 70.

## Table 3: Estimated the cost of different debt instruments over PSE4

| Debt Instrument | Cost of existing debt | Cost of new debt | Comments |
|---|---|---|---|
| Fixed rate bonds | Based on the yields of WIAL's existing bonds, plus debt issuance costs. | Base rate +1.80% which is the Commission's debt premium (2019) for five-year BBB+ debt, plus debt issuance costs.<br><br>The base rate in the future is estimated for each bond issue using observed forward rates. | Forecasts of new bond issues during PSE4 taken from WIAL's corporate model.<br><br>WIAL anticipates issuing 10-year corporate debt.<br><br>Conservatively adopts the debt premium for five years and a BBB+ credit rating, together with the forward rates for 10-year risk free rates.<br><br>Adopts the Commission's allowance of 20 basis points for debt issuance costs. |
| Commercial paper | Based on the yields on WIAL's existing commercial paper, plus debt issuance costs | No new commercial paper expected to be issued during PSE4. | Adopts the Commission's allowance of 20 basis points for debt issuance costs. |
| US dollar private placements | Based on actual costs to WIAL after cross currency swaps plus the average cost of existing swaps. | No new US placements forecast to be issued during PSE4. | |

Consistent with the approach set out above, our estimate of WIAL's expected average cost of debt over PSE4 is **4.66 per cent** (including benchmark debt raising costs). This is below WIAL's current cost of debt of 4.97 per cent and reflects the expectation that debt refinanced during PSE4 will generally have a lower yield than retiring debt.[7]

Notwithstanding the assumption that the debt premium on bonds will remain unchanged, the total cost of debt is expected to rise over PSE4 because observed forward rates suggest that base interest rates will increase over the pricing period. Figure 1 shows the forward yield curve of ten-year New Zealand government bonds over PSE4.

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[7] Sourced from WIAL's Treasury month end reconciliation (June 2019) including 20 basis points for benchmark debt issuance costs.

Figure 1: Forward yield curve on 10-year bond New Zealand government bonds
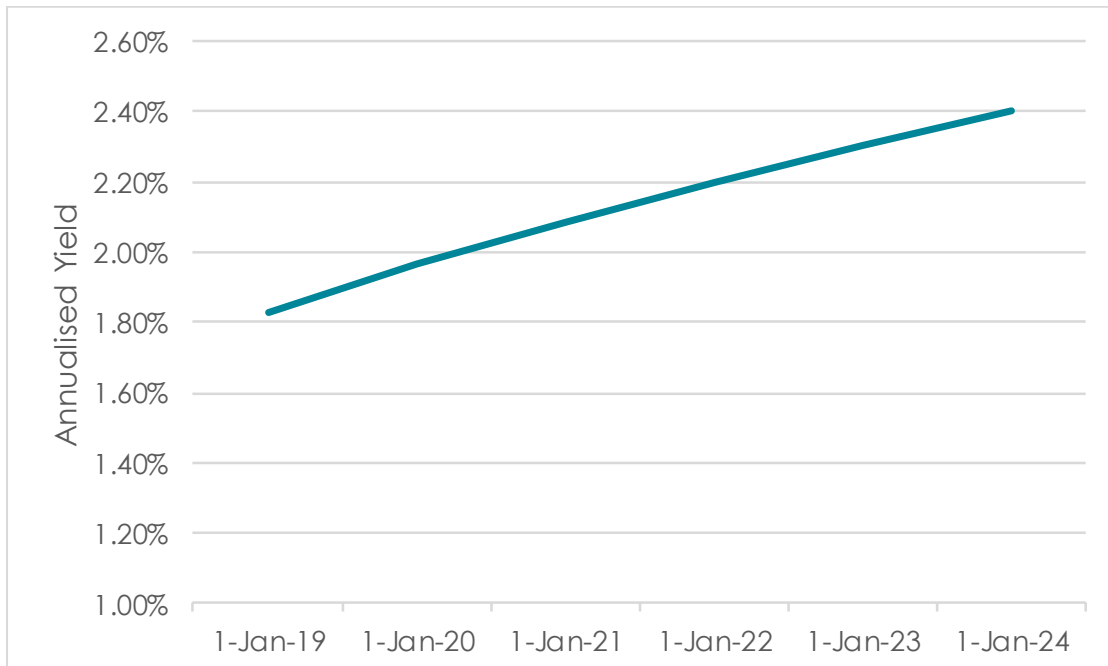


### 3.1.2   Leverage

We note that WIAL's debt gearing ratio over PSE4 is forecast to increase. Adopting WIAL's forecast gearing ratio in the WACC would allow it to recover its forecast efficient debt costs over PSE4. However, adopting WIAL's higher leverage in the WACC would result in a higher cost of capital, under the simplified Brennan-Lally CAPM (in which debt betas are not used).[8]

In order to avoid the consequences of the leverage anomaly (whereby the Commission's WACC rises as leverage increases), we propose to take the conservative approach of adopting the Commission's benchmark gearing ratio of 19 per cent.

