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Weighted Average Cost of Capital

1. Introduction

The New Zealand airports are capital intensive, high fixed cost, low variable cost businesses. The airports are entitled to earn an appropriate return on their capital, provided they are efficient in their operations and investments. This paper outlines how airport cost of capital should be determined. In so doing, it addresses Questions 51 through 64 of the *Price Control Study of Airfield Activities, Critical Issues Paper* (Commerce Commission, dated 16 March 2001) (henceforth "*Critical Issues Paper*"). The following addresses the cost of capital at a conceptual and qualitative level. In the last section I comment on the specific weighted average cost of capital ("WACC") estimates proposed by the airports. In section 8, I also address Question 48 as part of the discussion of the appropriate form of the cost of capital.

The remainder of the paper is structured as follows:

- section 2 briefly reviews the impact of separating aeronautical and other services when it comes to determining cost of capital;
- section 3 presents the appropriate WACC model for New Zealand airports;
- section 4 discusses the cost of equity capital and the measurement problems that arise in estimating this cost;
- section 5 reviews gearing;
- section 6 addresses the corporate tax rate;
- section 7 discusses the cost of debt; and
- section 8 reviews the problems involved in converting between pre- and post-tax and nominal and real measures; and
- section 9 comments on the WACC estimates of the three airports.

2. Separation of activities

In developing the basis for an estimate of airside WACC an immediate problem is the diverse activity of the airports in question. The focus of the Commission's *Critical Issues Paper* is airside activities. At a conceptual level, separation of the airside activities from other activities may be relatively easy. In practice, separation is difficult. None the less, when such separation is mandated for price setting purposes, the airside activities [as defined in the Act] are sufficiently different from the airport companies' other activities that it would be inappropriate to estimate WACC for the entire company, and then assume that the resultant WACC can serve as an appropriate proxy for the airside activities.

Airside activities are conducted by monopoly providers, with some level of regulatory oversight or intervention. It would be the case in New Zealand and most other locations that airside activities are subject to less risk than an airport's other activities. The WACC of an airport company would be some amalgamation of the WACCs of the component activities of the company. Since airside activities would normally be significantly less risky, it would be inappropriate to use the company's WACC for the airside activities.

3. The appropriate models

The WACC is the predominate method for estimating an appropriate cost of capital for businesses. There are however alternative specifications of the WACC model and some controversy over how different inputs to the model are best measured.

Although there are some alternatives[1], the consensus in New Zealand for estimating WACC is to use the model:

$$WACC = R_e * E/V + R_d * (1 - T_c) * D/V \qquad \textbf{(1)}$$

where

R_e = cost of equity capital

R_d = cost of debt capital

T_c = effective *corporate* tax rate

E = market value of equity

D = market value of debt

V = market value of the firm (D+E).

[1] See R. Bowman and A. Marsden ("Cost of Capital Under Imputation: An Analysis of Comparative Models," New Zealand Investment Analyst, 1996, pp 27-32) for a detailed comparison of different approaches.

The cost of equity capital (R_e) in equation (1) is defined using an after-tax version of the Capital Asset Pricing Model ("CAPM") formula:

$$R_e = R_f * (1 - T_i) + \beta_e * PTMRP \quad \textbf{(2)}$$

where

R_f = risk-free rate of return

T_i = effective *investor* tax rate

β_e = systematic risk parameter (equity beta)

PTMRP = post-tax market risk premium

This is the WACC model and the CAPM that have been used for a number of monopoly businesses in New Zealand. While, as noted above, there are different forms of the WACC model, the general acceptance of this model in New Zealand suggests that it is an appropriate model for New Zealand airports.

The remainder of this paper discusses definition and measurement issues related to implementing the models. The last section also discusses the transformation of a nominal, post-tax rate into a real, pre-tax rate of return.

4. Cost of equity capital

The CAPM, in the form shown above in equation (2), is an accepted model for estimating a company's cost of equity capital in New Zealand. This section deals with measurement of the parameters of the CAPM.

