

CIAL's Weighted Average Cost of Capital:

Response to Submission on Risk-free Rate

Report to BARNZ

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Futures Consultants Limited

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Authorship

This report has been prepared by Brent Layton.

Futures Consultants Ltd
183 South Karori Road
Karori
P O Box 17-359
Wellington 6147
Tel: +64 4 476 9041
Fax: +64 4 476 9042
Mobile: +64 21 384 147
e-mail: brent.layton@xtra.co.nz

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1. Introduction

On 22 March 2013 Christchurch International Airport Limited (CIAL) provided the Commerce Commission (Commission) with its submission on the Commission's Section 56G process and issues paper. The Board of Airline Representatives in New Zealand (BARNZ) has asked me to comment on one of CIAL's claims in relation to its weighted average cost of capital (WACC). Specifically, that in the current circumstances of historically low yields on Government debt, the Commission's use of the current government stock rate as the proxy for the risk free rate when using the Capital Assets Pricing Model (CAPM) will result in significant understatement of the true cost of equity and WACC for CIAL.

I produced for BARNZ two reports which dealt with this matter, among others, during CIAL's consultation with its major customers over prices in 2012.¹ This paper draws on these earlier reports but also refers to some very recently published empirical evidence which tests over a long time period and a wide range of economies the core argument of CIAL in this context and shows it to be not supported by the evidence.

2. The risk free rate

2.1 PwC Australia's arguments

The clearest and most comprehensive statement of why CIAL used a risk free rate of 6.00% when calculating the cost of equity during its recent price setting event (PSE2) is set out in a letter to CIAL dated 22 March 2013 from Jeff Balchin of PwC Australia. The 6.00% figure used was roughly double the current rate for government stock appropriate under the Commission's input methodologies for information disclosure.

The key elements of PwC Australia's arguments are:²

- “the use of the current spot government interest rates as the risk free rate (in our March 2012 averaging period as well as currently) in a conventional application of the Capital Asset Pricing Model will lead to a material understatement of the cost of equity, and a risk free rate drawn from “normal market” conditions will result in a materially better estimate of the cost of equity”;
- “there is considerable support in the theoretical and empirical finance literature for the proposition that the cost of equity does not move one-for-one with government interest rates”;
- “there is also considerable regulatory precedent in the UK and US for ignoring transitory movements in government interest rates when estimating costs of equity for regulatory purposes”.

¹ Futures Consultants Ltd, *CIAL's Weighted Average Cost of Capital: Comparison with the Commerce Commission's Information Disclosure Requirements*, 11 May 2012. (Hereinafter “Comparison”) and Futures Consultants Ltd, *CIAL's Weighted Average Cost of Capital: Update*, 6 September 2012. (Hereinafter “Update”).

² Letter from Jeff Balchin, PwC Australia to Neil Cochrane, CIAL, 22 March 2013, p. 3.

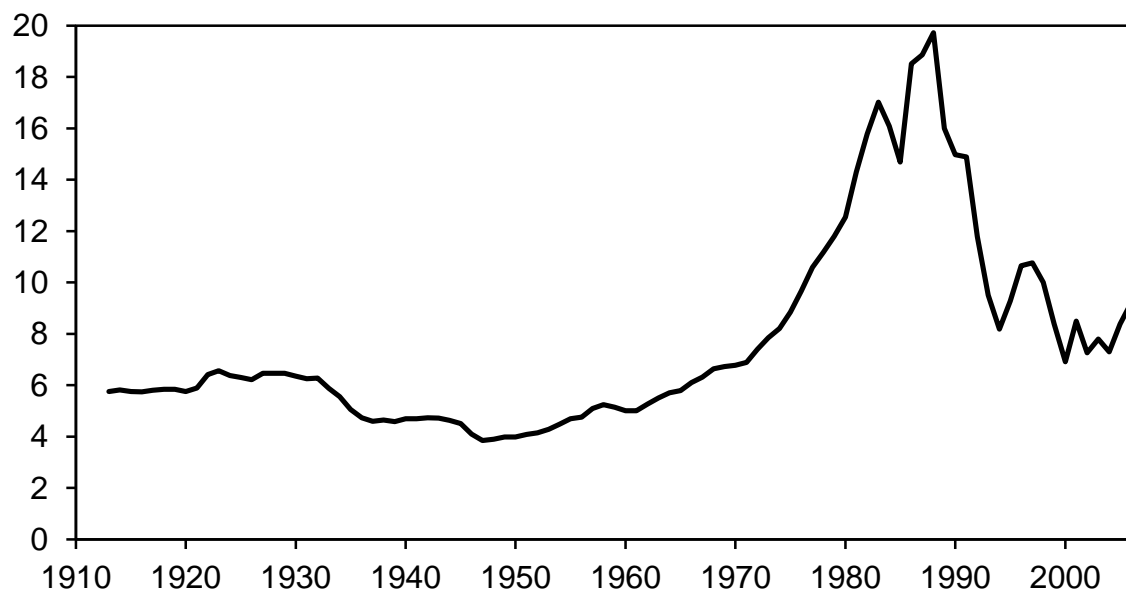
PwC Australia sometimes couch their advice in terms of the need, when calculating CIAL's cost of equity, to use a higher rate than the current government stock interest rate and sometime in terms of using a higher Market Risk Premium (MRP). Mathematically the effect is the same; to raise the cost of debt and WACC above what it would otherwise be. I follow PwC Australia by discussing both these options.