## 3.2   WIAL's asset beta

The asset beta compensates investors for the systematic (non-diversifiable) risks associated with their investment. Systematic risk is commonly measured by the extent that returns on securities of a listed business co-vary with returns on the market portfolio.

The Commission calculated an industry-wide average beta for airports, based upon the asset betas of 26 listed international airports over two recent five-year periods (ie, 2006-2011 and 2011-2016), producing an estimate of 0.65. However, the Commission made a 0.05 downward adjustment to its asset beta estimate because in its opinion:[9]

> …the average asset beta from the comparator sample (0.65) is likely to overstate beta for regulated aeronautical activities, because it relates to airports' overall (multi-divisional) businesses.
>
> …

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[8] The 'leverage anomaly' was explained well by the High Court in 2013. See Wellington Airport & others v Commerce Commission [2013] NZHC 1570 to 1661.

[9] Commerce Commission, *Input Methodologies review decision | Topic paper 4: Cost of capital issues*, 20 December 2016, para 476-479.

> …Unregulated services (such as retail shopping) are generally considered more risky than regulated services (such as provision of airfields), for example there is greater demand uncertainty.
>
> …
>
> …We considered the average asset beta for the 2010 comparator sample (0.65) to be an upper bound, as it included both regulated and unregulated activities.

Combining an asset beta of 0.60 with the Commission's notional leverage estimate of 19 per cent results in an equity beta of 0.74.

In the remainder of this section we outline the reasons that WIAL's specific circumstances warrant the adoption of an asset beta of 0.63.

### 3.2.1 WIAL's proposed capex program will effectively double the aeronautical asset value over the next two pricing period

WIAL is proposing to undertake a substantial capital expenditure (capex) program in PSE4 and price setting event 5 (PSE5) that will more than double its aeronautical asset value over the next 10 years.

WIAL is currently forecasting to invest $570.9 million in new aeronautical assets in PSE4, with a further forecast investment of $448.2 million in PSE5.[10] Figure 2 shows that these forecast outlays are approximately three and 3.5 times higher than those undertaken by WIAL in PSE3.

Figure 2: Actual and forecast aeronautical capex in PSE3, PSE4 and PSE5 for WIAL
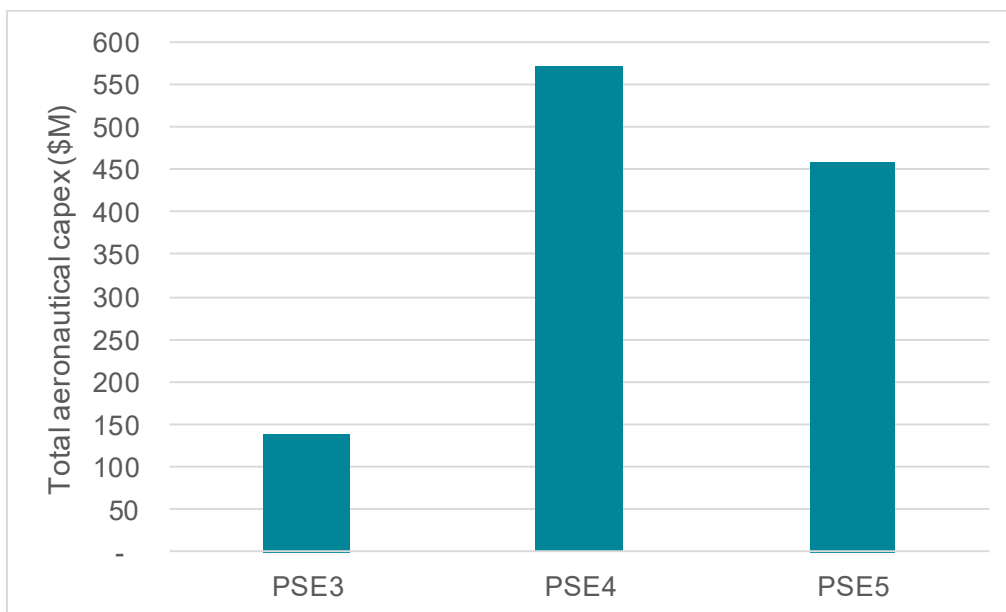


Figure 3 shows the cumulative aeronautical capex over PSE3, PSE4 and PSE5 as a proportion of the value of WIAL's aeronautical assets at the start of each pricing period (ie, its opening regulatory asset base from PSE3, PSE4 and PSE5). These investments will increase the value of WIAL's aeronautical assets from $494 million at the start of PSE4 to just under $1.3 billion by the end of the PSE5 (ie, 10 years later).

