

Input Methodologies (Transpower) Supplementary Reasons Paper for Leverage in Cost of Capital

The Commission:

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The reasons for setting leverage to reflect that of comparator companies

Purpose and application

- 1.1.1 This document provides our reasons for setting leverage in the Cost of Capital Input Methodology (IM) for Transpower at 44%, which is the same as the average leverage observed for a sample of comparator companies. It operates in addition to chapter 6 of the Transpower reasons paper.¹ The reasons in the EDB / GPB reasons paper are still relevant to Transpower's cost of capital IM except for sections 6.6, H3 and H9, which are replaced by the contents of this paper.²
- 1.1.2 The new Cost of Capital IM for Transpower, which reflects our final decision on leverage, is located on our website.³ In all material respects it is the same as the version published in November 2011 (which incorporated corrections in the original version).

Background

- 1.1.3 In 2010 we determined a Cost of Capital IM for Transpower (and for other services regulated under Part 4 of the Commerce Act). The reasons for our decisions were set out in our reasons papers.⁴
- 1.1.4 To set the value of the asset beta and leverage in the Cost of Capital IM for Transpower, we used estimates derived from analysis of a set of international comparators. The same beta and leverage estimates were also used in the Cost of Capital IMs for electricity distribution businesses (EDBs) and gas pipeline businesses (GPBs).
- 1.1.5 Transpower successfully challenged the process for determining the leverage parameter of the Cost of Capital IM in the High Court on the basis that Transpower had not been properly consulted on the approach to leverage. The Court ordered us to consult further on leverage for the Transpower Cost of Capital IM.⁵
- 1.1.6 On 15 March 2012 we invited further submissions from interested parties on our approach to leverage in the Cost of Capital IM for Transpower.⁶ Submissions were received from Transpower, MEUG and the NZ Airports Association. Cross-submissions were then invited. MEUG and Transpower cross-submitted.⁷

¹ Commerce Commission, *Input Methodologies (Transpower) Reasons Paper*, 22 December 2010 (the Transpower Reasons Paper). Terms defined in that paper have the same definition in this paper.

² Commerce Commission, *Input Methodologies (Electricity Distribution and Gas Pipeline Services) Reasons Paper*, 22 December 2010 (the EDB / GPB Reasons Paper). Terms defined in that paper have the same definition in this paper.

³ Commerce Commission, *Transpower Input Methodologies Determination [2012] NZCC 17*, 29 June 2012. <http://www.comcom.govt.nz/transpower-input-methodologies>

⁴ Commerce Commission, *Input Methodologies (Transpower) Reasons Paper*, 22 December 2010.
Commerce Commission, *Input Methodologies (Electricity Distribution and Gas Pipeline Services) Reasons Paper*, 22 December 2010.

⁵ Wellington International Airport Ltd v Commerce Commission HC Wellington CIV-2011-485-1031, 22 December 2011.

⁶ Commerce Commission, *The leverage assumption in the cost of capital input methodology for Transpower, Consultation on draft decision*, 15 March 2012.

⁷ Copies of submissions are on our website at <http://www.comcom.govt.nz/transpower-input-methodologies>.

Summary

- 1.1.7 In April 2012 Transpower submitted that because its forecast leverage was above that of the comparator firms, leverage in the Cost of Capital IM should use:
- Transpower's average forward looking actual leverage for the value of leverage without further adjustments to the Cost of Capital IM; or
 - Transpower's average forward looking actual leverage for the regulatory period for the value of leverage together with a non-zero debt beta; or
 - a notional leverage for the value of leverage that is a weighted average of Transpower's average forward looking actual leverage for the regulatory period and the average leverage of the comparator firms sample used to derive the asset beta estimate.⁸
- 1.1.8 For the reasons set out more fully below, we do not agree with Transpower's submissions.
- 1.1.9 When we and other analysts use the simplified Brennan-Lally CAPM to estimate the cost of equity, the resulting estimate of the weighted average cost of capital (WACC) increases as leverage increases. Like most other commentators, we consider this to be an anomaly attributable to shortcomings in the simplified Brennan-Lally CAPM (the leverage anomaly).⁹
- 1.1.10 The positive relationship between leverage and WACC under the simplified Brennan-Lally CAPM, which is peculiar to that CAPM model, does not in our view adequately depict the relationship between leverage and actual WACC in New Zealand. If it did, New Zealand firms would prefer to have no leverage since this would minimise their cost of capital, and maximise their value.
- 1.1.11 The fact that many New Zealand firms (including Transpower) do have leverage, and are willing to increase their leverage (as Transpower is doing), strongly implies such firms consider that increasing leverage does not in fact increase their actual cost of capital (so long as leverage remains within prudent levels).¹⁰
- 1.1.12 Due to the anomaly in the simplified Brennan-Lally CAPM we do not favour the use of a supplier's actual leverage in estimating its cost of capital. This is because we do not consider that variations in a supplier's actual leverage (within prudent levels) do in practice alter its actual cost of capital. Nor should it alter the regulatory cost of capital. Further, the use of actual leverage is inconsistent with how we have estimated the value of other parameters in the cost of capital (especially asset beta),

⁸ Transpower, *Submission on Leverage Value in the Cost of Capital Input Methodology for Transpower*, 5 April 2012, at paragraph 5.

⁹ Note that in countries without dividend imputation, debt has a tax advantage, and WACC is considered to fall with increasing leverage. However, as our dividend imputation tax credit regime largely removes the tax advantages of debt, there is no reasons for most New Zealand companies to prefer debt funding over equity funding.

¹⁰ Alternatively, there may be other benefits from leverage, such as those identified in paragraph A1.6. that offset any increase in the cost of capital. A shareholder may prefer greater dividends in the short term, which can be financed by greater leverage.

and this may bias the resulting estimate of WACC (unless a debt beta is incorporated).

- 1.1.13 Additionally, we remain concerned that if we were to use Transpower's actual or forecast leverage this could create a perverse incentive on Transpower to, in future, increase its leverage in order to secure a higher regulatory cost of capital.¹¹ Since the WACC is generally considered to be largely invariant to leverage, an incentive to increase leverage would be perverse. Moreover, we would not want our Cost of Capital IM to incentivise any regulated supplier to increase leverage, particularly since doing so at some point increases the risk of the supplier suffering financial distress, which is not to the long term benefit of consumers.
- 1.1.14 Reflecting the expectations of its shareholder, Transpower prefers a relatively high level of leverage. That is its choice. However, even if (contrary to our conclusion above) increases in leverage do increase actual cost of capital, we do not think that in a regulatory context that cost should be borne by consumers. Consumers should not pay higher or lower prices because Transpower alters its capital funding mix. Such an outcome would be inconsistent with outcomes in workably competitive markets. Any cost from increasing Transpower's leverage above the notional level derived from the analysis of comparable companies, should be borne by the shareholder, who benefits from higher dividends resulting from higher leverage.¹² Similarly, if decreases in leverage do reduce Transpower's actual cost of capital, that benefit should be enjoyed by the shareholder.
- 1.1.15 We do not believe that our concerns with using Transpower's actual leverage can be overcome by using by using a debt beta of 0.1 when calculating WACC in conjunction with Transpower's forecast leverage, as PwC (for Transpower) submitted. Consistent with advice received from Dr Lally, we do not consider PwC's estimate of debt beta is sufficiently robust to be relied upon.¹³
- 1.1.16 We note that MEUG submitted that leverage should be set at zero. For the same reasons as we outlined in our 2010 reasons papers¹⁴ and in this paper, we do not support this view.
- 1.1.17 We accept MEUG's submission that the asset beta and leverage should be set consistently with the comparator companies used to estimate asset beta. We do not consider that this requires us to change our estimate of leverage, as the asset beta of 0.34 and leverage of 44% reflects, in our judgment, the best estimate of asset beta and leverage for the comparator companies.
- 1.1.18 In summary, we prefer that leverage and the cost of capital be set by notional leverage determined by reference to the average leverage of our sample of comparable companies, rather than Transpower's forecast leverage (or zero leverage). This will:

¹¹ Transpower, through a letter from its CEO, advises it is not doing this. Transpower, *Response to Lally Allegation Regarding Motives for Transpower's Capital Structure Decisions*, letter from Patrick Strange, 12 June 2012.

¹² In Transpower's case, its plan to increase leverage will be facilitated through the payment of higher dividends to its shareholder in the short term.

¹³ Lally, M., *Leverage and WACC for Transpower*, 18 June 2012

¹⁴ EDB / GPB Reasons Paper, at paragraphs H3.22-H3.28.

- ensure estimates of the regulatory cost of capital do not vary with leverage, as we do not consider that the actual cost of capital does in fact increase with leverage (so long as leverage is at prudent levels)
- ensure consistency with how we have set other parameters in the Cost of Capital IM, especially asset beta
- ensure consumers do not face changes in prices resulting from changes in a regulated supplier's capital structure, as consumers of goods and services traded in workably competitive markets also do not face changed prices from such changes by an individual supplier, and
- ensure the IM does not create an incentive for a regulated supplier to increase its leverage.

Comparator companies – no change

1.1.19 Some parties at the High Court judicial review hearing in October 2011 contended that they had been given insufficient opportunity to review the composition of the set of comparator companies used to set leverage. However, the submissions we received in April 2012 did not challenge the appropriateness of our comparators, (although MEUG considered that more weight should be given to National Grid, one of the comparators, in setting both asset beta and leverage for Transpower). We do not believe there is any basis in the submissions upon which to revise our set of comparator companies or our discussion of how that set was defined.¹⁵

Structure of this paper

- 1.1.20 This paper outlines our reasons for our decision on leverage. All other aspects of our cost of Capital IM for Transpower remain as set out in the 2010 reasons papers for Transpower and EDB and GPBs.
- 1.1.21 Much of the content in the balance of this paper has been derived from the EDB/GPB Reasons Paper, while having regard to submissions received during consultation in 2012. The next section, Chapter 2 outlines the issues and our approach to leverage at a high level. It is based on section 6.6 from the EDB/GPB Reasons Paper. There are two attachments. Attachment A1 discusses leverage in greater detail and is based on Appendix H3 from the EDB/GPB Reasons Paper. Attachment A2 discusses debt beta in further detail because of its relevance as a potential way of addressing the leverage anomaly. Attachment A2 is based on Attachment H9 of the EDB/GPB Reasons Paper.
- 1.1.22 Given that our decision, having considered all submissions and cross-submissions, has been to not change our 2010 decision, the main amendments and additions to the content of the EDB / GPB reasons paper are as follows:
- Additional reasons are added to respond to the points raised in submissions from Transpower and MEUG during consultation on leverage in 2012 (see paragraphs 1.2.15 to 1.2.53)

¹⁵ The discussion of the comparator companies and how they were selected was included in the asset beta section of our 2010 EDB/GPB Reasons Paper, see Appendix H8 especially paragraphs 8.37-8.45.

- Additional content is added discussing the views from a range of submitters during the entire consultation process on how the leverage anomaly should be addressed (see paragraphs A1.38 to A1.40 and A1.43 to A1.49).
- Additional reasons are added on PwC's submission that a debt beta of 0.1 could be used in the Transpower Cost if Capital IM (see paragraphs A2.24 to A2.31).

1.2 Leverage

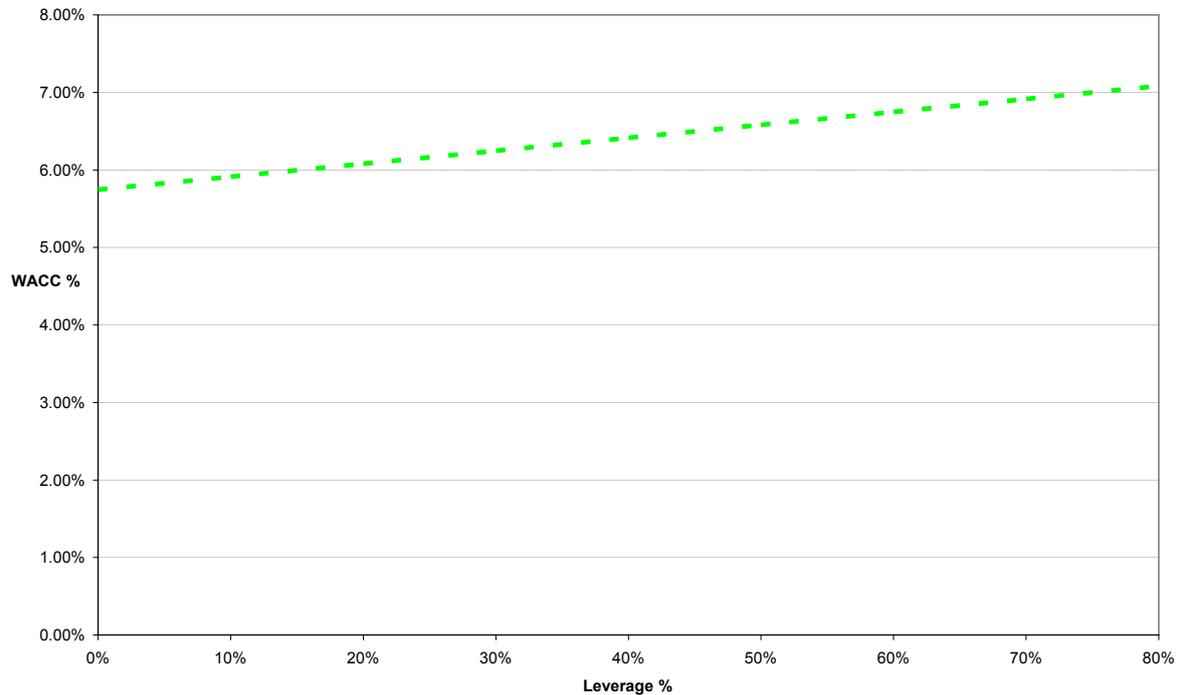
- 1.2.1 Leverage refers to the mix of debt and equity capital that is used to fund an investment. Leverage is used in two places in estimating the cost of capital. One use is to re-lever the asset beta into an equity beta (and vice versa). The second use is to derive a weighted average cost of capital (WACC) from the estimates of the cost of debt and the cost of equity.
- 1.2.2 In a tax neutral world, leverage is generally understood not to affect a firm's WACC, since the cost of capital reflects the riskiness of the cash flows, rather than how these are divided up between equity and debt investors. When corporate tax is considered, the WACC is generally understood to decline with increases in leverage.¹⁶ This is because interest costs are tax deductible to the firm but dividends are not.
- 1.2.3 When personal tax is considered some of the tax advantages of debt are reduced. The New Zealand dividend imputation credit regime allows firms to pass on to their shareholders a credit for the tax the company has already paid.
- 1.2.4 When the simplified Brennan-Lally CAPM is used to estimate the cost of equity (in conjunction with the simplified beta leveraging formula, i.e. debt beta is assumed to be zero), and the estimated cost of debt includes a positive debt premium, the resulting estimate of WACC increases as leverage increases.¹⁷ The higher the value for the debt premium incorporated in the estimated cost of debt, the greater the effect on the resulting estimate of WACC as leverage increases.¹⁸ This anomaly is being created by the analytical models used to estimate the WACC rather than simply reflecting unusual market conditions.
- 1.2.5 This positive relationship between leverage and the estimated cost of capital is a potentially serious anomaly as it is inconsistent with the behaviour of firms in workably competitive markets. That is, firms in workably competitive markets do issue debt and, so long as the debt levels are prudent, are considered to be acting rationally when they do so. In regard to regulated suppliers this anomaly, if left uncorrected, would result in such suppliers obtaining an increase in the cost of capital if they were able to persuade the regulator to use higher leverage assumptions when applying the simplified Brennan-Lally CAPM. If the Commission were to regard the actual leverage of regulated suppliers as a relevant consideration in deciding on the leverage assumption, such suppliers would have an incentive to increase their leverage which could be detrimental to the long-term interests of consumers by raising the risk of bankruptcy.
- 1.2.6 The effect of leverage on the cost of capital can be substantial, as illustrated in Figure 1.1 below.