2.2 Are conditions abnormal?

PwC Australia's first and third points are based on essentially the same assertion; that the current government stock interest rates are the result of abnormal market conditions and transitory movements and so should be ignored. I agree that it would be wrong to use the current spot rate if the government stock market was clearly in disequilibrium as a result of, for example, some unexpected shock. This is clearly not the case at present, however.

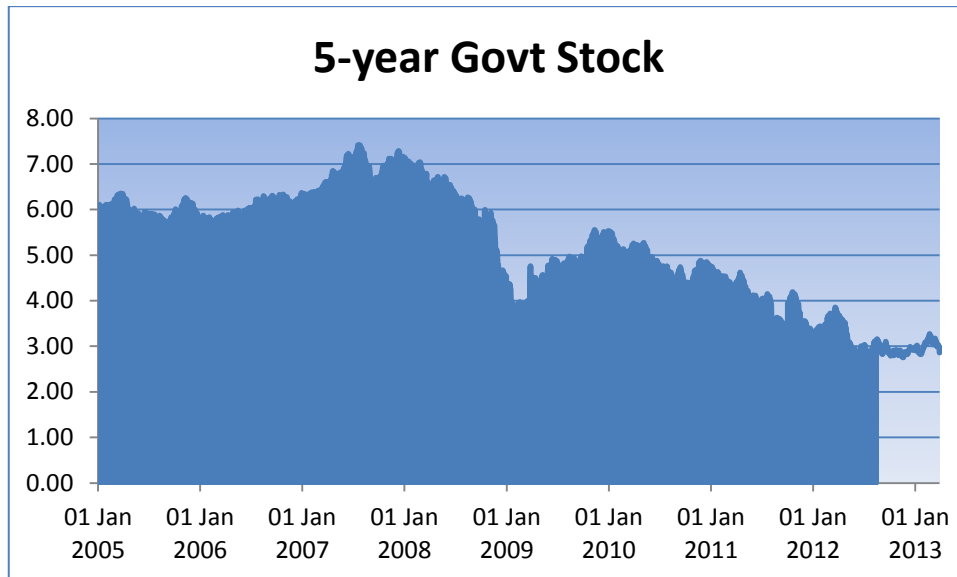
Government stock interest rates are currently lower than they have been for some considerable number of years, but they have been trending downwards for several years in an orderly manner and there is nothing to suggest the market is in a state of disequilibrium or undergoing "transitory movements".

The only published long-term interest series for New Zealand relates to house mortgages. It covers the period from 1913 until 2007.³ The data are reproduced in the following graph. House mortgage rates are typically higher than government stock rates. The clear implication is that in a long term context current interest rates are not abnormally low; on the contrary, rates have for the last 20-30 years until recently been abnormally high. Prior to the 1970s, inflation was much lower than it was from the 1970s until the early 1990s and was at levels similar to the current inflation rate.



³ NZIER, *Looking at the Numbers* available at <http://nzier.org.nz/publications/looking-at-the-numbers>.

The following graph of New Zealand five year government stock rates over the last 10 years does not reflect the gyrations one would expect if the market was out of equilibrium.