Despite the significant growth in WIAL's aeronautical asset value, the magnitude of aeronautical capex over PSE4 is approximately 65 per cent of the closing aeronautical asset value at the end of the pricing period. While the magnitude of aeronautical capex over PSE5 is approximately 35 per cent of the closing

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[10] We understand that WIAL is currently considering its investment plans and capex forecasts may be revised following airline consultation.

aeronautical asset value at the end of the pricing period. This demonstrates a shift in the relative size of the capex program compared to the aeronautical asset value for WIAL that outlay only an equivalent 25 per cent of closing aeronautical asset value in PSE3.

Figure 3: Cumulative aeronautical capex as a proportion of aeronautical asset value for WIAL
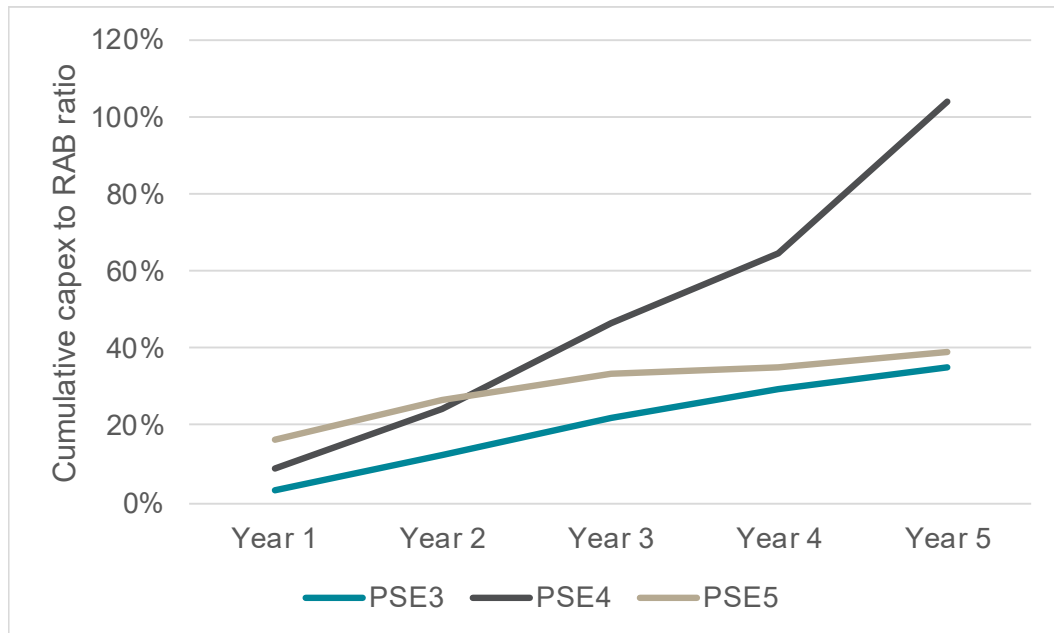


Note: 'RAB' refers to regulatory asset base, a measure of aeronautical asset value at the start of PSE3, PSE4 or PSE5

WIAL's forecast capital program over PSE4 is of a similar magnitude to that currently undertaken by AIAL over its PSE3.[11] Figure 4 shows that the magnitude of forecast aeronautical capex to aeronautical asset value for WIAL's PSE4 and PSE5 periods are comparable to the profile for AIAL's PSE3.

We agree with the Commission that a capex program of this magnitude will increase the systematic risk of the airport:[12]

> We accept that Auckland Airport's investment plans are likely to increase risk to Auckland Airport, particularly given its significant size.

When a business undertakes a substantial capex program, its operating leverage will increase through an increase in the ratio of its fixed costs to its variable costs. Increases to operating leverage increase the volatility of a business' profits to changes in demand. The Commission has accepted that firms with higher operating leverage have higher systematic risk (ie, a higher asset beta) due to this volatility of profits:[13]

> Conceptually, we agree that Auckland Airport's significant capital expenditure programme is likely to increase its operating leverage, and that this may increase its exposure to systematic risk.

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[11] AIAL forecasts to almost double its aeronautical asset value over PSE3. See, Commerce Commission of NZ, *Review of Auckland International Airport's pricing decisions and expected performance (July 2017 – June 2022) | Final report,* 1 November 2018, p 111.

[12] Commerce Commission of NZ, *Review of Auckland International Airport's pricing decisions and expected performance (July 2017 – June 2022) | Final decision*, 1 November 2018, para X10.