¹⁶ This is the context normally set out in textbooks when discussing the use of the classical CAPM to estimate the cost of equity, as an input to estimating the WACC.

¹⁷ The debt premium itself is a function of leverage. That is, the debt premium would be expected to increase as leverage increases.

¹⁸ If the value for the debt premium incorporated in the estimated cost of debt is sufficiently high, the resulting estimate of WACC can increase as leverage increases, even if the cost of equity is estimated using the classical CAPM.

Figure 1.1 The Post-tax Cost of Capital Rises with Increases in Leverage under the Simplified Brennan-Lally CAPM¹⁹



1.2.7 The situation is not unique to the simplified Brennan-Lally CAPM. A similar anomaly was noted by the UK Competition Commission in its most recent price-setting review of Heathrow. The UK Competition Commission used the classical CAPM.

The key feature of these charts is the upward-sloping relationship that exists between a firm's gearing and its pre-tax cost of capital when one assumes a zero debt beta. This suggests that gearing up increases a firm's pre-tax cost of capital and therefore warrants the inclusion of a higher rate of return in price caps—something that can be seen explicitly in Table 1 at the beginning of this appendix where BAA's estimates for the pre-tax cost of capital at Heathrow increase with the use of a higher gearing figure, while estimates of the pre-tax cost of capital at Gatwick fall on the assumption of lower gearing.

We find this overall position difficult to reconcile with the observed behaviour of a range of firms in a broad sample of different industries. In the regulated sectors, the trend in recent years has been for firms to inject more debt into their capital structures on the apparent assumption that higher levels of gearing represent more efficient financing. Indeed, ADI has told us that its own decision to move BAA's gearing from around 34 per cent to more than double this figure would improve the efficiency of BAA's financing.

Given this starting point, we do not accept the argument that higher levels of gearing produce a higher cost of capital. We do not believe that this is a credible characterization of the returns that investors require at different levels of gearing²⁰

¹⁹ Assuming a risk-free rate of 4.64%, an all-up debt premium of 2.35% (including debt issuance costs of 0.35%), an asset beta of 0.34, a TAMRP of 7.1%, average investor tax rate of 28.2% and average corporate tax rate of 28.4%. These parameter values are consistent with the reasonableness tests the Commission has undertaken, see Appendix H3 in the EDB/GPB Reasons Paper.

- 1.2.8 The Commission too would not want to set a higher cost of capital due to higher levels of gearing. To address this anomaly, the UK Competition Commission used debt betas.²¹ The Draft Reasons Papers proposed to resolve this anomaly by setting a single notional level of leverage of 40% to apply to all services regulated under Part 4.
- 1.2.9 In adopting the 40% notional leverage assumption in the Draft Reasons Papers the Commission addressed the anomaly in the simplified Brennan-Lally CAPM which sees the cost of capital increasing with leverage. The Commission sought to protect consumers from the risks of suppliers increasing leverage (which would result in a higher cost of capital if actual leverage was provided for in the IM), as higher leverage increases the risk of financial distress, and this has potentially detrimental consequences for consumers.
- 1.2.10 PwC (for ENA and Telecom) submitted that there are other more technically correct ways to address the anomaly of the cost of capital increasing with leverage. The two options identified by PwC were to use the leverage level observed in the samples of comparator companies (that is, 17% for airports and 44% for EDBs, GPBs and Transpower) or to use non-zero debt betas. PwC (for ENA and Telecom) submitted that the:
- “Commission is technically wrong to attempt to apply a single fixed leverage assumption to all regulated firms. If debt betas are to be excluded from the WACC analysis (which we concur with), then to be consistent the notional leverage used in the WACC estimation should be close to the average leverage of the comparator companies used to derive the (average) beta estimate. This is a fundamental requirement in order to be able to justify application of a “short cut” approach and thus ignore debt betas.”²²
- 1.2.11 The use of non-zero debt betas is theoretically sounder than using notional leverage as the use of non-zero debt betas would reduce or eliminate the extent to which the post-tax WACC estimate for each service varies with leverage.
- 1.2.12 However, the Commission notes that most submissions continue to prefer the use of zero debt betas, that most regulators do not use debt betas (though a minority do)²³, and that the Commission has not used non-zero debt betas in the past. Further, there

²⁰ UK Competition Commission, *A report on the economic regulation of the London airports companies (Heathrow Airport Ltd and Gatwick Airport Ltd), Appendix F - Cost of Capital*, 28 September 2007, paragraphs 88-90, p. F23.

²¹ A debt beta measures the systematic risk associated with a firm’s debt. A detailed discussion on debt betas is included in Appendix A2.

²² Electricity Networks Association, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: PricewaterhouseCoopers, *Submission on the Cost of Capital parameter estimates in the Commerce Commission’s Draft Electricity Distribution Services Input Methodology Determination: a report prepared for Electricity Networks Association*, 13 August 2010, p. 8; Telecom Limited, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: PricewaterhouseCoopers, *Submission on Cost of Capital Material In the Commerce Commission’s Draft Input Methodologies Determination and Reasons Paper: a report prepared for Telecom New Zealand Limited*, 13 August 2010, p. 10.

²³ Notably, the Queensland Competition Authority (see, for example, Queensland Competition Authority, *Gladstone Area Water Board: Investigation of Pricing Practices, Final Decision*, June 2010), pp.126-127. And see also the UK Competition Commission (UK), *A report on the economic regulation of the London airports companies (Heathrow Airport Ltd and Gatwick Airport Ltd), Appendix F - Cost of Capital*, paragraphs 88-90, 28 September 2007, pp. F21-F28.

are practical difficulties in accurately estimating debt betas (but this is offset in part by the estimates available from regulatory decisions overseas, which are generally in the range of 0.1 to 0.2). In the 2012 consultation, PwC for Transpower submitted that we should use non-zero debt betas in our analysis. This was contrary to PwC's previous advice on behalf of ENA when it submitted that debt betas should not be used. Based on analysis in its 2012 submission on behalf of Transpower PwC proposed a debt beta of 0.1. However, consistent with advice we received from Dr Lally, we do not consider the PwC estimate is sufficiently reliable for us to use in the Cost of Capital IM.²⁴

- 1.2.13 If the Cost of Capital IM specifies leverage for each regulated service in line with that observed for the respective sample of comparator companies (that is, 44% for EDBs, GPBs and Transpower), the cost of capital estimated and applied under Part 4 will be the same for those services, regardless of whether the debt beta is set at zero or at a level to make the estimated cost of capital invariant to leverage.
- 1.2.14 For these reasons, which are explained more fully in Appendix A1, the IM specifies leverage of 44% for EDBs, GPBs and Transpower, and does not incorporate the use of non-zero debt betas (since for these leverage levels the resulting WACC is the same for all values of debt beta).

Should Transpower's forecast leverage be used

- 1.2.15 To determine the values for asset beta and leverage in the Cost of Capital IM for each service regulated under Part 4, we have referenced comparable listed companies. Comparable means firms that have similar exposure to market risk.²⁵ Reliable estimates of beta require a sufficient number of comparator companies but, due to the small number of comparable listed New Zealand firms, we source comparator companies from other countries, especially the US, UK and Australia.
- 1.2.16 Transpower is largely an electricity transmission company but there are too few 'pure-play' listed electricity transmission companies to use only those companies as comparator companies for Transpower. Instead we use overseas electricity lines and gas pipeline services as our comparator companies for Transpower. This resulted in a set of 79 comparator companies which we use to estimate beta and leverage. We consider these have a similar exposure to market risk as Transpower. However, as some of these overseas comparator companies are vertically integrated into electricity generation, retail and unregulated activities this may affect the estimates of beta and leverage compared to that for a pure-play transmission company. Dr Lally, in previous advice to us, considered that any impact of unregulated activities on beta was likely to be small.²⁶ We also considered whether we needed to make adjustment for systematic risk attributable to differences in regulatory regimes and concluded that no adjustment is required.²⁷

²⁴ PwC (for Transpower), *Transpower New Zealand Limited Leverage and the Cost of Capital*, 5 April 2012, at p.11. Lally, M., *Leverage and WACC for Transpower*, 18 June 2012.

²⁵ EDB / GPB Reasons Paper, at paragraph H8.37.

²⁶ See Lally, M., *Review of the WACC in Transpower's Formal Settlement Proposal*, 19 September 2007, at pp.13-14.

²⁷ We had previously made such an adjustment, but for the reasons explained in the EDB / GPB Reasons Paper, we do not consider such an adjustment is required (at paragraphs H8.85-H8.162).

- 1.2.17 Transpower instead proposed that its average forecast actual leverage should be used to set leverage in the Transpower Cost of Capital IM. In particular, Transpower submitted that the Commission should use one of the following options, listed in order of Transpower's preference:
- Transpower's average forward looking actual leverage for the value of leverage without further adjustments to the IM;
 - Transpower's average forward looking actual leverage for the regulatory period for the value of leverage together with a non-zero debt beta;
 - a notional leverage for the value of leverage that is a weighted average of Transpower's average forward looking actual leverage for the regulatory period and the average leverage of the comparator firms sample used to derive the asset beta estimate.²⁸
- 1.2.18 Transpower submitted that the application of a notional leverage assumption to Transpower that is known to be significantly less than Transpower's forward looking actual leverage will (given the identified relationship between leverage and the WACC produced by the Simplified Brennan-Lally CAPM) produce an estimate of Transpower's regulatory cost of capital that is systematically lower than its actual cost of capital.²⁹ In support of its contention that estimating the cost of capital using leverage of 44% would understate Transpower's actual cost of capital, Transpower relied on reports from Professor Guthrie and PwC.³⁰ Transpower's advisor Professor Guthrie did, however, acknowledge that use of Transpower's own leverage without a debt beta would over-estimate its WACC, but contended that this would be preferable to under-estimating it.
- 1.2.19 Transpower submitted that the under-estimation of Transpower's regulatory cost of capital would have negative effects on its capital raising initiatives and hence its ability to fund its investment in the national grid.³¹
- 1.2.20 We discuss Transpower submissions under the following section headings:
- Does Transpower behave as though leverage affects its cost of capital?
 - Should prices to consumers change if Transpower's leverage changes?
 - How different is Transpower's leverage from that of the comparators?
 - Conclusions on the use of Transpower's leverage.

²⁸ Transpower, "Submission on Leverage Value in the Cost of Capital Input Methodology for Transpower", 5 April 2012, at paragraph 5.

²⁹ Transpower, "Submission on Leverage Value in the Cost of Capital Input Methodology for Transpower", 5 April 2012, at paragraph 14.

³⁰ Guthrie, G., *Leverage and Transpower's WACC*, 4 April 2012. PwC (for Transpower), *Transpower New Zealand Limited Leverage and the Cost of Capital*, 5 April 2012. To assess claims made in these submissions, the Commission obtained independent expert advice from Dr Lally: Lally, M., *Leverage and WACC for Transpower*, 18 June 2012.

³¹ Transpower, "Submission on Leverage Value in the Cost of Capital Input Methodology for Transpower", 5 April 2012, at paragraph 15.

Does Transpower behave as though leverage affects its actual cost of capital?