4.1. Risk-free rate of return

The first place the risk-free rate of return[2] enters into the determination of WACC is in the CAPM. The risk-free rate of return is taken from the returns on government bonds. A major issue is selecting the appropriate maturity of government bonds. The dominant view in commercial applications is that the rate should be set based upon current market rates, and the maturity should match the lives of the income generating assets of the company. In the case of New Zealand airports, the average life of its assets would be long. This can be seen in paragraph 81 of *Critical Issues*

[2] In addition to the explicit use of the risk-free rate of return in the CAPM, it also is involved implicitly. The post tax market risk premium (PTMRP) is determined from the premium of the market return above the risk-free rate of return. Therefore, the relationship between the maturity used to estimate the risk-free rate of return here and the maturity used in the estimate of the PTMRP is important for consistency. The risk-free rate of return is also important to the estimation of return to debt capital in the WACC model. Both parameters are discussed later in this paper.

Paper. In the case of AIAL for example, roughly forty percent of its total asset value is in land and near fifty percent is in assets with lives of up to 50 years. Two issues are relevant for consideration.

- The first issue is that, although the total life of an asset such as a building might be 30 years, its average life will be about half of that life. The reason is that the building is depreciated throughout its life.[3] Even with this adjustment, the effective life of airport assets would be well over ten years.

- A second issue is the availability of reliable market rates of interest for long-lived government bonds. The longest maturity bond that might be used with confidence would be ten years, and many practitioners would be hesitant to use maturities beyond five years.

A considerable amount of discussion has arisen in Australia and the UK over the relationship between periodic review and the maturity of the bond that best represents the risk-free rate. In some cases the maturity has been chosen by reference to the time between regulatory reviews rather than the lives of the underlying assets. However, this is moot in the case of New Zealand airports, which are not regulated using periodic review.

Accordingly, the most appropriate means of estimating the risk-free rate of return is to adopt the current market rate on the longest maturity bond that is actively traded.[4] The current interest rate environment in New Zealand features a flat yield curve, so the issue of the appropriate life to use is not currently of much importance. However, the yield curve will not always be flat.

4.2. Investor tax rate[5]

The tax rate used in the equation (2) version of the CAPM is the rate that will apply to the relevant investors in a risk-free asset.[6] The identity of the relevant investors is not known. It is conventional to assume that the 'marginal' investor(s) are subject to tax at the top statutory personal tax rate. That rate was 33% in New Zealand until 1 April 1999 when it was increased to the current rate of 39%. The statutory rate should

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3 The precise life can be calculated using the bond maturity formula and will depend on (economic) depreciation rates and interest rates. However, such precision is not needed here as all the calculations are approximations.

4 It is, in principle, possible to estimate a liquidity premium for longer maturity bonds that are less liquid. However, given the flat yield curve that is current in New Zealand, particular when considering bonds of 5 years and greater maturity, there is little benefit in doing so in this case.

5 The corporate tax rate, which appears in equation (1), is a different rate and will be discussed in section 6.

6 The tax parameters in the formulation of equation (2) are varied and complex. To get to equation (2), the simplifying assumption is made that the investor does not pay tax on capital gains.

be adopted in the case of New Zealand airports depending on the time period being evaluated.

4.3. Post-tax market risk premium (PTMRP)

The PTMRP in the CAPM formulation used in New Zealand is a forward-looking measure of the post-tax return on equity securities over the risk-free asset. The issues are difficult theoretically, even more difficult empirically, and are not discussed here. For a more detailed exposition, Bowman and Marsden[7] provide a discussion of the key issues.

The PTMRP is an expectation and is therefore not directly observable. The difficulties of estimating the PTMRP are considerable and have been discussed in many forums. I do not see any merit in replaying that debate in this submission. What is important to see is that this is an area that is unavoidably judgemental. The common approach, and one I support, is to choose a rate from within a reasonable range.