[13] Commerce Commission of NZ, *Review of Auckland International Airport's pricing decisions and expected performance (July 2017 – June 2022) | Draft decision*, 26 April 2018, para X19.

Figure 4: Cumulative aeronautical capex as a proportion of asset value for WIAL and AIAL
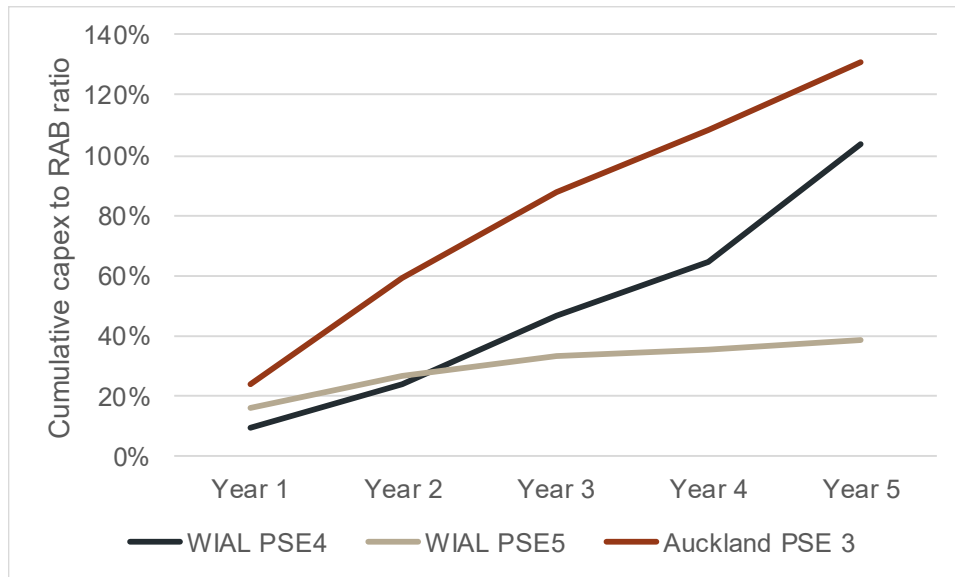


*Source: Auckland Airport, Annual disclosures, https://corporate.aucklandairport.co.nz/investors/regulation, accessed 27 June 2019; Auckland Airport, Price setting disclosure schedules, August 2017, p 2.*

*Note: 'RAB' refers to regulatory asset base, a measure of aeronautical asset value at the start of PSE3, PSE4 or PSE5*

Notwithstanding, agreement that high operating leverage increases a business' exposure to systematic risk the Commission in its final decision found that AIAL:[14]

> does not appear to have a higher historical operating leverage than the average of the comparator sample.
>
> This is consistent with our analysis which suggests Auckland Airport's degree of historic and current operating leverage is below or, at best, similar to the average of the sample

This conclusion was based on the Commission's analysis of the ratio of earnings before interest and taxes (EBIT) growth, divided by revenue growth (as reported by Bloomberg) for AIAL and the comparator sample. The Commission found that by this measure of operating leverage, AIAL's operating leverage:

- over the FY2013 to FY2017 period averaged 1.93, which was the median of the comparator sample, but significantly below the mean of the comparator sample (3.47); and

- in FY2017 was 1.57, which was the median of the comparator sample, but below the mean of the comparator sample (2.11).

The Commission also re-estimated AIAL's operating leverage using underlying EBIT[15] which resulted in AIAL's degree of operating leverage averaging 1.16 for the FY2013 to FY2017 period and 1.10 for FY2017.

Our analysis suggests that the operating leverage of WIAL is substantially above that reported by AIAL and the comparator sample. The underlying EBIT measure of operating leverage for WIAL is set out below in table 4.

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[14] Commerce Commission of NZ, *Review of Auckland International Airport's pricing decisions and expected performance (July 2017 – June 2022) | Final decision*, 1 November 2018, paras A97-A98.

[15] Underlying EBIT excludes factors that are unlikely to be relevant to its proportion of fixed costs, such as changes in the fair value of derivative positions, shares in the profits or loss in associated companies and write downs.