- 1.2.21 Due to the imputation tax credit regime, there is no strong tax advantage of debt funding over equity funding in New Zealand. It is generally accepted that the cost of capital does not increase with leverage in New Zealand (up to the point at which bankruptcy costs become significant).³²
- 1.2.22 Firms in New Zealand generally behave as though leverage does not affect their actual cost of capital, except where the leverage is excessive such that a firm risks becoming financially distressed. Accordingly, listed firms have a wide range of leverage ranging from zero leverage to having moderate to high leverage, implying the use of some or moderate amounts of debt is not inefficient. Further, so long as the leverage is not excessive, they are generally considered to be acting rationally and efficiently. Firms with higher (but not extreme) leverage continue to invest in their businesses. That is, high (but not extreme) leverage does not deter investment.
- 1.2.23 In 2011, Transpower reviewed its capital structure and decided to pay higher dividends to its shareholder.³³ This was notwithstanding Transpower's large proposed capital investment programme of around \$3.5 billion over the period to 2013.
- 1.2.24 Transpower recommenced the payment of dividends in March 2012 (its first dividends since the 2004/05 year).³⁴ This was a year earlier than previously forecast.³⁵ Dividends totalling \$315 million are budgeted to be paid in respect of the 2011/12 year.³⁶
- 1.2.25 Transpower will fund the payment of dividends by an increase in leverage. In response to that decision, the Moody's rating agency downgraded the long-term rating of Transpower to A1 from Aa3.³⁷ The notification from Moody's stated that the "rating downgrade reflects the expected weakening in Transpower's financial metrics following the announcement that Transpower's board has approved its 2011/12 Business Plan, which includes a change to Transpower's dividend policy."³⁸

³² Transpower appears to accept this proposition as noted in its cross-submissions on the draft determination: "It is widely accepted that the WACC should not change as a result of a change in leverage". Transpower, *Cross Submission in relation to MEUG's Pan Industry Input Methodologies for Cost of Capital*, 31 August 2010.

³³ Transpower, *Review of Transpower New Zealand's dividend policy*, 5 July 2011.

³⁴ Transpower, *Transpower Announces Half-year Results*, 29 February 2012. Transpower paid an interim dividend of \$110 million and reported a net loss, after allowing for changes in the fair value of financial instruments, of \$51.5 million. Earnings before net changes in the fair value of financial instruments and debt, was \$77.1 million.

³⁵ Transpower, *Review of Transpower New Zealand's dividend policy*, 5 July 2011.

³⁶ Transpower, *Statement of Corporate Intent 2011/12*, at page 11.

³⁷ Moody's, *Rating Action: Moody's downgrades Transpower to A1 following change in dividend policy*, 5 July 2011.

³⁸ Moody's, *Rating Action: Moody's downgrades Transpower to A1 following change in dividend policy*, 5 July 2011.

- 1.2.26 A letter from Transpower’s Chief Executive to the Commission includes further information on Transpower’s decision to increase leverage.³⁹ In particular, it notes that:
- Transpower is required under section 4 of the State Owned Enterprises Act 1986 to operate as a successful business and to be as profitable and efficient as a comparable business that is not owned by the Crown (paragraph 6)
 - Transpower periodically reviews its capital structure to assess whether its target leverage is efficient in light of prevailing and expected market conditions, business risks and shareholder expectations (paragraph 7)
 - Transpower has not sought to increase leverage for the purpose of obtaining a higher regulatory cost of capital under the Commission’s IM (paragraphs 5 and 12).
- 1.2.27 Further, and relevantly to our current considerations, Transpower’s CEO states that “The analysis that supported this decision *explicitly ignored* the effects of leverage on WACC in the simplified Brennan-Lally CAPM”, (italics in original, paragraph 13).
- 1.2.28 This raises an interesting observation about how Transpower determines its leverage. The statement from the CEO that Transpower ignored the effects of leverage on the cost of capital in the simplified Brennan-Lally CAPM when deciding on its leverage target suggests that, in setting its leverage target, Transpower is not primarily concerned with achieving the lowest or optimal cost of capital.
- 1.2.29 It also raises an issue regarding the internal consistency of Transpower’s statements regarding its cost of capital. The letter from its CEO states that Transpower’s decision making on its leverage ignores any effect of leverage on the cost of capital, but Transpower has submitted to the Commission that it believes its cost of capital increases with leverage and if this is not recognised in the IM this may affect Transpower’s ability to raise capital.
- 1.2.30 One way of reconciling these two positions is that for reasons that have not been explained, Transpower’s decision on leverage is not based on achieving the optimal or lowest cost of capital. Perhaps this is because of the peculiarities of its relationship with its shareholder.⁴⁰ An alternative inference is that Transpower does not consider that its actual cost of capital increases with leverage, or if it does increase Transpower’s actual cost of capital, that any increase has a minimal impact

³⁹ Transpower, *Response to Lally Allegation Regarding Motives for Transpower’s Capital Structure Decisions*, letter from Patrick Strange, 12 June 2012.

⁴⁰ For example, at paragraph 10 of his letter Transpower’s CEO quotes from a letter from its shareholder which states, among other things, that the shareholder has “asked COMU (the Crown Ownership Monitoring Unit) to work with you to determine an appropriate dividend policy, which in our view should be related to an agreed proportion of a cash flow measure rather than net profit after tax (NPAT).” We note a New Zealand business not owned by the Crown would not disregard NPAT, and would in most circumstances not pay out dividends unless it could fully impute those dividends, to avoid creating an additional tax liability for its shareholders.

only, and/or that any increased costs are outweighed by other benefits to the shareholder.⁴¹

- 1.2.31 In an event if Transpower decides its leverage without regard to the effect on its actual cost of capital then we are not convinced the IM should compensate Transpower's shareholder for any increase in its actual cost of capital that results from that decision.
- 1.2.32 We note that the decision to markedly increase leverage, and resume payment of dividends, was announced in July 2011 *after* the release of the Commission's draft determination (in June 2010 which proposed leverage of 40%) and its final determination (in December 2010 which proposed leverage of 44%). That is, in full knowledge of how leverage would be set in the regulatory cost of capital, Transpower opted to increase its leverage and it did so after explicitly ignoring the effects of leverage on WACC in the simplified Brennan-Lally model.
- 1.2.33 Yet, Transpower submits that if we do not set leverage to reflect Transpower's forecast leverage this will have negative effects on its capital raising initiatives and its ability to fund its investment in the national grid. If such negative effects were to result from Transpower's higher leverage relative to assumed leverage in the regulatory cost of capital, why did Transpower decide to target a higher leverage (and resume the payment of dividends when it did)? Again, Transpower's actions in increasing leverage and paying dividends, imply it either accepts that its actual cost of capital does not increase with leverage, or it is unconcerned by this.

Should prices to consumers change if Transpower's leverage changes?

- 1.2.34 Transpower's forecast increase in leverage results from its recent capital structure review which review is stated by Transpower's CEO to be "consistent with the expectations of Transpower's shareholder".⁴² For its own reasons Transpower's shareholder prefers the payment of higher dividends by Transpower, even if this results in a higher cost of capital for Transpower and/or a credit rating downgrade.⁴³ The preference of Transpower's shareholder is for the capital structure for all of its SOEs to include a relatively high proportion of debt. The owner's expectations manual for SOEs states:⁴⁴

...the government has a credit rating benchmark policy whereby SOEs are expected to have a capital structure consistent with a BBB(flat) credit rating (unless the SOE can demonstrate good reasons for an alternative benchmark). This is to ensure that all SOEs have appropriate financial disciplines to manage capital efficiently at similar risk levels.

⁴¹ Paragraph A1.6 identifies other potential benefits to the shareholder.

⁴² At paragraph 10 of his letter of 12 June 2012.

⁴³ Moody's state, for example, that "[g]iven the company's willingness to weaken credit metrics in favor of shareholder distributions, Moody's does not envisage an upgrade at this time." Moody's, *Rating Action: Moody's downgrades Transpower to A1 following change in dividend policy*, 5 July 2011. Standard & Poor's affirmed their credit rating (due to Transpower's continued Government ownership) but "lowered the standalone credit profile of the company to 'a-' from 'a', because we expect the dividend policy to result in a fundamental step-down in the company's financial metrics." Standard & Poor's press release, 5 July 2011.

⁴⁴ Treasury crown company monitoring advisory unit, *Owner's expectations manual for state-owned enterprises*, 29 October 2007, page 29.

The application of this credit rating benchmark may involve moving to a higher gearing ratio. While there may be a number of ways to achieve this, shareholding Ministers have a general preference for SOEs to reach higher gearing through debt financed distributions (ie, special dividends) to shareholders.

- 1.2.35 In this vein, we note that the shareholder's letter to Transpower indicates that the dividend policy should be related to an agreed proportion of a cash flow measure, rather than net profit after tax. This implies the Crown, as shareholder, may not be concerned about whether the dividends could be fully imputed. This may be rational for the Crown since it does not pay tax and therefore places no value on imputation credits, but other owners would generally prefer lower leverage and the payment of fully imputed dividends (to the extent possible).
- 1.2.36 The Cost of Capital IM consistently makes no allowance for current ownership arrangements of regulated suppliers, including Transpower's ownership arrangements, which increase or decrease the cost of capital. This is consistent with the Part 4 Purpose which is to promote the long term benefit of consumers by promoting outcomes consistent with outcomes in workably competitive markets. It is not to the long term benefit of consumers if a supplier, through its (or its shareholder's) choice of capital structure, seeks to set higher prices for consumers by that fact alone. In workably competitive markets, the ownership or financing arrangements peculiar to one supplier are not relevant in determining the prices paid by consumers.
- 1.2.37 In respect of the debt premium component of the regulatory WACC, the cost of capital IM estimates a debt premium for Transpower, as for the EDBs and GPBs, based on debt with a Standard and Poor's long-term credit rating of BBB+. This rating makes no allowance for current ownership arrangements, and the fact that Transpower, through its Crown ownership, enjoys a much higher credit rating (for example, a long term credit rating of AA- from Standard and Poor's) than its financial metrics warrant. This high credit rating reflects Government's 100% ownership of Transpower and an assumption it will stand behind Transpower should it ever face financial distress.⁴⁵
- 1.2.38 As a result of its Crown ownership leading to a higher credit rating and thus a lower debt premium, Transpower does not bear the full impact of its high leverage on its actual debt premium. The benefit to Transpower (and ultimately its shareholder) from calculating a debt premium based on a BBB+ rating, and not an AA- rating, is significant. For example, in the first determination of the cost of capital determination for Transpower under the IMs, the debt premium that was used for

⁴⁵ Moody's stated that Transpower's A1 rating reflects a 3-notch uplift reflecting the likely strong support from the New Zealand government (rated Aaa) given Transpower's government ownership and its national strategic importance. Moody's, *Rating Action: Moody's downgrades Transpower to A1 following change in dividend policy*, 5 July 2011. Standard and Poor's state that "As we expect a very high likelihood of extraordinary support from Transpower's owner, the New Zealand government (AA+/Stable/A-1+), the rating on Transpower is uplifted from its stand-alone credit profile, which we view as 'a-'." See: Standard & Poor's, *Transpower New Zealand Ltd.'s C\$250 million MTNs Rated 'AA-*, 14 March 2012.

Transpower for a five year term was 2.00%. This was 0.87% above the interpolated five year debt premium on Transpower's bonds (of 1.13%).⁴⁶

- 1.2.39 In the same way as the debt premium in the Cost of Capital IM should reflect outcomes in workably competitive markets, rather than matters specific to an individual supplier, we consider the leverage assumption should also reflect outcomes in workably competitive markets, rather than the leverage specific to Transpower (and/or the specific preferences of its shareholder). We proposed leverage of 44% which reflected the average leverage for 79 businesses currently supplying electricity lines and gas pipeline services.⁴⁷ This ensures Transpower's ownership arrangements do not affect any parameter (and in particular the debt premium and leverage) used to calculate the cost of capital under the IM.
- 1.2.40 Most of these comparator firms are based in the US which does not have a dividend imputation system. In the US, dividends are taxed in the hands of the shareholder with no allowance for any corporate tax already paid by the company. As a result, the comparator sample is largely drawn from a market where debt attracts a more favourable tax treatment than equity. All other things being equal, the optimal leverage for such companies is higher than it would be for a New Zealand company (where the imputation credit tax regime largely removes the tax advantage of debt). Thus, it may be that the average leverage for a sample of overseas companies is an over-estimate of the optimal leverage for an equivalent New Zealand company. Nevertheless, we have used the sample average leverage because at that leverage the estimate of WACC derived from the Brennan-Lally model is independent of the value of the debt beta (under certain assumptions). This invariance to debt beta is, in our view, a valid ground for using the sample average leverage.
- 1.2.41 Even if an increase in leverage does result in a higher cost of capital, it is not clear that any such incremental cost should be borne by consumers through higher prices, when leverage is above market norms for the electricity lines industry.⁴⁸ MEUG submitted that if Transpower's actual cost of capital is higher than the estimate derived from market data due to its choice of leverage, that is a matter for its shareholders to take into account.

Based on its submission, and its expert's concurrence that increasing its leverage will increase its actual cost of capital, Transpower seems to seek special treatment because it has a government owner with a preference for dividends ahead of a lower cost of capital. That is not a legitimate consideration for the Commission. The owner of Transpower must live with the regulatory fact that its charges will be based on the capital mix that would be adopted in a workably competitive business where both debt and equity are mobile. The owner not the consumer, should carry the cost (in terms of

⁴⁶ Commerce Commission, *Determination of the Cost of Capital for Services Regulated under Part 4 of the Commerce Act 1986, Decision Number 718*, 3 March 2011, at p.31. All calculations used data from the month of August 2010.

⁴⁷ Commerce Commission, *The leverage assumption in the cost of capital input methodology for Transpower Consultation on draft decision*, 15 March 2012, at paragraph 7.

⁴⁸ In the EDB / GPB Final Reasons Paper we estimated average leverage for 79 businesses supplying electricity lines and gas pipeline services is 44%. The corresponding average leverage in the Draft Reasons Paper for 54 electricity lines businesses was 42%.

reduced future dividend capacity) of a decision to oblige Transpower to adopt a less than optimal gearing.⁴⁹

- 1.2.42 The Part 4 Purpose is to promote the long-term benefit of consumers in markets referred to in section 52A by promoting outcomes that are consistent with outcomes produced in competitive markets. If one supplier, such as Transpower, decides to increase leverage above the levels of comparator companies and in so doing increases its costs (in this case the cost of capital), we consider that consumers should not bear that incremental cost. In a workably competitive market, the prices consumers pay do not reflect the costs incurred by suppliers where those costs are inefficient. Such a supplier would, in a workably competitive market, find its prices being undercut by other suppliers who had not incurred this higher cost.⁵⁰

How different is Transpower's leverage from that of the comparators?