The most common estimate of PTMRP in New Zealand has been 9%. However, there is virtually no published justification for the estimate. Empirical evidence from Australia, US and UK is often referenced, but none of that evidence is based upon the dividend imputation tax system in place in New Zealand nor the CAPM model being used here. To the best of my knowledge, the post-tax version of the CAPM (i.e. equation 2) is not used in any country other than New Zealand, and hence there are no international estimates of the PTMRP.

Recently there have been a number of articles written arguing that the equity risk premium has declined over the past decade. This observation has influenced some regulatory decisions in Australia and the UK. There is also a position paper published by PricewaterhouseCoopers (NZ) where they announce that they are revising their estimate of the PTMRP down to 8% from 9% based upon their empirical research.[8] They have not made the details of their calculations public.

As the PTMRP is based upon the post-tax return on equity securities over the return on the risk-free asset, the issue of the maturity of the risk-free asset is important. From a theoretical standpoint, as already noted, the maturity should be consistently chosen in applying the CAPM. Hence, the maturity used in estimating the PTMRP should be the same as that used in computing the risk-free rate of return in all other calculations. However, given the *ad hoc* nature of PTMRP estimation in New Zealand, a strict observance of this principle is not possible.

I support the use of 8% as the PTMRP, this being consistent with the most recent examples in New Zealand.

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7 See footnote 1.

8 PricewaterhouseCoopers (NZ), "The Cost of Capital Report," March 2000.

4.4. Systematic risk or equity beta[9]

The systematic risk parameter (β or beta) of a firm is the only risk factor incorporated in the CAPM. For a publicly listed company the usual approach to estimating equity beta is to use a time-series of its market returns. There are a number of reasons why this is a problematic approach for New Zealand airports:

- not all airports are publicly listed;
- where they are listed, they have only been listed for a relatively short period, so there is inadequate data from which to derive a reliable estimate; and
- the returns on the listed entities cover all the airport's activities, not just the aeronautical activities.

4.4.1 Comparable companies

The problems of available data often arise when attempting to estimate betas. The "method of similars" is commonly used when there is not adequate market-based data for the company. A set of comparable (publicly listed) firms is identified and their equity betas calculated. After adjusting for differences in financial risk, the average beta of those firms is used as a proxy for the beta of the company in question. This approach conventionally focuses on listed firms in the same industry, often by reference to overseas firms operating in overseas markets. The usefulness of this approach is dependent upon how closely the chosen firms reflect the systematic risk characteristics of the firm at issue.

In the context of the current inquiry, the major concern is to accurately capture the systematic risk of the aeronautical activities. For example, the publicly available equity betas for UK airports cover the entire firm, including both aeronautical and non-aeronautical services. To be useful these airport betas must be adjusted in some way to yield an indicator of betas for aeronautical services only. How to make such an adjustment is not obvious. Furthermore, consideration must be given to the regulatory environment of the comparators relative to the environment of the New Zealand airports. In general, airports internationally operate under different and stricter regulatory arrangements than are in place in New Zealand.

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[9] This discussion relates to equity betas. In most presentations of WACC equity betas are 'de-geared' and presented as asset betas. An asset beta shows the systematic risk of the firm as if it were 100% equity financed. As there is no financial risk in an asset beta, it will be lower than the equivalent equity beta.

4.4.2 Other relevant influences

An alternative approach is to focus on the fundamental sources of systematic risk in the free cash flows. This requires an assessment of the systematic risk that arises from its generation of income, its cost structure and the relevant regulatory regime. The following observations are offered.

- Airports have a largely fixed cost structure. A company with high fixed costs has high operating leverage. Both theoretical and empirical evidence supports a positive relationship between operating leverage and systematic risk.

- The greater the sensitivity of a firm's cash flows to the general level of economic activity (the income elasticity of demand for its products) the greater the risk to equity investors and the higher the beta. In this regard, an important issue will be an assessment of the elasticity of demand for airside services. Issues that will need to be considered in evaluating this sensitivity will be the mix of international versus domestic and business verus leisure traffic. There is precedent for this perspective in reports on Australian airports.