## Table 4: Underlying EBIT growth to revenue growth for WIAL

|  | FY2012 | FY2013 | FY2014 | FY2015 | FY2016 | FY2017 | FY2018 |
|---|---|---|---|---|---|---|---|
| WIAL revenue ($m) | $99.5 | $106.2 | $110.9 | $108.3 | $113.5 | $119.6 | $128.6 |
| *% change in Revenue* | | *6.76* | *4.43* | *-2.33* | *4.80* | *5.33* | *7.59* |
| WIAL EBIT ($m) | $19.1 | $36.7 | $44.8 | $26.2 | $29.3 | $38.5 | $47.3 |
| *% change in EBIT* | | *92.18* | *21.84* | *-41.55* | *11.96* | *31.39* | *22.93* |
| **Unadjusted operating leverage** | | 13.64 | 4.93 | 17.85 | 2.49 | 5.89 | 3.02 |
| WIAL EBIT excluding fair value movement in swaps ($m) | $28.7 | $37.4 | $34.6 | $27.3 | $31.9 | $30.2 | $45.4 |
| *% change in EBIT* | | *30.43* | *-7.57* | *-20.95* | *16.76* | *-5.54* | *50.63* |
| **Adjusted operating leverage** | | **4.50** | **-1.71** | **9.00** | **3.49** | **-1.04** | **6.67** |

Table 4 shows that over the FY2013 to FY2017 period, WIAL's unadjusted operating leverage averaged 8.96 which is substantially above that reported for AIAL and above the mean and median of the comparator group. WIAL's adjusted operating leverage averaged 2.85 over the period from FY2013 to FY2017, which is above AIAL's reported operating leverage and above the median, but below the mean of the comparator group.

Further, WIAL's adjusted operating leverage for the most recent year FY2018 is 6.67, which is substantially above both the median and mean of the comparator group. WIAL's substantial capex program over PSE4 and PSE5 will increase the proportion of WIAL's costs that do not vary with passenger numbers such as its depreciation allowance. This increase in the proportion of fixed costs over time would be expected to increase WIAL's operating leverage as a given change in revenues has a bigger impact on EBIT for companies with high proportion of fixed costs.[16]

This higher operating leverage suggests that over PSE4, WIAL will have higher systematic risk than the median and mean of the comparator group. Given this higher operating leverage and capex program the adoption by WIAL of an asset beta of 0.63 consistent with that implicitly adopted by AIAL is reasonable. We note that an asset beta of 0.63 is below the upper bound of the Commission's reasonable range.

### 3.2.2    WIAL predominately serves domestic passengers

While the evidence of WIAL's capex program and operating leverage provide a persuasive justification for adopting an asset beta of 0.63, WIAL passenger mix provides a further argument for an uplift over the Commission's 50th percentile estimate of the asset beta.

Systematic risk refers to the component of a business's total risk that is due to economy-wide factors.[17] Consequently, one would expect that a business whose demand is more sensitive to movements in a country's GDP (which, in turn, is likely to affect returns on the market portfolio) to have a high asset beta. This is because economic booms (and downturns) are likely to have a relatively greater impact on its revenues, and so the valuation of the business, as compared with a firm whose demand is less sensitive to movements in a country's gross domestic product (GDP).

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[16] For example, a company that uses 40 per cent of its revenue to cover variable costs and 40 per cent of its revenue to cover fixed costs, leaving 20 per cent of its revenue as EBIT. A one per cent increase in throughput results in a one per cent increase in revenue and variable costs, while fixed costs do not change. Therefore, EBIT increases by three per cent. In contrast, a one per cent increase in the throughput of a company that uses 60 per cent of its revenue to cover variable costs and 20 per cent of its revenue to cover fixed costs (similarly leaving 20 per cent of its revenue as EBIT) would only result in a two per cent increase in EBIT.

[17] Pierson, Graham, Rob Brown, Steve Easton and Peter Howard, *Business Finance*, 8th Edition, p. 214.

WIAL services a relatively greater share of domestic passengers than either CIAL or AIAL. Table 5 provides a breakdown of the mix of international and domestic passengers at the AIAL, CIAL and WIAL.

### Table 5: Mix of domestic and international passengers at AIAL, CIAL and WIAL

|  | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | **Average** |
|---|---|---|---|---|---|---|---|
| **AIAL** | | | | | | | |
| Domestic | 44.5% | 46.6% | 45.9% | 45.5% | 45.8% | 45.2% | **45.6%** |
| International | 55.5% | 53.4% | 54.1% | 54.5% | 54.2% | 54.8% | **54.4%** |
| **CIAL** | | | | | | | |
| Domestic | 74.4% | 76.3% | 76.2% | 75.6% | 75.4% | 74.8% | **75.5%** |
| International | 25.6% | 23.7% | 23.8% | 24.4% | 24.6% | 25.2% | **24.5%** |
| **WIAL** | | | | | | | |
| Domestic | 86.2% | 86.5% | 86.2% | 85.8% | 84.5% | 85.1% | **85.7%** |
| International | 13.8% | 13.5% | 13.8% | 14.2% | 15.5% | 14.9% | **14.3%** |

Table 5 shows that 85.7 per cent of all passenger movements at WIAL related to domestic travel. This compares to 45.6 per cent at AIAL and 75.5 per cent at CIAL.