- 1.2.43 Our leverage decision is not driven by the extent to which Transpower's forecast leverage differs from the notional 44% leverage. However, as a practical matter it is useful to observe that our estimate of leverage for the comparator companies and Transpower's estimate of its leverage are calculated on different bases.
- 1.2.44 Transpower submitted that its forecast leverage (which it estimated at 66%) was higher than the average for the comparator companies (44%). We accept Transpower's forecast leverage is higher than the average leverage of the comparator companies but the gap is not as big as the headline comparison suggests. Transpower calculates its own leverage using the book value of its equity, while we have estimated the average leverage of the comparator companies using the market values of their equity.
- 1.2.45 Book values are generally and often markedly lower than market values. So the use of book values to estimate leverage will likely lead to higher estimates of leverage. This is indeed the case here with the comparator companies' equity having a higher market value than book value. We have re-calculated the average leverage of the comparator companies using their book values disclosed in 2009.⁵¹ This increases the estimate of average leverage for the comparator companies to around 54% (estimated on a comparable basis to Transpower), closer to Transpower's forecast average leverage of 66%.
- 1.2.46 Transpower is not listed so it is not possible to observe its market value. However, First NZ Capital, Forsyth Barr, and Cameron Partners have each independently estimated the market value of Transpower's equity.⁵² We note that each of those estimates is greater than Transpower's actual or forecast book value, emphasising the point that market values typically exceed book value. When these estimates are used to calculate leverage, estimates of Transpower's average leverage ranges from

⁴⁹ MEUG, *MEUG cross submission on Transpower leverage re-consultation*, 11 May 2012, page 4, paragraph 3.2(f).

⁵⁰ Using actual or forecast leverage if the cost of capital does increase with leverage would be inconsistent with providing incentives to improve efficiency (s 52A(1)(b)).

⁵¹ Using data from Bloomberg.

⁵² First NZ Capital, *Transpower A Valuation Perspective*, 31 October 2011, pp.16-17. Forsyth Barr, *Transpower Capex coming to Fruition*, 8 November 2011, page 1. Cameron Partners, *Report to Transpower New Zealand Limited relating to a market based rate of return assessment*, 16 August 2010, page 8.

56% (on Forsyth Barr's estimate) to 62% (on First NZ Capital's estimate). Such estimates are closer, although still above, the average leverage for the comparator sample (of 44%) (when calculated on a market value of equity basis).

1.2.47 The above discussion is summarised in the Table below.

	Leverage calculated using equity at book value	Leverage calculated using equity at market value
Transpower	66% (5 year average)	56%-62%
Average of comparator companies	54% (FY 2009)	44% (5 year average)

Conclusion on why Transpower's forecast leverage should not be used

1.2.48 In our view, setting an input methodology that reflects the average leverage of comparator firms better reflects the Part 4 Purpose than an IM which reflects the decision of a single supplier (and/or its shareholder) to prefer high leverage. This is particularly the case when that supplier has, for its own reasons or that of its shareholder, preferred leverage which is an increase on its current leverage, to levels above that of comparable companies (in jurisdictions which could be expected to favour higher leverage), and has done so in the knowledge that the regulator is to set the regulatory cost of capital for it using a lower level of leverage (which matches market norms for leverage).

1.2.49 For the reason outlined above we do not consider it appropriate to use Transpower's forecast leverage in the Cost of Capital IM for Transpower. If forecast leverage were used, non-zero debt betas would have to be used in the simplified Brennan-Lally CAPM to minimise the effect of leverage on the estimate of the cost of capital and ensure there are no incentives on suppliers to increase leverage (or propose increases in leverage that would exploit the anomaly in the model). However, given the practical difficulties in reliably estimating debt beta, and that even if non-zero debt betas were incorporated into the IM this may not remove all of the incentives for suppliers to increase leverage or otherwise benefit from the leverage anomaly, non-zero debt betas are not incorporated into the Cost of Capital IM.

Consistency between asset beta and leverage

1.2.50 MEUG submitted that our preferred estimate of the asset beta and our estimate of leverage were not drawn from the same sample of comparator companies. MEUG suggested that while leverage was drawn from the sample of 79 companies used in the final reasons paper, the asset beta was determined from the smaller set of companies analysed in the draft reasons paper. MEUG submitted that to ensure consistency, we should have set an asset beta that was lower than 0.34 (to reflect the average asset beta reported in the EDB / GPB final reasons paper), or a leverage value that was less than 44% to offset the higher asset beta we selected.

1.2.51 We accept MEUG's submission that the asset beta and leverage should be set consistently with the comparator companies used to estimate asset beta, particularly when debt betas are not used. We consider that we have done this. The EDB / GPB Reasons Paper reported our estimates of asset beta for a range of periods and

frequencies. Some of these were higher than 0.34, others were lower.⁵³ Based on the information available to us, we selected 0.34 as the best estimate of asset beta for the comparator companies. The leverage estimate for the comparator companies was the average for those companies in the five years to 2010.

- 1.2.52 We consider we have selected an estimate of leverage and asset beta from the set of comparator firms that is consistent and do not consider that consistency considerations require us to set a different value of leverage, or of asset beta, than the values we have determined.

Our decision

- 1.2.53 Our final decision is to set a leverage value in the Cost of Capital IM for Transpower of 44%. This is consistent with the average leverage of the comparator firms we used to estimate beta.

⁵³ We also considered a range of other estimates of beta for electricity lines and gas pipeline assets.

A1 Leverage

Decision - leverage

A1.1 The IM specifies a service-wide notional leverage of 44% when estimating the cost of capital for EDBs, GPBs and Transpower.

Commission's reasons - leverage

Overview

A1.2 Leverage is the ratio of debt to total capital (i.e. debt plus equity). Leverage is used in the cost of capital estimation in two places: first, in order to calculate the capital structure weights in the cost of capital, and secondly, in the formula transforming asset betas to equity betas (and vice versa).

A1.3 There are three possible approaches to setting the leverage value for a type of service. These are:

- optimal leverage – where the cost of capital for a firm is minimised;
- actual leverage – the ratio of a firm's actual debt capital to the firm's actual debt plus equity capital (where market values are used); and
- notional leverage – the level consistent with a hypothetical representative supplier of a regulated service.

Leverage and firms' cost of capital - theoretical and practical considerations

A1.4 In theory, where there are no taxes and no bankruptcy costs or costs of financial distress apply, the market value of an investment is not affected by the relative proportions of debt and equity capital, i.e. leverage. In other words, leverage does not change the total amount of risk associated with the investment, or the cost of capital. Leverage just reallocates the existing risk between suppliers of debt capital and suppliers of equity capital. The cost of capital would be expected to be invariant to changes in leverage.⁵⁴

A1.5 With the introduction of corporate taxes, firms can deduct interest on debt capital as an expense for tax purposes ('leverage tax shield'), but cannot deduct dividends on equity capital. Therefore, taking into account corporate taxes but not personal taxes, as leverage increases, the leverage tax shield increases. As a result the cost of capital declines as leverage increases.⁵⁵ Taking account of personal taxes, in New Zealand the effect of dividend imputation and no tax on capital gains redresses the tax advantage of debt described above.⁵⁶

⁵⁴ Modigliani, F., Miller, M. The Cost of Capital, Corporation Finance and the Theory of Investment, *American Economic Review*, Vol. 48, No. 3, 1958, pp. 261–297.

⁵⁵ Modigliani, F., Miller, M., Corporate income taxes and the cost of capital: a correction, *American Economic Review*, Vol. 53, No. 3, 1963, pp. 433–443.

⁵⁶ Not all equity investors in the New Zealand market can fully utilise imputation credits. In particular, international investors cannot utilise imputation credits. However, this does not mean such investors have a higher estimate of the cost of capital than domestic investors. This is discussed further at paragraphs 6.4.33 - 6.4.35 of the EDB / GPB Reasons Paper.

- A1.6 Leverage also possesses a number of qualitative advantages that would be expected to lower the actual cost of capital or to benefit capital providers but cannot be incorporated into models of the cost of capital. These include the signalling value of debt in the presence of asymmetric information,⁵⁷ the reduction of underinvestment problems arising from the use of equity finance,⁵⁸ the reduction of agency costs due to the disciplinary effects of debt,⁵⁹ and the financial flexibility arising from debt.
- A1.7 In practice, businesses would not include debt in their capital structure unless they believed that doing so would lead to the cost of capital remaining unchanged or decreasing, not increasing.

Leverage and the simplified Brennan-Lally CAPM

- A1.8 When debt premiums are particularly high, estimates of WACC that incorporate CAPM estimates for the cost of equity component show WACC as increasing with leverage. This effect is amplified when using the simplified Brennan-Lally CAPM in conjunction with the simplified beta gearing model, as the WACC increases with a positive debt premium when using the simplified Brennan-Lally CAPM and more rapidly than when using the classical CAPM framework. This implies that the cost of capital is minimised when leverage is zero, and thus this would represent the optimal leverage. Using an example with assumed values for a number of parameters,⁶⁰ the magnitude of this anomaly in terms of changes in the post-tax WACC is illustrated in Table A1 and Figure A1 below. This contrasts the post-tax WACC estimated using the simplified Brennan-Lally CAPM and the classical CAPM.

Table A1 Leverage and Post-tax WACC⁶¹

Leverage	Post-tax cost of capital estimated using the simplified Brennan-Lally CAPM	Post-tax cost of capital estimated using the classical CAPM
0%	5.75%	6.61%
20%	6.11%	6.71%
40%	6.43%	6.77%
60%	6.75%	6.83%

⁵⁷ Ross, S., The Determination of Financial Structure: The Incentive Signalling Approach, *Bell Journal of Economics*, Spring, 1977, pp. 23-40.

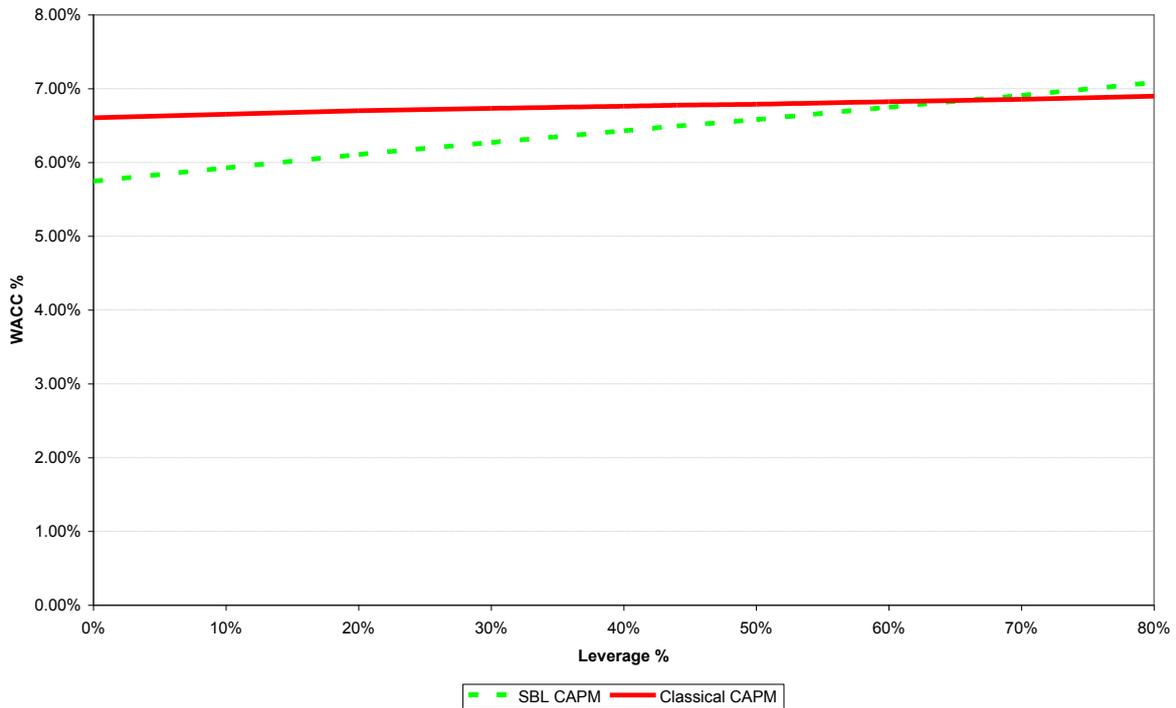
⁵⁸ Myers, S., Majluf, N., Corporate Financing and Investment Decisions when Firms have Information that Investors do not Have, *Journal of Financial Economics*, Vol. 13, 1984, pp. 187-221.

⁵⁹ Jensen, M., Meckling, W., Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure, *Journal of Financial Economics*, Vol. 3, 1976, pp. 305-360; Jensen, M., Agency Costs of Free Cash Flow, Corporate Finance and Takeovers, *American Economic Review*, Vol. 76, 1986, pp. 323-329.

⁶⁰ This assumes a risk-free rate of 4.64%, a debt premium of 2.35% (including debt issuance cost of 0.35%), an asset beta of 0.34, a TAMRP of 7.1% (equivalent to an MRP of 5.8% for the classical CAPM), average investor tax rate of 28.2% and average corporate tax rate of 28.4%. For both WACC estimates the tax neutral formula for the effects of leverage on betas has been used. These parameters values are consistent with the reasonableness tests the Commission has undertaken, (see Appendix H13 of the EDB / GPB Reasons Paper).

⁶¹ The estimates in the table are mid-point estimates of the post-tax WACC.

Figure A1 Leverage and the post-tax WACC estimated using the simplified Brennan-Lally CAPM versus the classical CAPM



A1.9 The table and figure above illustrate how the post-tax WACC, estimated using the simplified Brennan-Lally CAPM for the cost of equity, increases as leverage increases, while holding all other parameters constant. The table shows that, using the simplified Brennan-Lally CAPM for the cost of equity, the post-tax WACC would be approximately 5.75% assuming zero leverage. The post-tax WACC would increase to 6.1% at an assumed leverage of 20%. At an assumed leverage of 60%, the post-tax WACC would be approximately 6.75%.