Perhaps the most important issue in estimating the systematic risk of the airports is pricing structure and the regulatory environment. Pricing rules can reduce systematic risk. For example, if pricing is based upon seats flown rather than passengers flown, then this substantially shields airports from demand volatility and, accordingly, tends to reduce systematic risk.

Under the current regulatory regime, New Zealand airports have limited constraints on their monopolistic pricing. They have the legal right to set prices. If airports have pricing structures that provide them the ability to maintain a financial target even when economic conditions are fluctuating, they then have the ability to virtually eliminate risk from their financial performance in their aeronautical activities. To the extent that they are able to use their right to set prices to remove volatility in their profitability, they can mitigate systematic risk, if not eliminate it. This would result in very low asset betas, perhaps near zero.

4.4.3 The likely range

Studies for AIAL and CIAL commissioned by the airports themselves, provide some estimates of airport asset betas. Dr Alastair Marsden suggested an asset beta for AIAL of between 0.375 and 0.45. Crighton Seed & Associates Limited[10] estimated a value of 0.3 for CIAL. Both of these estimates are intended to reflect the systematic

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[10] Crighton Seed & Associates Limited, April 1998, "Weighted Average Cost of Capital for Christchurch International Airport Limited."

risk of the airside activities of the airports. However, neither of these estimates considers the pricing structure and the regulatory environment of airports.

I regard this as a serious omission that results in upwardly biased estimates of asset beta. I believe that the asset beta estimations commissioned by the airports place an absolute upper limit on the reasonable range of estimates for the aeronautical activities of New Zealand airports.

In my opinion airports in New Zealand are uniquely privileged in their ability to set prices in a manner that guarantees they will achieve their desired revenue targets. As a result, they are able to virtually eliminate profit risk should they so choose. That further implies that asset betas could be nearly as low as zero. Based on the information available from the airports' consultants and my understanding of the airports' control over pricing, I believe that a reasonable range for asset beta for the airside activities of New Zealand airports is 0.1 to 0.3.

5. Debt and equity proportions – gearing

The debt and equity proportions used in the calculation of WACC are to be measured in market values rather than book values. This is important in the case of some New Zealand airports where market and book values diverge; for example, AIAL's market value of equity is more than twice its book value.

There is a debate over whether the appropriate measure to use is: (1) the current proportions; (2) the firm's target proportions; or (3) the 'optimal' proportions for the firm.

WACC is forward-looking. Therefore, the appropriate gearing to use is a forward-looking measure. The current proportion of debt and equity is subject to transitory variability in the measure and is only of interest if it is the same as the expected gearing going forward. This would generally be the case if (and only if) the current proportion is also the target proportion.

Some have proposed using an optimal gearing for determining WACC. This requires that they estimate what is optimal for the firm. They then must justify imposing this view of optimality on the firm. I do not generally support this approach for a number of reasons.

- The process of estimating optimal debt to equity proportions is difficult and subject to many factors, some of which are informational and some of which are theoretical. Clearly the firm has all the informational advantages, and the theoretical issues are virtually all debatable, at least to some degree.

- In general, the firm has real economic incentives to get its proportions such that the value of the firm is maximised (i.e., optimal). External commentators do not have comparable economic incentives.

Each airport has to determine its target debt and equity proportions. The proportions should be those that management believes are optimal for the firm and that it intends to pursue in the future. In my opinion it would only be valid to challenge this position if either:

- the airport's understanding of the concepts and principles underlying the setting of the target was flawed;
- the company has an established history of maintaining a gearing level that is inconsistent with its stated target gearing; or
- there are other reasons to doubt the veracity of its statement as to its target.

Assuming none of these concerns applies, the correct measure to use for the *overall business* is the company's target proportions.

Three factors are crucial to my willingness to accept the firm's target gearing for purposes of estimating its WACC:

- the managers of the firm can be expected to make decisions to maximise the value of the firm;
- the firm's gearing will impact directly on its market value; and
- there are no regulatory incentives that reward suboptimal gearing.