WIAL's relatively high exposure to demand by domestic passengers is likely to be more highly correlated to variations in GDP (and so non-diversifiable risk) than is the case for demand by international passengers.

This expectation is reinforced by a 'proxy beta' analysis of international and domestic passenger demand at WIAL and real GDP. We find that over the period 1993 to 2017 (24 observations) the proxy beta for WIAL for:

- domestic passenger demand was 0.94; and
- for international passenger demand was 0.74.

There are a number of other factors likely to affect the sensitivity of WIAL's revenues to domestic GDP shocks (such as the mix of business and leisure traveller). However, our analysis of the relationship between the growth in passenger numbers and the growth in (home-country) real GDP strongly suggests that WIAL is exposed to higher systematic risk than the Commission's sample of 26 international airports.

We have replicated analysis undertaken by Incenta[18] for CIAL and find that, using passenger numbers from 1992 to 2017 and real GDP data, the proxy beta for WIAL is 0.92. Figure 5 plots the relationship between WIAL's passenger numbers and real GDP.

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[18] Incenta, *Depreciation, allocation of implied depreciation and asset beta | Report for Christchurch International Airport Limited*, November 2016.

## Figure 5: WIAL passenger growth and real GDP growth
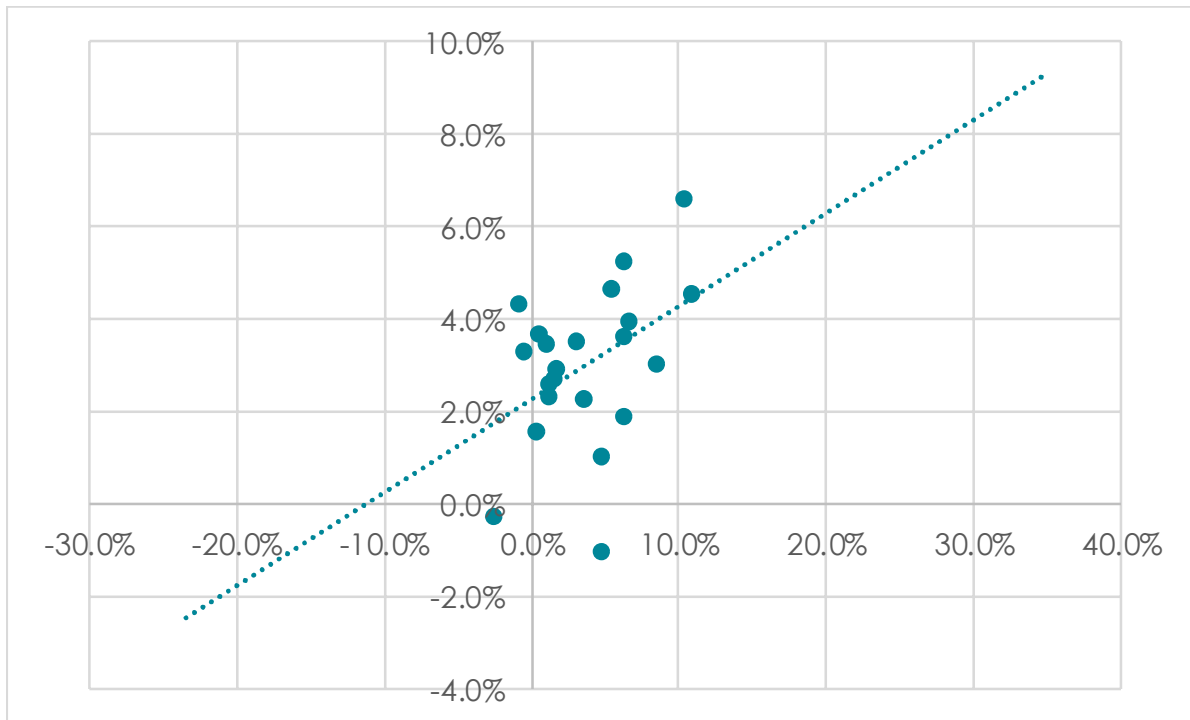


*Note: This figure excludes observations from 1999 and 2000. In 1999 WIAL changed from reporting on a financial year ending 30 June to a financial year ending 31 March. Consequently, 1999 includes only nine months of passenger and GDP data, this results in anomalous annual GDP and passenger growth in both 1999 and 2000.*

Further, the proxy beta for WIAL of 0.92 has a standard error that conforms with conventional levels of statistical significance. We note that the proxy beta of 0.92 for WIAL is:

- a little below the 1.08 proxy beta for CIAL calculated by Incenta; and

- substantially higher than the average proxy beta of the Commission's sample of comparable airports, which Incenta calculated had an average proxy beta of 0.67.