A1.10 In contrast, the table and figure above illustrates how the post-tax WACC estimated using the classical CAPM for the cost of equity increases only marginally as leverage increases, while holding all other parameters constant. The Commission notes this increase in WACC with leverage, where the classical CAPM is used for the cost of equity, is an unconventional result which reflects the current very high debt premiums.

A1.11 This increase in the cost of capital with higher levels of leverage under the simplified Brennan-Lally CAPM for estimating the cost of equity:

- is inconsistent with both capital structure theory and observed practice;
- if incorporated in the Cost of Capital IM, would risk creating an incentive for suppliers of regulated services to increase their actual leverage in order to generate higher allowed rates of return or to propose higher benchmark leverage so as to receive a higher estimate of the cost of capital; and
- can be large, particularly when debt premiums (which affect the cost of debt) are high.

- A1.12 Where the simplified Brennan-Lally CAPM is used in the context of information disclosure or default/customised price-quality regulation, suppliers of regulated services have an incentive to assert that the notional leverage should be as high as possible. This is because, when estimating the cost of capital using the simplified Brennan-Lally CAPM to estimate the cost of equity, any increase in leverage will flow through into a higher allowed cost of capital.
- A1.13 Similarly, if suppliers' allowed cost of capital is influenced by their actual leverage, with the allowed cost of capital being estimated from the simplified Brennan-Lally CAPM to estimate the cost of equity, suppliers have an incentive to increase their actual leverage in order to increase the allowed cost of capital. Suppliers would recognise that, although the allowed cost of capital has risen, the actual market cost of capital they face is likely to have remained unchanged.⁶²
- A1.14 This anomaly (of the cost of capital increasing with leverage) is not unique to the Commission's current development of IMs using the simplified Brennan-Lally CAPM. A similar anomaly with respect to the classical CAPM was noted by the UK Competition Commission in a recent price-setting review of Heathrow/Gatwick. The UK Competition Commission stated that:⁶³

The key feature of these charts is the upward-sloping relationship that exists between a firm's gearing and its pre-tax cost of capital when one assumes a zero debt beta. This suggests that gearing up increases a firm's pre-tax cost of capital and therefore warrants the inclusion of a higher rate of return in price caps—something that can be seen explicitly in Table 1 at the beginning of this appendix where BAA's estimates for the pre-tax cost of capital at Heathrow increase with the use of a higher gearing figure, while estimates of the pre-tax cost of capital at Gatwick fall on the assumption of lower gearing.

We find this overall position difficult to reconcile with the observed behaviour of a range of firms in a broad sample of different industries. In the regulated sectors, the trend in recent years has been for firms to inject more debt into their capital structures on the apparent assumption that higher levels of gearing represent more efficient financing. Indeed, ADI has told us that its own decision to move BAA's gearing from around 34 per cent to more than double this figure would improve the efficiency of BAA's financing.

Given this starting point, we do not accept the argument that higher levels of gearing produce a higher cost of capital. We do not believe that this is a credible characterization of the returns that investors require at different levels of gearing

- A1.15 The Commission too would not want to set a higher cost of capital due to higher levels of leverage. To address this anomaly, the UK Competition Commission used debt betas.⁶⁴ The use of debt betas was generally not supported by submissions in

⁶² The Commission notes that the de-levering of the equity beta is based on the market value of the comparative firm sample. Therefore, to be consistent with the asset beta the re-levering should also be based on a market value leverage. As only three of the suppliers affected by Part 4 have market value data available to estimate the market value of leverage the use of actual leverage for each supplier will bias the cost of capital for the majority of the regulated suppliers that are covered by Part 4 as their actual leverage would be based on book values.

⁶³ UK Competition Commission, *A report on the economic regulation of the London airports companies (Heathrow Airport Ltd and Gatwick Airport Ltd)*, Appendix F - Cost of Capital, 28 September 2007, paragraphs 88-90, p. F23.

⁶⁴ A debt beta measures the systematic risk associated with a firm's debt. A detailed discussion on debt betas is included in the debt beta section (Attachment A2).

New Zealand,⁶⁵ or the Expert Panel, although the Expert Panel recommended the Commission consider debt betas if they are significant.⁶⁶

- A1.16 At the Cost of Capital Workshop, representatives of the suppliers of regulated services recognised that the cost of capital increases with leverage under the simplified Brennan-Lally CAPM but were unconcerned by this. Representatives of consumers of regulated services argued that it was inappropriate to allow suppliers' cost of capital to increase with leverage. There was broad agreement that the positive relationship between leverage and cost of capital when applying the simplified Brennan-Lally CAPM would be counter-intuitive. The Commission sought clarification on this matter from Dr Lally.

Advice from Dr Lally

- A1.17 In advice to the Commission, Dr Lally attributed the anomalous increase in the estimates of the cost of capital with increased leverage to the combined effects of the following on the estimate of the debt premium:⁶⁷

⁶⁵ Aurora Energy Limited, *Submission to the Commerce Commission on its Discussion Paper on Input Methodologies*, 14 August 2009, p.18; LECG for ENA, *Comments on the Commerce Commission's proposed approach to estimating the cost of capital*, 11 August 2009, p. 18; LECG, *Comments on the Commerce Commission's proposed approach to estimating the cost of capital*, Report on behalf of NZAA, 31 July 2009, p. 27; Maui Development Limited, *Submission to the Commerce Commission on the Input Methodology Discussion Paper*, July 2009, pp. 19-20; NZ Airports, *Submission by NZ Airports Association on the Commerce Commission Input Methodologies Discussion Paper*, 31 July 2009, pp. 49-50; Powerco Limited, *Input Methodologies Discussion Paper*, 14 August 2009, p. 30; PwC, *Revised Draft Guideline s- Submission to Commerce Commission*, August 2009, Report on Behalf of Powerco, p. 26; PwC for 17 EDBs, *Submission to the Commerce Commission on the Revised Draft Guidelines – The Commerce Commission's Approach to Estimating the Cost of Capital*, 14 August 2009, pp. 11-12; Synergies Economic Consulting for Vector, *Initial WACC Review*, 13 August 2009, pp. 23-25; Synergies Economic Consulting for Vector, *WACC Review Final*, 31 August 2009, pp. 36-39; Telecom, Annex B: *Submission on Commerce Commission Revised Draft Guidelines for estimating the Cost of Capital*, August 2009; ENA, *Cross Submission on the Cost of Capital Workshop*, 2 December 2009, p. 9; Telecom Limited, *Post-workshop Submission on the Cost of Capital*, Attachment: PricewaterhouseCoopers, *Cross Submission to the Commerce Commission on the Cost of Capital Workshop*, 2 December 2009, p. 12; Uniservices, *Comments on the Commerce Commission's Approach to estimate the Cost of Capital*, Report on Behalf of NZAA, 2 December 2009, p. 86; Electricity Networks Association, *Submission on EDBs (Input Methodology) Draft Determination and Reasons Paper*: Attachment: PricewaterhouseCoopers, *Submission on the Cost of Capital Parameter Estimates*, 13 August 2010, p. 56; Major Electricity Users' Group, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, 13 August 2010, Appendix; NZ Airports Association, *Submission on Draft Information Disclosure Determination and Draft Reasons Paper*, Attachment: Uniservices, *Comments on the Commerce Commission's Approach to estimate the Cost of Capital in its Input Methodologies Draft Reasons Paper - Report for NZAA*, 12 July 2010, pp. 36-37; Auckland International Airport Limited, *Cross Submission on the Draft Input Methodologies (Airport Services) Determinations and Draft Reasons Papers*, 3 August 2010, p. 12; Christchurch International Airport Limited, *Cross Submission on the Draft Input Methodologies (Airport Services) Determinations and Draft Reasons Papers*, 3 August 2010, p. 4; NZ Airports Association, *Cross Submission on the Draft Input Methodologies (Airport Services) Determinations and Draft Reasons Papers*, 3 August 2010, p. 39; NZ Airports Association, *Cross Submission on the Draft Input Methodologies (Airport Services) Determinations and Draft Reasons Papers*, Attachment: Uniservices, *Comments on Air New Zealand's and Board of Airline Representatives New Zealand Incorporated's Submissions to the Commerce Commission's Approach to estimate the Cost of Capital in its Input Methodologies Draft Reasons Paper: report prepared for New Zealand Airports Association*, 3 August 2010, p. 16.

⁶⁶ Franks, J., M. Lally and S. Myers, *Recommendations to the New Zealand Commerce Commission on an Appropriate Cost of capital Methodology*, December 2008, pp. 23-24.

⁶⁷ Lally, M., *WACC and Leverage*, Report to the Commerce Commission, 17 November 2009, pp. 3-5.

- the assumption that the debt beta is zero;
- a liquidity premium within the cost of debt that has no counterpart within the cost of equity; and
- the use of the promised debt premium rather than the more conceptually correct expected debt premium which would be lower. (The higher the debt premium, the higher the increase in the cost of capital for any given increase in the level of leverage.)

A1.18 Dr Lally outlined that, if the simplified Brennan-Lally CAPM was used by the Commission, then it could adopt one of three options (all of which are further discussed below):⁶⁸

- accepting the anomaly and continuing to use the simplified Brennan-Lally CAPM (status quo);⁶⁹
- setting leverage equal to zero; and
- using a non-zero debt beta and defining the cost of debt as the expected yield plus an allowance for bankruptcy costs.

A1.19 Dr Lally considered that the policy to minimise the effect of the anomaly was far from clear and that measurement difficulties would seem to rule out the third option. Dr Lally concluded that:⁷⁰

When using the simplified Brennan-Lally CAPM in conjunction with the simplified beta gearing model, WACC ... rises with leverage and therefore implies that leverage is undesirable. However, the use of debt by companies is typical. This implies that companies are acting irrationally or that there is some deficiency in the models used to estimate WACC. This paper shows that there are some deficiencies in the WACC model currently employed by the Commerce Commission, but these are not readily correctable, leaving the choice between the status quo (which overstates WACC) and a simple alternative in the form of setting WACC equal to the unlevered cost of capital (which would understate WACC). Choosing between these two options is a judgement matter for the Commission.

Possible solutions

A1.20 The Commission considers that the relationship between cost of capital and leverage when applying the simplified Brennan-Lally CAPM to estimate the cost of equity is a significant matter as the effect of leverage on the cost of capital estimate can be substantial (as illustrated in Table A1 and the accompanying discussion). Therefore, the Commission considers that accepting the anomaly is not an appropriate solution.

A1.21 In its IM Draft Reasons Papers the Commission identified an additional option, which was a variation of Dr Lally's option (i) above. This option is to use a notional leverage which attempts to choose the point where the model neither overstates nor

⁶⁸ Lally, M., *WACC and Leverage*, Report to the Commerce Commission, 17 November 2009, p. 5.

⁶⁹ Dr Lally considered that this option would overestimate the cost of capital as the cost of debt would be improperly defined as the promised yield rather than as the expected yield plus an allowance for bankruptcy costs.

⁷⁰ Lally, M., *WACC and Leverage*, Report to the Commerce Commission, 17 November 2009, p. 7.

understates the cost of capital. In order to ensure that the cost of capital estimate does not create perverse incentives when using the simplified Brennan-Lally CAPM, the Commission has considered the following options:

- Option a setting leverage equal to zero;
- Option b setting a notional leverage that either is fixed:
 - i. for all services regulated under Part 4 of the Act;
 - ii. for each service and is based on the average leverage of the comparative firms sample used to derive the asset beta estimate; and
- Option c using a non-zero debt beta.

These options are discussed below.

Option a: Setting a zero leverage

- A1.22 An advantage of setting leverage equal to zero and using the simplified Brennan-Lally CAPM to estimate the expected cost of equity capital (and hence the cost of capital) is that the allowable regulatory rate of return would be invariant to the leverage choice of a supplier. This would avoid the incentive problems discussed in paragraphs A1.12 and A1.13. WACC being invariant to leverage also does not contradict capital structure theory in the way that WACC increasing with leverage at all levels of leverage does (see paragraphs A1.4 to A1.7).
- A1.23 In submissions on the Revised Draft Guidelines and the draft IM, Ireland, Wallace & Associates (for MEUG) noted that if the simplified Brennan-Lally CAPM is used to estimate the cost of equity then the WACC is sensitive to leverage and is lowest when leverage is equal to zero. They submit that on efficiency grounds (i.e. the lowest cost of capital constitutes an appropriate benchmark), the best estimate of the efficient cost of capital structure for regulated suppliers, if the simplified Brennan-Lally CAPM is being used, is to assume zero leverage.⁷¹
- A1.24 AECT, ENA, Powerco, Telecom, PwC (for Telecom), Unison, Uniservices (for NZAA) and Vector all disagreed with the zero leverage assumption proposed by the submissions from Ireland, Wallace & Associates (for MEUG).⁷² They submitted

⁷¹ Major Electricity Users' Group, *Submission on Draft Input Methodologies and Draft Cost of Capital Guidelines*, Attachment: Ireland, Wallace & Associates Limited, *Submission on the Input Methodologies Discussion Paper: prepared for Major Electricity Users' Group*, 31 July 2009; Major Electricity Users' Group, *Cross-Submission on Draft Input Methodologies and Draft Cost of Capital Guidelines*, Attachment: Ireland, Wallace & Associates Limited, *Cross-Submission on the Input Methodologies Discussion Paper: prepared for Major Electricity Users' Group*, 3 September 2009; Major Electricity Users' Group, *Post-Workshop Submission on Cost of Capital Workshop*, Attachment: Ireland, Wallace & Associates Limited, *Post-Workshop Submission on the Input Methodologies Cost of capital: prepared for Major Electricity Users' Group*, 2 December 2009; Major Electricity Users' Group, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: Ireland, Wallace & Associates Limited, *Submission on the Cost of Capital*, 13 August 2010.