The combination of these three requirements provides clear economic incentives to the firm to align its target gearing with the firm's optimal gearing. However, if any of the three factors are missing, the argument for accepting the firm's professed target gearing as appropriate for regulatory purposes is seriously compromised. I will discuss each of the factors below.

The first factor may not be met if the managers have incentives that are not aligned with the incentives of the firm's shareholders. For example, managers may have short time horizons, may have different risk preferences than shareholders, may have incentives to consume excessive perquisites, and may have compensation agreements that reward short term performance or are based on accounting measures (rather than economic measures).

The second of these factors is particularly important and has two implications that are relevant here. Although all firms have economic incentives to choose gearing that will maximise their value, only firms that are publicly listed will have a transparent monitor of firm value (i.e., share price). Most importantly, business units within a firm do not meet this requirement. In the case of airport companies, with a number of business units one of which is airside activities, management's stated target gearing has no implications for its value other than through its impact on the regulatory

process. Managers may be able to maximise the value of the firm (the first factor above) by misrepresenting an appropriate gearing for airside activities. In particular this will be the case to the extent that gearing impacts on WACC.[11]

Statements by the airports in respect of gearing of a subset of their activities must be evaluated in this light. Consequently, I believe it is appropriate and necessary to estimate the optimal gearing for an airport's aeronautical activities. This should be done considering the dynamics of gearing on a business with monopolistic powers. Just as control over revenues changes systematic risk for an airport, as noted above, so it will have significant implications for its optimal financial structure. An appropriate estimate of an airport's optimal gearing will require knowledge of its pricing scheme. This will need to be evaluated on a case-by-case basis.

6. Corporate tax rate

The corporate tax rate is another forward-looking measure. It should reflect the effective tax rate that the company expects to face with respect to its future cash flows. When there is no anticipated change in the tax rate, the choice of an appropriate corporate tax rate is between using the statutory tax rate, currently 33%, or an estimate of the corporation's average tax rate (which may be the statutory tax rate).

The average tax rate has been measured in a variety of ways, but most commonly it is considered to be the average tax rate on book income for the firm. Thus, a firm that has substantial tax shelters, typically as a result of differences between accounting depreciation and tax depreciation,[12] may have an average tax rate that is less than the statutory tax rate.

In my opinion, the appropriate rate to use is the statutory rate. The extent to which a company can reduce its tax through the use of tax shields should be reflected in cash flows. It should not impact upon the required rate of return in competitive markets. Whatever tax advantages a firm might possess would be priced out in a competitive market. The tax advantages will not change the cost of capital. Therefore, the company's WACC should be based upon the statutory tax rate.

The estimation of the appropriate corporate tax rate is potentially complicated for airports in New Zealand by the treatment of asset revaluations. A review of the statements of financial performance of the three major airports is interesting. AIAL and CIAL have average tax rates that approximate the statutory rate of 33%. However, WIAL has an effective tax rate of about zero over the past two years. The

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[11] I take note that in the context of the models used in estimating WACC in New Zealand, the WACC is not particularly sensitive to changes in the proportions of debt and equity.

[12] This commonly results from adopting straight-line depreciation for the company's books but using accelerated depreciation methods for tax purposes. Book-tax differences in asset values can also cause significant departures of the effective tax rate from the statutory tax rate.

footnote on taxation indicates that this is attributable to "Tax effect of permanent differences." The nature of these permanent differences is not disclosed in its financial statements or footnotes. It is likely that this peculiar taxation amount is related to the airport's revaluations, but I cannot be sure. It would be appropriate for WIAL to provide an explanation of its taxation accounting and reporting.

In my opinion, the statutory tax rate should be used as the corporate tax rate in the WACC formula (equation 1). However, this view is subject to gaining an understanding of the treatment of taxation by WIAL.