## Table 6: Proxy beta estimates

|  |  | Observations | Intercept | Proxy beta | $R^2$ |
|---|---|---|---|---|---|
| Average airport in the Commission's sample | Parameter |  | 0.04 | 0.66 |  |
|  | Standard error | 233 | 0.01 | 0.09 | 18% |
|  | p-value |  | 0% | 0% |  |
| WIAL - whole sample | Parameter |  | 0.01 | 0.92 |  |
|  | Standard error | 24 | 0.01 | 0.07 | 88% |
|  | p-value |  | 40% | 0% |  |
| WIAL - excluding 1999 and 2000 | Parameter |  | 0.01 | 0.90 |  |
|  | Standard error | 22 | 0.01 | 0.43 | 18% |
|  | p-value |  | 56% | 5% |  |
| CIAL - whole sample | Parameter |  | 0.01 | 1.08 |  |
|  | Standard error | 28 | 0.02 | 0.54 | 13% |
|  | p-value |  | 57% | 5% |  |

We note that the passenger numbers and GDP data for 1999 includes only nine months of data, since WIAL changed from reporting on a '30 June' financial year to a '31 March' financial year. We therefore removed two observations (1999 and 2000) to assess whether the inclusion of the truncated year has had a material impact on our analysis. We find that it does not, with the proxy beta falling from 0.92 to 0.90 and continuing to have a standard error that conforms with conventional levels of statistical significance.

Our analysis supports the adoption by WIAL of an asset beta of 0.63, which is below the upper bound of the Commission's reasonable range.

# 4. WIAL's target rate of return

The Commission's IM reasons paper on the WACC percentile for airports explicitly acknowledges that an airport may target an overall rate of return that differs from its own WACC estimate.

An airport's WACC may diverge from its ex-ante overall target rate of return to provide for the costs associated with its material asymmetric risks. Asymmetric risks arise when there is a significant mismatch between the potential financial gains and losses from future events.

The existence of asymmetric risks gives rise to a difference between the 'most likely' outcomes and the 'expected' outcomes.[19] We note that asymmetric risk does not affect a business' opportunity cost of capital, ie, the WACC,[20] because asymmetric risks affect the calculation of expected returns, while the WACC compensates for the non-diversifiable risk of variations in expected returns. Consequently, the expected costs of asymmetric risks must be recovered by either adjusting the cash flows to which any overall target rate of return is applied or targeting an overall rate of return that is above a business's WACC. The latter option is often taken to be the more expedient.

WIAL has identified two significant asymmetric risks for PSE4, ie:

- earthquake risk, associated with a significant earthquake event that impacts the operations of WIAL during PSE4; and
- downward risks to forecast passenger numbers, that results in a significant fall in the number of passengers using WIAL.

Each of these asymmetric risks are discussed below.

## 4.1   Earthquake/tsunami event

WIAL is located within the plate boundary of the Pacific and Australian tectonic plates and is part of a region that has the highest seismicity in New Zealand. Table 7 sets out the GeoNet forecasts of the probability of a large earthquake event in the central New Zealand area.[21]

Table 7: GeoNet forecast probabilities for large earthquakes in central New Zealand

|  | Magnitude range | Chance of occurrence | |
|---|---|---|---|
|  |  | Range | Best estimate |
| Within the next year | M7.8 or greater | 0.3% to 3% | 1% |
|  | M7.0 or greater | 2% to 14% | 6% |
| Within the next decade | M7.8 or greater | 2% to 20% | 7% |
|  | M7.0 or greater | 10% to 60% | 30% |

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[19] For example, passenger numbers may grow at three per cent per annum except in years where there is a flu epidemic. A flu epidemic is expected to occur once every 50 years and in those years passenger numbers fall by 20 per cent. In this scenario the 'most likely' outcome is that demand will grow by three per cent per annum; however, the 'expected' outcome is that demand will grow by 2.54 per cent per annum. Expected passenger growth is a weighted average of passenger growth in non-epidemic years (three per cent growth in 49 out of 50 years) and epidemic years (20 per cent fall in one out of 50 years).

[20] In other words, asymmetric risks affect the calculation of expected returns of the business (say five per cent) while the WACC compensates investors for the risk that actual returns may be either zero or 10 per cent (but are expected to be five per cent).

[21] GeoNet is the result of a partnership between the Earthquake Commission (EQC), GNS Science, and Land Information New Zealand (LINZ).

WIAL's risk register assesses the likelihood of an earthquake/tsunami of sufficient scale to stop key operations for a period greater than two weeks to be 'rare', such that it is expected to occur within a 100 year period.

Consistent with the relatively small probability but very substantial impact of a large earthquake/tsunami event occurring, WIAL purchases significant first loss limit insurance to cover these events.