⁷² Auckland Energy Consumer Trust, *Post-Workshop Cross-Submission to Commerce Commission on Cost of Capital Workshop*, 2 December 2009, pp. 24-25; Electricity Networks Association, *Cross submission on the cost of capital workshops*, 2 December 2009, pp. 7-8; Powerco Limited, *Cross submission on Input Methodologies Discussion Paper*, 28 August 2009, p. 2; Telecom, *Cross Submission on the Revised Draft Guidelines for Estimating the Cost of Capital*, 28 August 2009, p. 5; Telecom Limited, *Post-workshop*

the zero leverage assumption is inappropriate, as it does not recognise that most infrastructure firms have debt in their capital structures and is inconsistent with workably competitive market outcomes, as debt financing (up to a point) is considered to lower WACC. These arguments generally imply that leverage reduces WACC in practice, but adoption of a non-zero leverage and the simplified Brennan-Lally CAPM would result in a higher WACC.

- A1.25 ENA and PwC (for Telecom) have argued that a practical application of a simplified modelling setup (assuming a debt beta of zero) should not be allowed to be used as a theoretical framework for arguing for an extreme leverage assumption of zero leverage.⁷³
- A1.26 NZIER (for BARNZ) noted that setting leverage equal to zero was a logical position for the Commission but did not prefer this option. NZIER submitted that in balancing the relevant factors the IM should provide for a moderate benchmark leverage in each service.⁷⁴
- A1.27 Other considerations with a zero leverage assumption are that:
- there is no regulatory precedent by overseas regulators or the Commission for setting leverage equal to zero;

Submission on the Cost of Capital, Attachment: PricewaterhouseCoopers, *Cross Submission to the Commerce Commission on the Cost of Capital Workshop*, 2 December 2009, p. 10; Unison, *Cross submission on Input Methodologies*, 28 August 2009, p. 4; Vector, *Cross-submission to the Commerce Commission on Submissions on the Input Methodologies Discussion Paper*, 28 August 2009, pp. 8-9; Electricity Networks Association, *Cost of Capital Cross Submission on EDBs and GPBs (Input Methodologies) Draft Determination and Reasons Paper*, 3 September 2010, p. 1; Electricity Networks Association, *Cross Submission on EDBs and GPBs (Input Methodologies) Draft Determination and Reasons Paper*, Attachment: PwC Report, 3 September 2010, p. 3; Powerco Limited, *Cross Submission on EDBs and GPBs (Input Methodologies) Draft Determination and Reasons Paper*, 31 August 2010, pp. 7-8; Unison Networks Ltd, *Cost of Capital Cross Submission on EDBs and GPBs (Input Methodologies) Draft Determinations and Reasons Paper*, 2 September 2010, pp. 7-8; Vector Ltd, *Cost of Capital Cross Submission on EDBs and GPBs (Input Methodologies) Draft Determinations and Reasons Paper*, 3 September 2010, pp. 4-7; NZ Airports Association, *Post-Workshop Submission on Input Methodologies Cost of Capital*, Attachment: Uniservices, *Comments on the Commerce Commission's Approach to estimate the Cost of - Report for NZAA*, 2 December 2009, p. 87; NZ Airports Association, *Submission on Draft Information Disclosure Determination and Draft Reasons Paper*, Attachment: Uniservices, *Comments on the Commerce Commission's Approach to estimate the Cost of Capital in its Input Methodologies Draft Reasons Paper - Report for NZAA*, 12 July 2010, pp. 23-25; NZ Airports Association, *Cross Submission on the Draft Input Methodologies (Airport Services) Determinations and Draft Reasons Papers*, Attachment: Uniservices, *Comments on Air New Zealand's and Board of Airline Representatives New Zealand Incorporated's Submissions to the Commerce Commission's Approach to estimate the Cost of Capital in its Input Methodologies Draft Reasons Paper: report prepared for New Zealand Airports Association*, 3 August 2010, p. 15.

⁷³ Electricity Networks Association, *Cross Submission on the Cost of Capital Workshop*, 2 December 2009, p. 8; Telecom Limited, *Post-workshop Submission on the Cost of Capital*, Attachment: PricewaterhouseCoopers, *Cross Submission to the Commerce Commission on the Cost of Capital Workshop*, 2 December 2009, p. 10.

⁷⁴ Board of Airline Representatives New Zealand Incorporated, *Post Workshop Submission on the Input Methodologies and Cost of Capital*, Attachment: The New Zealand Institute of Economic Research Incorporated, *Cost of Capital: prepared for the Board of Airline Representatives New Zealand Incorporated*, 28 November 2009, pp. 2-3.

- a leverage assumption of zero is not consistent with the observed behaviour of firms in workably competitive markets as they have debt;⁷⁵
- Dr Lally advises that at zero leverage the result of using the model to estimate the cost of equity would tend to underestimate the true cost of capital;⁷⁶ and
- using zero leverage has implications for other parameters within the cost of capital framework, such as the equity beta.

A1.28 In summary, a zero level of leverage is the optimal leverage position under the simplified Brennan-Lally CAPM with an assumed debt beta of zero (i.e. the cost of capital is minimised at this point). However, with a more realistic value of the debt beta, this may no longer be the case. Further, zero leverage is inconsistent with practice, as suppliers' actual capital structure includes a portion of debt. Therefore, in the interests of maintaining a relationship with suppliers' actual capital structure, the Commission considers that the notional leverage should be greater than zero. If zero leverage was applied, and it was considered to be an underestimate of the cost of capital, then a margin would have to be added. There is presently no theoretical framework or precedent for estimating such a margin. A zero leverage assumption would also reduce the cost of capital to just the cost of equity capital. In addition, this assumption would set the equity beta equal to the asset beta when estimating the cost of equity.

Option b: Setting a notional leverage

A1.29 Adopting a positive 'notional' level of leverage would be preferable to adopting a zero leverage assumption. This would limit the adverse impact of the anomaly in the simplified Brennan-Lally CAPM, and maintain a relationship with suppliers' actual capital structure. The approach of using a notional level of leverage is consistent with:

⁷⁵ It has been suggested in the corporate finance literature that capital structure may reflect, among other things, (i) a desire to take advantage of tax benefits (Graham, J. R., Debt and the Marginal Tax Rate, *Journal of Financial Economics*, Vol. 41, 1996, pp. 41–73), (ii) a desire to mitigate free cash flow agency problems (Jensen, M. C., Agency Costs of Free Cash Flow, Corporate Finance and Takeovers, *American Economic Review*, Vol. 76, 1986, pp. 323–329), (iii) imperfect or incomplete capital markets (Rose, J. R., The Cost of Capital, Corporation Finance, and the Theory of Investment: Comment, *American Economic Review*, Vol. 49, 1959, pp. 638–639 and Modigliani, F., and Miller, M., Corporate income taxes and the cost of capital: a correction, *American Economic Review*, Vol. 53, No. 3, 1963, pp. 433–443), (iv) the prospective costs of financial distress or bankruptcy (Myers, S. C., The Capital Structure Puzzle, *Journal of Finance*, Vol. 39, 1984, pp. 575–592), (v) the availability of internal finance (Myers, S., and Majluf, N., Corporate Financing and Investment Decisions when Firms have Information that Investors do not Have, *Journal of Financial Economics*, Vol. 13, 1984, pp. 187–221), (vi) the nature of strategic interactions between competitors, suppliers and customers (Harris, M., and Raviv, A. The Theory of Capital Structure, *Journal of Finance*, Vol. 46, 1991, pp. 297–355), (vii) whether or not the firm is in the market for corporate control (Harris, M., Raviv, A., Corporate Control Contests and Capital Structure, *Journal of Financial Economics*, Vol. 20, 1988, pp. 55–86 and Stulz, R., Managerial control of voting rights: Financing policies and the market for corporate control, *Journal of Financial Economics*, Vol. 20, 1988, pp. 25–54), and (viii) the firm's growth prospects (Graham, J. R., How Big Are the Tax Benefits of Debt?, *Journal of Finance*, Vol. 55, 2000, pp. 1901–1941). As yet, there is no completely unified theory on the determinants of optimal capital structure (for regulated or unregulated firms).

⁷⁶ See Lally, M., *WACC and Leverage*, Report to the Commerce Commission, 17 November 2009, pp. 5-6.

- i. the approach taken in previous Commission regulatory decisions, where a service specific notional leverage assumption for the regulatory service in question has been applied;
- ii. the approach taken by the majority of overseas regulators; and
- iii. the approach agreed to by most parties in their submissions on this matter.

i. Notional leverage set at the same level for all regulated services under Part 4

A1.30 In the Draft Reasons Papers the Commission adopted ‘notional’ leverage of 40% for all regulated services so as to limit the adverse impact of the anomaly in the simplified Brennan-Lally CAPM.⁷⁷

A1.31 The Draft Reasons Papers discussed how the Commission could set the level of notional leverage for all services.⁷⁸ The Draft Reasons Papers noted that “[g]iven the variation of leverage levels among regulated suppliers, there is no one ‘right’ level of leverage”.⁷⁹ It also explained that the Commission had adopted a notional leverage assumption in previous regulatory decisions, although these leverage assumptions differed between the regulated services. Therefore, applying a single level of notional leverage across all regulated services would require the exercise of judgement by the Commission.

A1.32 In setting a single notional leverage assumption the Commission sought to “balance the legitimate use of debt capital in the capital structure of suppliers of services regulated under Part 4 of the Act with the need to protect customers of the suppliers of these regulated services from the substantial consequences and costs if financial distress of a supplier of regulated services were to occur”.⁸⁰

A1.33 In setting the level of notional leverage for all regulated services, the Commission considered actual leverage for regulated firms in New Zealand and overseas, the level of leverage assumed in prior regulatory decisions in New Zealand (25%-40%) and the leverage assumption in regulatory decisions overseas. Ultimately, the Commission considered greatest informational value was from New Zealand regulatory precedent and adopted 40% as the estimate for the level of notional leverage. This estimate was consistent with the leverage assumed in previous Commission energy decisions, but at the top end of the range submitted by New Zealand airports. A number of submissions were received on the issue of leverage.

A1.34 Ireland, Wallace & Associates (for MEUG) submitted that the appropriate cost of capital model is the unlevered cost of capital which is indifferent to leverage, and

⁷⁷ Commerce Commission, *Input Methodologies Airport Services, Draft Reasons Paper*, section 6.5, pp. 168-182; Commerce Commission, *Input Methodologies Electricity Distribution Services, Draft Reasons Paper*, section 6.5, pp. 224-238; Commerce Commission, *Input Methodologies Gas Pipeline Services, Draft Reasons Paper*, section 6.5, pp. 206-220.

⁷⁸ Commerce Commission, *Input Methodologies Airport Services, Draft Reasons Paper*, paragraphs 6.5.40-6.5.61; Commerce Commission, *Input Methodologies Electricity Distribution Services, Draft Reasons Paper*, paragraphs 6.5.41-6.5.62, pp. 233-238; Commerce Commission, *Input Methodologies Gas Pipeline Services, Draft Reasons Paper*, paragraphs 6.5.41-6.5.62, pp. 215-220.

⁷⁹ Commerce Commission, *Input Methodologies Airport Services, Draft Reasons Paper*, paragraph 6.5.40; Commerce Commission, *Input Methodologies Electricity Distribution Services, Draft Reasons Paper*, paragraphs 6.5.41, pp. 233; Commerce Commission, *Input Methodologies Gas Pipeline Services, Draft Reasons Paper*, paragraphs 6.5.41, p. 215.

⁸⁰ Commerce Commission, *Input Methodologies Airport Services, Draft Reasons Paper*, paragraph 6.5.58.

that the Commission's proposed notional leverage approach achieves a cost of capital which is indifferent to leverage but has elevated the cost of capital above that of the unlevered cost of capital. They submitted that the practical consequences are material and adverse for consumers.⁸¹

- A1.35 PwC (for ENA and Telecom) submitted, in conjunction with a worked example to demonstrate, that the.^{82, 83}

Commission is technically wrong to attempt to apply a single fixed leverage assumption to all regulated firms. If debt betas are to be excluded from the WACC analysis (which we concur with), then to be consistent the notional leverage used in the WACC estimation should be close to the average leverage of the comparator companies used to derive the (average) beta estimate. This is a fundamental requirement in order to be able to justify application of a "short cut" approach and thus ignore debt betas.

- A1.36 PwC considered that if the Commission were to apply a zero debt beta assumption and a leverage estimate that was lower than the leverage of the comparative firms sample used to derive the asset beta, this would result in an under-estimation of cost of capital for EDBs, GPBs and Transpower. The Commission notes that under this logic the reverse is also true for Airports (i.e. assuming 40% notional leverage will overstate the cost of capital for Airports).

- A1.37 CEG (for Vector), ENA and Powerco made a similar point that the notional leverage assumption should be based on the sample of comparator suppliers.⁸⁴ Transpower

⁸¹ Major Electricity Users' Group, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: Ireland, Wallace & Associates Limited, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses) Reasons Paper: prepared for Major Electricity Users' Group*, 13 August 2010, p. 2; Major Electricity Users' Group, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, 13 August 2010; Major Electricity Users' Group, *Submission on EDBs (Input Methodology) Draft Determination and Reasons Paper, Appendix: MEUG comments on Pan Industry Input Methodology for Cost of Capital*, 13 August 2010, pp. 4-7.

⁸² Electricity Networks Association, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: PricewaterhouseCoopers, *Submission on the Cost of Capital parameter estimates in the Commerce Commission's Draft Electricity Distribution Services Input Methodology Determination: a report prepared for Electricity Networks Association*, 13 August 2010, p. 8; Telecom Limited, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: PricewaterhouseCoopers, *Submission on Cost of Capital Material In the Commerce Commission's Draft Input Methodologies Determination and Reasons Paper: a report prepared for Telecom New Zealand Limited*, 13 August 2010, p. 10.