2.3 Cost of equity and the risk-free rate

The second point – that the cost of equity and the risk free rate are not necessarily perfectly linked with a 1% point increase in one leading to the same increase in the other – is implicit in the formula of the cost of equity. The requirement for the two variables to move one-for-one is for the corporate tax rate to be zero. This is not the case in the New Zealand economy. In short, the statement of this mathematical tautology by PwC Australia provides no justification at all for CIAL not using the current government stock rate for the risk free rate for the cost of equity.

Apart from this point, the theoretical argument that PwC Australia seem to have in mind is that there is an inconsistency in calculating the cost of equity using a market risk premium (MRP) derived from long term historical average government stock rates with a risk free rate term that reflects a short term average of current government stock rates.⁴

There is, however, no inconsistency. “The market risk premium (MRP) represents the additional return, over and above the risk-free rate, that investors look for to compensate them for the risk of holding ... the market portfolio which is the average risk portfolio.”⁵ It is a forward looking concept which cannot be directly observed. There are, however, a number of approaches to estimate it, and its associated tax

⁴ See Letter from Jeff Balchin, PwC Australia to Neil Cochrane, CIAL, 22 March 2013, pp. 8-10.

⁵ Commerce Commission, *Input Methodologies (Airport Services); Reasons Paper*, December 2010, p.125. (Hereinafter, Reasons Paper).

adjusted market risk premium (TAMRP), which is more commonly used in calculating the cost of equity in New Zealand. These approaches include:⁶

- studies of historic returns on shares relative to the risk-free rate;
- surveys of investors that ask them to state their expected rate of return for the overall market; and
- empirical estimates of the MRP from share prices and expected dividends

In other words, the calculation of the MRP and TAMRP using long term historical average government stock rates is one method of estimating what should be a forward looking parameter and not an indicator that the concept is backward looking.

On the other hand, the current government stock rate for the term of the regulatory period for which prices are being set is included directly in the formula for calculating the cost of equity because it represents the pre-tax opportunity cost to the investor of currently taking on the risks associated with owning equity. The opportunity cost is the current cost. It must be measured in terms of current interest forgone, not some historic average of past interest rates. It is also forward looking.

The use of long term historical average government stock rates to estimate the MRP and TAMRP is not inconsistent with using the current government stock rate of the term of the regulatory price setting period in the formula for the cost of equity. PwC Australia have confused the conceptual nature of the MRP and TAMRP parameters, which are forward looking, with a backward looking approach being commonly used to estimate them because they are not directly observable.

2.4 Long term evidence of New Zealand's MRP

The Commission arrived at its TAMRP estimate of 7.0% for information disclosure purposes from a careful consideration of a number of estimates of MRP derived by a variety of methods. If, as PwC Australia seems to assume, it had placed sole reliance on the estimates derived from long term historical relationships between the returns on equity and government stock it could have arrived at a much lower estimate.

In fact, a very recent study by Dimson, Marsh and Staunton from the London Business School, using data for the period 1900-2012, puts the annualised historical equity risk premia for New Zealand at 3.7% compared with bonds (ie government stock) and 4.2% compared with bills.⁷ These convert to TAMRP of 4.6% (against bonds) and 5.1% (against bills) using the current five-year government stock rate of 3.1%. According to this study, the premia for New Zealand are slightly above the average for the 20 developed economies for which data are available. The premia for Australia are the highest among the 20 countries and approximately 2.0% points above the premia for New Zealand.⁸

⁶ Ibid, p.126.

⁷ Dimson, L., P. Marsh and M. Staunton, "The Low-Return World", in *Credit Suisse Global Investment Returns Yearbook 2013*, p. 8. (Hereinafter, Dimson et al). Available at: http://www.investmenteurope.net/digital_assets/6305/2013_yearbook_final_web.pdf

⁸ Loc. cit.

2.5 Empirical evidence on rates and equity premia

The empirical evidence that PwC Australia has in mind to support the proposition that when government stock rates fall the cost of equity does not also fall appears to be:

- a 2001 finding by Lettau and Ludvigson that “equity risk premiums tended to move in the opposite direction to the de-trended government bond rate”;⁹ and
- AMP Capital Investors’ finding that since 1993 in Australia “there has existed a strong negative correlation between the market risk premium and the risk free rate”.¹⁰

CIAL in its submission also refers to research by Damodaran on the implied forward looking risk premium in the United States over the period 1960-2011 calculated using a simplified constant dividend growth model for valuing equity.¹¹ CIAL also attempts to apply the same approach to the share price of Auckland International Airport Limited (AIAL) to conclude that its MRP fell until about 2007/08, followed by a rise to pre-crisis level.¹²

All of these studies suffer from being narrow in geographic or time period coverage. In the case of the Damodaran-type studies, they are also critically dependent upon the validity of the underlying assumptions, such as, shares are expected to display constant dividend growth. Such an assumption is very unlikely to be strictly true, particularly during periods of turmoil and disruption in equity markets and economies.