7. Cost of debt capital

The cost of debt capital is the current market rate of interest on debt at the appropriate maturity. New Zealand airport debt is not actively traded so a direct estimate of the market rate of interest is not available. The standard alternative, which I support, is to decompose the rate into the risk-free rate plus a debt risk premium. The risk-free rate used for this purpose should be the same rate as used in estimating the cost of equity capital, with the same maturity.

A company will typically want to have similar maturities for its debt and its assets. New Zealand airports have predominately long-lived assets and would be expected to have similarly long-lived debt. In fact, they have only minor amounts of short-term debt, but their long-term debt is relatively short lived. On balance the maturities of the airports are relatively short and significantly shorter than the lives of their assets. It is not clear from the information available to me why they would choose relatively short maturity debt profiles.

Determining the appropriate maturity for the debt of an airport requires consideration of circumstances very similar to those discussed above in section 5 on optimal gearing. The firm has clear economic incentives to optimally structure its debt maturities, and I would expect it to do so. Presumably the airports believe their debt maturity structures are appropriate. I assume that the current debt maturity structures are expected to continue in the future.

Therefore, the maturity of the risk-free rate should approximately match the average maturity of the debt that the airports have in place.

The appropriate debt risk premium will have to be estimated. In many ways, the procedure is similar to the approach used to estimate equity beta. Reference is made to similar companies, credit reference company ratings and the views of financial analysts. Primarily, the debt risk premium will be impacted by the risk of default. To the extent that the company can insulate itself from unanticipated swings in the economy, it will reduce the risk of default. In my opinion, the airports have sufficient ability to control the earnings of their airside activities to virtually eliminate any risk of default. From this perspective, it would seem that the debt risk premium for the three large New Zealand airports should be small, largely reflecting transactions costs.

8. Nominal rates of return versus real rates of return

The choice between setting rates of return in nominal or real terms has one over-riding consideration: to match the form of the rate of return with the measurement of the asset base to which the rate of return will be applied. The decision is straightforward. If the asset base valuation is on an historic cost basis, without adjustment for price level changes, the appropriate rate of return is nominal. The use of a nominal rate provides the regulated firm compensation for the impact of inflation on the return.

If a valuation method is used which incorporates the impact of inflation, the rate of return should be on a real basis. The changes in the valuation of the asset base will include the effect of inflation. If the rate of return were on a nominal basis, the firm would be rewarded for inflation twice. Valuation methods which incorporate the impact of inflation include Replacement Cost, Optimised Depreciated Replacement Cost (ODRC), Optimised Deprival Value (ODV) and Price Level Adjusted (Indexed) Historic Cost.

8.1. Treatment of the adjustment arising from revaluation

If a valuation method other than historic cost is used, the periodic adjustment to the asset value should be included as a component of income, in the same period, in evaluating the firm's return on investment. This addresses Question 48 in *Critical Issues Paper*. There are two ways to explain the intuition for requiring that changes in the value of assets should be included in income.

The revaluation of assets can be viewed as adjustments to accounting depreciation. The sum of accounting depreciation and the revaluation adjustment should equal economic depreciation. So the revaluation amount is merely a correction to a provisional depreciation amount. Just as depreciation is appropriately included in determining income, so is the revaluation adjustment. I note that in principle the revaluation adjustment can be an increase or a decrease. However, in the case of the three major New Zealand airports, the adjustments are all increases and quite substantial.

Alternatively, the analogy of an investment in shares can be used. An investor receives income in the form of dividends and changes in the value of the investment. The changes in value are sometimes referred to as holding gains or losses.[13] To evaluate the return to the investor, both forms of income must be included. Revaluation gains or losses to airports are equivalent to changes in share value to an investor.

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[13] Tax laws are such that these gains are only subject to taxation when realised. However, to determine economic return unrealised gains must be included.

If an airport revalues its assets, the adjustment to the asset value should be included in its income in the period of the revaluation in evaluating the firm's return on investment.