⁸³ PwC (and others) had made similar comments in other submissions during the consultation period on the IM and RDG. See PricewaterhouseCoopers, *Cross Submission to the Commerce Commission on the Cost of Capital Workshop*, Report on Behalf of 17 EDBs, 2 December 2009, p. 10; PricewaterhouseCoopers, *Cross Submission to the Commerce Commission on the Cost of Capital Workshop*, Report on Behalf of Telecom, 2 December 2009, pp. 9-11; PricewaterhouseCoopers, *Commerce Commission WACC Conference*, Report on Behalf of Powerco, 2 December 2009, pp. 14-15 Electricity Networks Association, *Cross Submission on the Cost of Capital Workshop*, 2 December 2009, pp. 7-8; Wellington Electricity, *Post-workshop submission for the Commerce Commission's cost of capital workshop, November 12 and 13, 2009*, 3 December 2009, pp. 8-10.

⁸⁴ Vector Limited, *Submission in response to the Commerce Commission's Input Methodologies Draft Reasons and Determinations for Electricity Distribution Businesses and Gas Pipeline Businesses Cost of Capital*, Attachment: Competition Economists Group, *Cost of Capital Input Methodologies: a report prepared for Vector Limited*, 15 August 2010, pp. 32-35; Electricity Networks Association, *Cost of Capital Cross Submission on EDBs and GPBs (Input Methodologies) Draft Determination and Reasons Paper*, 3

submitted that as it was subject to IPP regulation there is no need to apply a service-wide notional leverage assumption and instead Transpower's actual forward-looking leverage should be used.⁸⁵

A1.38 In its cross-submission of August 2010, Transpower agreed with MEUG that a reasonable (i.e. not zero) debt beta in the simplified Brennan-Lally CAPM was necessary to prevent the flawed result of cost of capital increasing with leverage.⁸⁶ However, Transpower rejected MEUG's proposal for zero leverage, when the debt beta was assumed to be zero, on the basis that it was inconsistent with the leverage of the comparator firms used to estimate beta. In Transpower's view, so long as the Commission's approach to de-levering and re-levering does not involve the adoption of a leverage assumption that differs significantly from the market observed data, the resulting equity beta will be reasonably accurate (page 3).

A1.39 Attached to Transpower's cross-submission was an annotated graph which stated:

It is widely accepted that the WACC should not change as a result of a change in leverage. Therefore, the regulatory WACC estimate cannot be less than the WACC estimate ... derived from market-observed equity beta and corresponding leverage levels of 40% ...

Given that the leverage assumed by the Commission to calculate re-levered (equity) betas is consistent with market observations (40%), and the assumed debt beta (zero) is applied consistently in the de-levering and re-levering calculations, the debt beta assumption has no impact on the WACC estimate. However, under the assumption of a fixed debt beta of zero: 1. if gearing is assumed to be higher than 40%, then the estimated WACC will exceed the market-observed WACC; and 2. conversely, at any assumed gearing level below 40%, the estimated WACC will be below the market-observed WACC.

A1.40 Powerco also made a cross-submission in August 2010. It states that:

Powerco agrees that the proposition that WACC increases with gearing is counter-intuitive ... The Commission's response to this issue – which is to adopt a level of leverage that is consistent with the firms that are observed when deriving empirical beta estimates – is a pragmatic way of minimising the extent to which this counter-intuitive relationship affects the WACC estimate.

A1.41 In its cross-submissions for ENA, PwC submitted that:⁸⁷

Should the Commission wish to set a regulatory WACC that is indifferent to leverage, the principled approach would be for the Commission to fix an industry-wide leverage assumption that is consistent with the observed leverage of the comparator companies

September 2010, p. 1; Powerco Limited, *Cross Submission on EDBs and GPBs (Input Methodologies) Draft Determination and Reasons Paper*, 2 September 2010, p. 7.

⁸⁵ Transpower New Zealand Ltd., *Submission on Transpower (Input Methodologies) Draft Reasons Paper, Cost of Capital Decisions*, August 2010, p. 10.

⁸⁶ Transpower, *Cross Submission in relation to MEUG's Pan Industry Input Methodologies for Cost of Capital*, 31 August 2010.

⁸⁷ Electricity Networks Association, *Cross-Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: PricewaterhouseCoopers, *Cross-Submission on the Cost of Capital parameter estimates in the Commerce Commission's Draft Electricity Distribution Services Input Methodology Determination 2010: a report prepared for Electricity Networks Association*, September 2010, p. 3.

used to derive the asset beta assumption. Failing this, the Commission will then need to re-consider introducing debt betas into the analysis.

A1.42 PwC preferred the use of a service-wide leverage assumption based on the leverage of the comparator firms to the use of non-zero debt betas.

A1.43 After the Cost of Capital workshop a number of submissions proposed that the leverage from a range of firms (for example, the average from the comparator firms) should be used to determine the value for leverage, and not an individual firm's leverage. For example, Mr Balchin (PwC), who attended the Cost of Capital Workshop on behalf of CIAL and Powerco and undertook to submit on the leverage anomaly, submitted in a post workshop submission on behalf of Powerco that stated:

In my view, the appropriate mechanism for the Commission to address the perverse incentive problem is to adopt a benchmark level of gearing when estimating the WACC – rather than to use a firm's actual gearing – and to base this benchmark on a sufficiently wide sample that individual firms would have little influence.⁸⁸

A1.44 In its post-cost of capital workshop submission PwC New Zealand on behalf of 17 EDBs submitted that:

The key point from a practical perspective, and one which then makes the leverage issue insignificant, is to ensure that the regulated entities' cost of capital is estimated using comparable leverage, asset beta and debt margin assumptions as measured for the comparator entities.⁸⁹

A1.45 After the cost of capital workshop ENA submitted that debt betas could be used to lessen the impact of leverage on WACC, and then submitted that:

However, as covered in other submissions, the introduction of debt betas makes little difference to the final WACC estimates, providing the firm of interest has broadly similar characteristics (e.g. leverage, cost of debt and asset beta) to the comparator firms that have been analysed. Hence, there are technical grounds to demonstrate that a more complex analysis can restore the expected invariance of the WACC to leverage, but from a practical perspective the Commission can continue to use the simplified Brennan-Lally model and ignore debt betas, providing it is estimating WACC parameters in accord with the leverage norms of comparator companies⁹⁰

A1.46 ENA also proposed that:

The use of an industry-wide leverage assumption is reasonable for DPPs. The industry-wide estimate should be estimated with primary reference to listed comparator firms in New Zealand and overseas that have 'normal' ownership arrangements (e.g. excluding firms from the sample whose ownership structure imposes a significant constraint on their access to new equity capital).⁹¹

A1.47 Finally, ENA noted that:

... if the Commission is using industry-wide / benchmark WACC parameters, including having regard to overseas firms, it is unlikely that the leverage decisions of individual

⁸⁸ Jeff Balchin (PwC Australia), *Commerce Commission WACC Conference: Submission on Behalf of Powerco*, 2 December 2009 at p 14.

⁸⁹ PwC, *Cross Submission to the Commerce Commission on the Cost of Capital Workshop, Made on Behalf of 17 Electricity Distribution Businesses*, 2 December 2009 at paragraph 22.

⁹⁰ ENA, *Cross Submission on the Cost of Capital Workshop*, 2 December 2009 at paragraph 24.

⁹¹ At paragraph 22.

regulated New Zealand firms will have much, if any effect on the industry-wide estimates.⁹²

A1.48 In 2009 Dr Marsden, on behalf of NZ Airports Association, considered that errors in the determination of WACC which result from assuming a zero debt beta are likely to be small provided:

- i. A consistent approach is used in the de-leveraging formula for comparative firms and the releveraging formula for the firm of interest; and
- ii. The comparator set of firms on average have similar leverage to the specific industry or firm that the Commission seeks to determine the cost of capital.⁹³

A1.49 Vector's post workshop cross-submission proposed the use of benchmark leverage rather than firm-specific leverage:

Vector submits that the Commission's concern about the incentive effect is over-stated and can be managed through adopting a benchmark approach to leverage, rather than using firm-specific estimates (including under CPP regulation). Dr Marsden stated that if the simplified Brennan-Lally CAPM is used with a zero debt beta, this will understate (overstate) a firm's cost of capital if the firm has a lower (higher) leverage than that of the comparator firms. In respect of the EDBs, Dr Marsden considered the size of the potential error to be small.⁹⁴

A1.50 In adopting the 40% notional assumption, the Commission's key concern was to address the anomaly in the simplified Brennan-Lally CAPM which sees the cost of capital increasing with leverage. The Commission sought to protect consumers from the risks of suppliers increasing leverage, and thereby increasing the risk of financial distress, as this was inconsistent with the Part 4 purpose. As PwC has outlined, there are other ways to address the anomaly which are technically more correct.

A1.51 The option of setting a service-specific notional leverage is discussed below. The option of introducing debt betas is considered in the following section.

ii. Setting service-specific notional leverage based on leverage of the comparator companies

A1.52 Using a notional leverage assumption will remove the variation of the cost of capital due to changes in leverage. But, as discussed above, a number of submissions considered that if the Commission used a zero debt beta with a notional leverage assumption that was not consistent with the leverage of the comparative firms sample used to derive the asset beta, the Commission will be introducing an unnecessary bias into the cost of capital. As a result, submitters considered that the leverage assumption for a regulated service should be based on the average leverage of the associated comparative firms sample used in estimating the asset beta for that regulated service.

A1.53 Appendix H8 of the EDB / GPB Reasons Paper identifies the comparative firms sample and the process for choosing the comparative firms sample for EDBs,

⁹² At paragraph 25.

⁹³ Alastair Marsden, Uniservices, (for NZAA) *Comments on the Commerce Commission's Approach to Estimate the Cost of Capital*, 2 December 2009 at p 88.

⁹⁴ Vector, *Cross Submission to Commerce Commission on the Weighted Average Cost of Capital Workshop*, 2 December 2009 at paragraph 55.

Transpower and GPBs. Table A2 displays the results of the individual firms' last five-year average (market value) leverage, which is consistent with the leverage used to estimate the asset beta. This results in an overall average leverage for the sample of 44%.

Table A2 List of Comparable Firms and the Average Market Leverage for 2005-2010

Name	Average Leverage for 2005-2010
Horizon Energy	23%
Vector	56%
DUET	73%
Spark Infrastructure	50%
SP AusNet	46%
APA	59%
Envestra	71%
Hastings Diversified Utilities	35%
National Grid	48%
Allegheny Energy	39%
Allete	24%
Alliant Energy	32%
Ameren	43%
American Electric Power	48%
Avista Corp	51%
Black Hills	41%
Central Vermont Public Service	36%
CH Energy	34%
Cleco	34%
CMS Energy	67%
Consolidated Edison	43%
Constellation Energy	29%
Dominion Resources	41%
DPL	30%
DTE Energy	54%
Duke Energy	36%
Edison International	39%

Name	Average Leverage for 2005-2010
El Paso Electric	39%
Empire District Electric	47%
Entergy	36%
Exelon	24%
FirstEnergy	42%
Great Plains Energy	44%
Hawaiian Electric	21%
Idacorp	46%
Integrys Energy	43%
ITC Holdings	45%
MGE Energy	31%
NextEra Energy [formerly FPL Group]	39%
Northeast Utilities	52%
Northwestern Corp	43%
NSTAR	45%
NV Energy	59%
OGE Energy	37%
Pepco	55%
PG&E	42%
Pinnacle West	46%
PNM Resources	59%
PPL Corporation	35%
Progress Energy	47%
Public Service Enterprise	36%
Scana Corp	46%
Southern Corp	38%
Teco Energy Corp	50%
UIL Holdings Corp	41%
Unisource Energy Corp	61%
Unitil Corp	55%
Westar Energy	49%
Wisconsin Energy	46%

Name	Average Leverage for 2005-2010
Xcel Energy	47%
AGL Resources	46%
Atmos Energy Corp	49%
Centerpoint Energy	65%
Chesapeake Utilities Corp	35%
Laclede Group	41%
National Fuel Gas Co	22%
New Jersey Resources Corp	29%
Nicor Inc	33%
Nisource Inc	58%
Northwest Natural Gas Co	37%
Oneok Inc	55%
Piedmont Natural Gas Co	34%
Sempra Energy	31%
South Jersey Industries	33%
Southwest Gas Corp	52%
Spectra Energy Corp	40%
UGI Corp	40%
Vectren Corp	45%
WGL Holdings Inc	33%
Mean market leverage	44%

A1.54 Based on this analysis the notional leverage for EDBs, GPBs and Transpower should be 44%.

A1.55 Setting a service-wide notional leverage which reflects the average leverage of the sample of comparator firms, also reflects the differences in leverage which exist between EDBs, GPBS and the other regulated services.

Option c: Non-zero debt betas

A1.56 The use of non-zero debt betas is a third alternative to address the anomaly of WACC estimates rising with leverage. Both Dr Lally and PwC identified the use of a zero debt beta as a factor in the estimates of the cost of capital increasing with

leverage.⁹⁵ The use of non-zero debt betas can reduce the impact of leverage on the estimate of the cost of capital. At a certain level, the use of debt betas could make the cost of capital invariant to leverage.

A1.57 The use of a non-zero debt beta was discussed by a number of submitters during consultation on the IM.⁹⁶ However a majority of these submitters did not favour the

⁹⁵ A debt beta measures a firm's systematic risk associated with borrowing. That debt does have systematic risk is evidenced by the increases in debt premiums during the GFC. Debt betas are discussed further in Appendix A2.