Dimson, Marsh and Staunton in their recently published study of 20 countries over the 113-years from 1900 to 2012 have also addressed the issue of whether current risks justify higher equity premiums on a longer term and more international basis. They conclude:

It is hard to find either historical or current market support for this view. Firstly, the empirical evidence over 113 years indicates that, when markets are turbulent, volatility tends to revert rapidly to the mean, so that we should expect any period of extreme volatility to be relatively brief, elevating the expected equity premium only over the short run. Second, at the time of writing [2012], volatility is in any case below the long-run average.

...we identify 11 major spikes in the VIX [volatility index], each associated with an economic or political crisis. ... the longest reversion time [time for the VIX to return from its peak to its long run average value] was during the credit crunch/Lehman crisis, when it took 232 trading days (11 months). The average time was 106 trading days, or just under five months. ... the half-life, or time taken to revert half way back to the mean ...was just 11 days.¹³

⁹ Ibid, p.8.

¹⁰ Loc.cit.

¹¹ CIAL, *Commerce Commission Section 56G Review: Process and Issues Paper*, March 2013, pp. 17-8.

¹² CIAL, op cit., p.19.

¹³ Dimson et al, p.12.

Dimson, Marsh and Staunton also note that the equity risk premium will also vary over time with investors' risk aversion. They note that after sharp market declines, investors are poorer and more risk averse and the long term evidence supports the view equity risk premia rise temporarily in such circumstances "albeit less strongly than many have argued."¹⁴ They go on to note, however, that currently share markets are rising. They are currently at historically high levels. The S&P 500 and Dow Jones are both record highs and the NZX 50 gross index is at its highest level for twenty-five years. Risk premia for equities should be currently very low, not abnormally high as PwC Australia claim.

The regulatory precedents in the UK and US for ignoring transitory movements in government interest rates when estimating costs of equity that PwC Australia identifies are, of course, no better than the evidence upon which they are based. I have already shown the evidence is weak when applied to CIAL adopting a higher risk free rate when calculating the cost of equity for PSE2.

2.6 Arbitrage and the equity premia

PwC Australia's view is that either the market risk premium should be raised or the risk-free rate used in the calculation of the cost of equity should be increased materially above the current government stock rate. A corollary is that when interest rates on essentially riskless assets, like New Zealand government stock, are low, investors require a larger absolute return over the returns available to them on these riskless assets to hold a market portfolio. I cannot think of any logic that would explain why and how investors would be able to achieve this outcome, and PwC Australia have not attempted to provide one.

In fact, the notion that opportunity cost is an important determinant of returns when alternatives are being considered suggests the PwC Australia proposal is fundamentally flawed. To understand why, consider an investment that is very close to providing the same returns as the risk free asset, government stock. An asset with an asset beta of, say, 0.01, would be such an asset. Assume further that the current government stock rate is 3.00% and the corporate tax rate is 28% and the tax adjusted market risk premium (TAMRP) is 7.0%. For simplicity, assume leverage is 0%. The post-tax cost of equity on the "near-bond" is 2.23% using the standard approach for calculating WACC and using 3.00% pre-tax as the risk free rate. This is marginally above the post-tax return on government stock of 2.16%. Using PwC Australia's approach, however, and setting the risk free rate at its arbitrary 6.00%, the return on the near-bond with the asset beta of 0.01 would be 4.39%, or over twice the 2.16% on the bond to which it is very similar in terms of risk.

Clearly risk-arbitrage would not allow such a situation to continue for long; investors would seek to sell the "bond" and buy the "near bond" and double their return. The result would be to push up interest rates on "bonds" and push down interest rates on "near bonds" until they were nearly equal. One could apply the same argument to an equity that is close to the near bond with, say, a 0.02 asset beta, and so on. The obvious implication is that PwC Australia's proposition is inconsistent with the

¹⁴ Dimson et al, pp.12-3.

operation of a financial market in which investors seek to maximise their returns.
PwC Australia's argument is clearly fundamentally flawed.