In our opinion, it would be appropriate to make an upward adjustment to the target rate of return – as compared with the estimated WACC - if the expected annual cost to WIAL (net of insurance coverage) of a future earthquake/tsunami event affecting WIAL could be reliably quantified. However, at this stage there are no readily available estimates of the net annual cost to WIAL of an earthquake/tsunami event.

## 4.2   Downside risk to forecast passenger numbers

Another potential source of asymmetric risk to WIAL is the possibility of an exogenous event that caused the number of passengers using WIAL to fall substantially.

We understand that WIAL's forecasts of passenger numbers over PSE4 are determined on a 'most likely' (best) basis. In other words, passenger movements have been calculated having regard to both:

- a detailed bottom-up analysis of flight schedules and load factors, which assesses exogenous growth from:
  - > new (larger) aircraft types, and
  - > anticipated opening of new routes; and
- a high level exogenous model based on historical growth, which includes parameters such as population, GDP, fuel prices, and exchange rates.

These forecasting methods do not include any allowance for unknown, one-off risk events. However, WIAL's risk register identifies and quantifies a number of potential downward passenger risks that would result in the closure of WIAL, for example a natural disaster, terrorist event or terminal damage.

WIAL's risk register indicates there is a six per cent chance that one of the above events would occur in any given year. WIAL has business interruption insurance that limits its exposure to these events to a deductable period.

In order to reflect the expected cost of these risks, we have calculated the required upward adjustment to the target rate of return, by means of the following steps:

- step one – the probability of event affecting passenger throughput occurring in any given year is assumed at six per cent;
- step two – the net cost of an event to WIAL is the loss of 1.9178 per cent of annual aeronautical revenue;[22] and
- step three – the upward adjustment to the target rate of return of 2 basis points is calculated by the following formula:

$$\Delta TRoR = \frac{P \times L \times AveRev}{AveAV}$$

where:

*ΔTRoR*          is the required uplift in the target rate of return over the WACC;

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[22] This is calculated by dividing the seven day deductable period of WIAL's business interruption insurance by the number of days in a year, ie, 365 days.

| *P* | is the probability of a downward passenger event (ie, six per cent); |
|---|---|
| *L* | is the reduction in annual aeronautical revenues not covered by insurance from a downward passenger event; |
| *AveRev* | is the average aeronautical revenue over PSE4; and |
| *AveAV* | is the average aeronautical asset value over PSE4. |

We note that the impact of negative passenger events could alternatively be addressed by WIAL by incorporating the probability of these negative events into its demand forecasts. However, where demand forecasts are calculated on a 'most likely' rather than on an 'expected' basis an upward adjustment to the overall target rate of return of 6.10 per cent is justified, having regards to events identified in WIAL's risk register.

# 5. Conclusion

Table 8 sets out our estimate of the Commission's mid-point WACC and our estimate of the mid-point WACC for WIAL.

### Table 8: The Commission's and WIAL's aeronautical mid-point WACC

| Parameter | Commission's WACC (1 April 19) | WIAL WACC (Forecast debt) |
|---|---|---|
| Risk-free rate | 1.77% | 1.77% |
| Debt premium | 1.24% | n/a |
| Leverage | 19% | 19% |
| Asset beta | 0.60 | 0.63 |
| Equity beta | 0.74 | 0.78 |
| Tax adjusted market risk premium | 7.00% | 7.00% |
| Average corporate tax rate | 28% | 28% |
| Average investor tax rate | 28% | 28% |
| Debt issuance costs | 0.20% | 0.20% |
| Cost of debt | 3.21% | 4.66% |
| Cost of equity | 6.46% | 6.72% |
| Mid-point vanilla WACC | 5.84% | 6.33% |
| **Mid-point post-tax WACC** | **5.67%** | **6.08%** |
| Commission's vanilla WACC percentile | 50% | 63% |
| **Commission's post-tax WACC percentile** | **50%** | **61%** |

Section 3 of this report outlines the two reasons why WIAL's WACC would differ from that estimated by the Commission for a benchmark airport, ie:

- WIAL's cost of debt is higher than the Commission's estimate because WIAL's expected actual cost debt over PSE4 differs from the Commission's benchmark;
- WIAL's asset beta is likely to be higher than that for the Commission's group of comparator airports.

Section 4 of this report notes that WIAL's method for estimating passenger demand over PSE4 does not explicitly take its asymmetric risks into account . We calculate that the potential impact of negative passenger events will require WIAL to target a rate of return of 6.10 per cent to have an expected post-tax WACC of 6.08 per cent over PSE4. This target rate of return falls in the 61st percentile of the Commission's vanilla WACC.

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