8.2. Conversion of WACC from a nominal rate to a real rate

The transformation of a nominal rate of return to a real rate of return is straightforward and is accomplished by using the Fisher equation:

$$(1 + R_n) = (1 + R_r) * (1 + i)$$

where R_n is the nominal rate of interest, R_r is the real rate of interest and i is the inflation rate.

8.3. Conversions of WACC from nominal, post-tax to real, pre-tax

The (double) transformation of a nominal, post-tax rate to a real, pre-tax rate is not straightforward.[14] The transformation has often been done by making a Fisher equation adjustment for nominal to real and then grossing up for tax.[15]

This approach is not generally appropriate. There are often tax timing issues, particularly with depreciation, that make this process complex. The issue has been investigated in some depth in recent regulatory decisions in Australia. The results of those investigations are that the appropriate approach to the transformation is to model the cash flows of the business under the different conditions. The results also indicate that the difference between the modelling approach and the simple approach can be substantial. In general, the modelling approach will result in a lower WACC than under the simple approach.

AIAL has adopted this simple procedure even though its financial advisor, Dr Marsden, recommended against it. Dr Marsden recommended that AIAL use the modelling approach described here.

In my opinion the modelling approach is the correct way to make the transformation from a nominal, post-tax rate to a real, pre-tax rate. A study of the transformation should be done before a final estimate of the real, pre-tax WACC is determined.

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[14] The CAPM is a nominal, post-tax model, and it is by no means obvious that it is applicable to pre-tax real returns, even under the adjustments discussed herein.

[15] The conversion can be done in the reverse sequence. It can be shown that the difference between the two approaches is a function of the corporate tax rate and expected inflation. If inflation is positive, the approach described above of adjusting for inflation and then for taxes will always give a higher resulting WACC than using the reverse sequence.

9. Estimates of WACC

In the sections above I have discussed the models recommended for estimating the appropriate rate of return for the three major airports and the measurement of the parameters of those models. For some parameters I was able to form an opinion on the appropriate parameter value. In other cases I did not feel I had sufficient information to reach a conclusion on a parameter value. In these cases, I tried to indicate my opinions in as much detail as possible.

In this section I pull together my views to estimate a WACC for a major airport in New Zealand.[16] With the information currently available to me, I have do not have sufficient information to differentiate among the three. I present my estimate with the WACCs proposed by the three airports at the time consultation took place. There is one serious problem in making comparisons such as this – they are made at different points in time. The parameter that is particularly impacted by being measured at different times is the risk-free rate of interest. Notice that all four calculations use different risk-free rates.

In my opinion, a post-tax, nominal WACC of 5.74% is appropriate for the three airports.

It should be remembered that this is a calculation of a post-tax, nominal rate of return. It may seem curious that the cost of equity is only marginally higher than the risk-free rate and that the WACC is actually lower than the risk-free rate. In addition to my choice of parameters, this is attributable to the fact that this is a post-tax rate and to the models used in New Zealand, in particular equation (2). For example, the post-tax return on the risk-free asset is the pre-investor rate (currently 6.2%) net of investor tax (39%), which is only 3.78%. My provisional opinion is that the post-tax, nominal return required for the airports is about two percent greater than the net of tax return to the risk-free asset.

Parameter	AIAL	CIAL	WIAL	My Estimate
Risk free rate	6.97%	6.7%	7.3%	6.3%
Investor tax rate				39%
Asset beta	0.40	0.65	0.45–0.60	0.2
Post tax market risk premium	9%	9.0%	9.0%	8.0%
Cost of equity	10.67%	13.47		7.0%
Debt premium	1.0%	0.8%	1.5%	0.5%
Cost of debt	8%	7.5%	8.8%	6.8%

[16] There are a few areas where additional information might cause me to change the parameter estimate for a given airport. For all airports, I could use more information on target gearing levels, maturity structures and debt premiums. Information on WIAL's effective tax rate might be useful.

Corporate tax rate	33%	33%	33%	33%
Debt proportion				50%
WACC – post-tax, nominal	8.55%	10.10%	9.5%–11.5%	5.8%

Robert G Bowman

26 April 2001

Date