⁹⁶ Aurora Energy Limited, *Submission to the Commerce Commission on its Discussion Paper on Input Methodologies*, 14 August 2009, p.18; LECG, *Comments on the Commerce Commission's proposed approach to estimating the cost of capital*, Report on behalf of ENA, 11 August 2009, p. 18; LECG, *Comments on the Commerce Commission's proposed approach to estimating the cost of capital*, Report on behalf of NZAA, 31 July 2009, p. 27; Maui Development Limited, *Submission to the Commerce Commission on the Input Methodology Discussion Paper*, July 2009, pp. 19-20; NZ Airports, *Submission by NZ Airports Association on the Commerce Commission Input Methodologies Discussion Paper*, 31 July 2009, pp. 49-50; Powerco Limited, *Input Methodologies Discussion Paper*, 14 August 2009, p. 30; PricewaterhouseCoopers, *Revised Draft Guideline s- Submission to Commerce Commission, August 2009*, Report on Behalf of Powerco, p. 26; Telecom Limited, *Post-workshop Submission on the Cost of Capital*, Attachment: PricewaterhouseCoopers, *Cross Submission to the Commerce Commission on the Cost of Capital Workshop*, 2 December 2009, pp. 9-11; PricewaterhouseCoopers, *Submission to the Commerce Commission on the Revised Draft Guidelines – The Commerce Commission's Approach to Estimating the Cost of Capital*, Report on behalf of 17 EDBs, 14 August 2009, pp. 11-12; PricewaterhouseCoopers, *Cross Submission to the Commerce Commission on the Cost of Capital Workshop*, Report on Behalf of 17 EDBs, 2 December 2009, pp. 9-11; Synergies Economic Consulting, *Initial WACC Review*, Report prepared for Vector, 13 August 2009, pp. 23-25; Synergies Economic Consulting, *WACC Review Final*, Report prepared for Vector 31 August 2009, pp. 36-39; Telecom, *Annex B: Submission on Commerce Commission Revised Draft Guidelines for estimating the Cost of Capital*, August 2009; NZ Airports Association, *Submission on Draft Information Disclosure Determination and Draft Reasons Paper*, Attachment: Uniservices, *Comments on the Commerce Commission's Approach to estimate the Cost of Capital in its Input Methodologies Draft Reasons Paper - Report for NZAA*, 12 July 2010, pp. 36-37; Auckland International Airport Limited, *Cross Submission on the Draft Input Methodologies (Airport Services) Determinations and Draft Reasons Papers*, 3 August 2010, p. 12; Christchurch International Airport Limited, *Cross Submission on the Draft Input Methodologies (Airport Services) Determinations and Draft Reasons Papers*, 3 August 2010, p. 4; NZ Airports Association, *Cross Submission on the Draft Input Methodologies (Airport Services) Determinations and Draft Reasons Papers*, 3 August 2010, p. 39; NZ Airports Association, *Cross Submission on the Draft Input Methodologies (Airport Services) Determinations and Draft Reasons Papers*, Attachment: Uniservices, *Comments on Air New Zealand's and Board of Airline Representatives New Zealand Incorporated's Submissions to the Commerce Commission's Approach to estimate the Cost of Capital in its Input Methodologies Draft Reasons Paper: report prepared for New Zealand Airports Association*, 3 August 2010, p. 16; Electricity Networks Association, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: PricewaterhouseCoopers, *Submission on the Cost of Capital parameter estimates in the Commerce Commission's Draft Electricity Distribution Services Input Methodology Determination: a report prepared for Electricity Networks Association*, 13 August 2010, p. 8 and p. 56; Major Electricity Users' Group, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, 13 August 2010, Appendix; Telecom Limited, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: PricewaterhouseCoopers, *Submission on Cost of Capital Material In the Commerce Commission's Draft Input Methodologies Determination and Reasons Paper: a report prepared for Telecom New Zealand Limited*, 13 August 2010, p. 10 and p. 53 ; PricewaterhouseCoopers, *Commerce Commission WACC Conference*, Report on Behalf of Powerco, 2 December 2009, pp. 14-15 Electricity Networks Association, *Cross Submission on the Cost of Capital Workshop*, 2 December 2009, pp. 7-8; Wellington Electricity, *Post-workshop submission for the Commerce Commission's cost of capital workshop, November 12 and 13, 2009*, 3 December 2009, pp. 8-10; Vector Limited, *Submission in response to the Commerce Commission's Input Methodologies Draft Reasons and Determinations for Electricity Distribution*

use of debt betas. Many of these submitters emphasised the practical difficulties in estimating the debt beta. The difficulties of estimating the debt beta are discussed in the debt beta section (Appendix A2).

- A1.58 Transpower and its experts Officer and Bishop favoured the use of debt betas in their submissions on the EDBs Draft Reasons Paper.^{97,98} Officer and Bishop considered the assumption that the beta of BBB+ debt was zero was unrealistic and would tend to bias downwards the asset beta and the regulated cost of capital.
- A1.59 On the issue of bias, the Commission notes that if the leverage of the individual entities from the sample of comparative firms is used when de-levering the respective entity's equity beta and the average leverage of the sample of comparative firms is used in the re-levering of the average estimated asset beta, then the resulting WACC estimate will not be biased (upwards or downwards) even if the debt beta is set at zero. Alternatively, if the correct debt betas are consistently incorporated in the de-levering process and the re-levering process, and the debt premium reflects the expected yield and bankruptcy costs,⁹⁹ the resulting WACC too should not be biased.
- A1.60 Officer and Bishop asserted that the Commission should use a debt beta of 0.2 for Transpower.¹⁰⁰ PwC (for Transpower) proposed an estimate of 0.1. This is discussed at paragraphs A2.24 to A2.26.
- A1.61 Although it is difficult to estimate the value of debt betas empirically, it is possible to back-solve for the value of the debt beta that results in the cost of capital becoming invariant to leverage. This is an approach that some practitioners in the New Zealand capital markets (e.g. equity analysts, investment bankers and corporate finance managers) have used in the past, to reflect the principle that the cost of

Businesses and Gas Pipeline Businesses Cost of Capital, Attachment: Competition Economists Group, *Cost of Capital Input Methodologies: a report prepared for Vector Limited*, 15 August 2010, pp. 32-35; Electricity Networks Association, *Cost of Capital Cross Submission on EDBs and GPBs (Input Methodologies) Draft Determination and Reasons Paper*, 3 September 2010, p. 1; Powerco Limited, *Cross Submission on EDBs and GPBs (Input Methodologies) Draft Determination and Reasons Paper*, 2 September 2010, p. 7; Transpower Limited, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, 13 August 2010, p.11; Transpower Limited, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: Officer R. and Bishop S., *Independent Review of Commerce Commission WACC proposals for Transpower*, 5 August 2010, pp. 22-24.

⁹⁷ Transpower Limited, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, 13 August 2010, p. 11; Transpower Limited, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: Officer R. and Bishop S., *Independent Review of Commerce Commission WACC proposals for Transpower*, 5 August 2010, pp. 22-24.

⁹⁸ BARNZ did not favour the use of debt betas but noted that adopting an estimate of zero is extremely conservative and highly favourable to the regulated suppliers. See Board of Airline Representatives New Zealand Inc, *Submission on Commerce Commission Input Methodologies (Airport Services) Draft Reasons Paper and Draft Determination*, 12 July 2010, p. 18.

⁹⁹ See Lally, M., *WACC and Leverage*, Report to the Commerce Commission, 17 November 2009.

¹⁰⁰ Officer and Bishop estimated the debt beta to be 0.2. See Transpower Limited, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: Officer R. and Bishop S., *Independent Review of Commerce Commission WACC proposals for Transpower*, 5 August 2010, pp. 22-24.

capital should be invariant to changes in leverage. This approach would allow the observed leverage to be incorporated in the cost of capital estimate, without the level of leverage having any net impact on the cost of capital estimate.

- A1.62 Such an approach assumes that the observed debt premium is purely a reward for systematic risk. However, Dr Lally advised the Commission that the positive relationship between leverage and the cost of capital was not entirely due to systematic risk, so flattening the line entirely may be inappropriate.¹⁰¹
- A1.63 Dr Lally advised that even if the debt beta were estimated to accurately capture the true systematic risk component of the debt premium, the cost of capital/leverage relationship might still be positive. In his view, there is a liquidity premium for corporate debt (for which there is no counterpart in the cost of equity) and debt incurs bankruptcy costs, which increase as leverage does. Furthermore, Dr Lally recommended that if debt betas were used the Commission should define the cost of debt as the expected yield (not the promised yield) plus an allowance for bankruptcy costs. This raises additional estimation challenges.
- A1.64 The use of a non-zero debt beta is theoretically the better approach to address the anomaly that increases in leverage can increase the cost of capital when using the CAPM framework. That is, the use of a non-zero debt beta can make the post-tax WACC estimate for each service less variant or invariant to leverage, as it should be. This would also ensure there is no incentive for regulated suppliers to increase leverage to exploit the anomaly.

Comparing Option B(ii) and Option C

- A1.65 The Commission notes that technically the result from applying a service-wide notional leverage assumption based on leverage from the sample of comparative firms (Option B(ii)) and the use of a non-zero debt beta at the leverage from the sample of comparator firms (Option C) provide the same estimate of the post-tax WACC. This is demonstrated below.
- A1.66 Table A3 and Figure A2 demonstrate the impact on the post-tax WACC estimated using the simplified Brennan-Lally CAPM, with debt betas of zero and 0.2 for EDBs.¹⁰²

Table A3 Leverage, Debt Betas and the Post-tax WACC¹⁰³

Leverage	Post-tax cost of capital estimated using a zero debt beta	Post-tax cost of capital estimated using a debt beta of 0.2
0%	5.75%	6.38%
20%	6.11%	6.45%

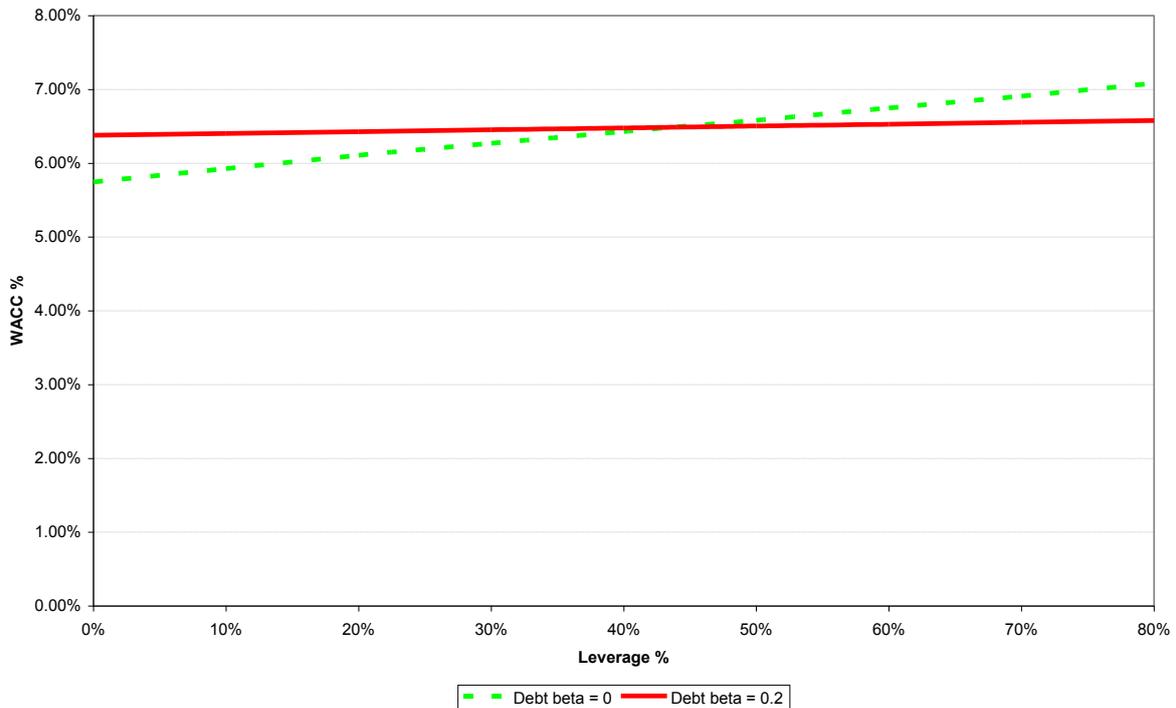
¹⁰¹ Lally, M., *WACC and Leverage*, Report to the Commerce Commission, 17 November 2009.

¹⁰² This assumes a risk-free rate of 4.64%, a debt premium of 2.35% (including debt issuance costs of 0.35%), an asset beta of 0.34 for a debt beta of zero, an asset beta of 0.43 (estimated using a debt beta of 0.2 in the de-levering process) for a debt beta of 0.2, a TAMRP of 7.1%, average investor tax rate of 28.2% and average corporate tax rate of 28.4%. These parameter values are consistent with the reasonableness tests the Commission has undertaken. See appendix H13 of the EDB / GPB Reasons Paper..

¹⁰³ The estimates in the table are mid-point estimates of the post-tax WACC.

40%	6.43%	6.47%
44%	6.49%	6.49%
60%	6.75%	6.55%

Figure A2 Leverage and the post-tax WACC estimated for EDBs and Transpower, using the simplified Brennan-Lally CAPM and different values for the debt beta.



A1.67 Assuming 44% leverage, and keeping all else constant the result of the post-tax WACC from the table and figure above demonstrate that applying Option B.(ii) (debt beta =0) or Option C (debt beta = 0.2) give the same estimate of the post-tax WACC (i.e. 6.49%).¹⁰⁴

Conclusion - Option B(ii) vs. Option C

A1.68 When using the same value for leverage as the average leverage value observed in the sample of comparator companies, then whether a zero debt beta or a positive non-zero debt beta is used, it will not change the estimate of the post-tax WACC that result from applying the IM to a regulated service.

Overall Conclusion - Leverage

A1.69 The Commission considers that where the use of the simplified Brennan-Lally CAPM results in estimates of WACC which increase with leverage the model is displaying an anomaly. Given the differences can be large, the Commission considers the anomaly should be addressed. The use of a single notional leverage assumption across all services under Part 4 would achieve this, but the Commission

¹⁰⁴ As part of this analysis the Commission also evaluated the resulting post-tax WACC estimated using an asset beta consistent with a debt beta of 0.1. This also resulted in the post-tax WACC of 6.49%.

accepts (in line with the submission from PwC) that applying this approach to each service separately would ensure the WACC is invariant to leverage in a more technically correct manner.

- A1.70 Conceptually the use of a non-zero debt beta is superior to the use of notional leverage, as this addresses the anomaly that increases in leverage can increase the cost of capital when using the CAPM framework. That is, the use of a non-zero debt beta can make the post-tax WACC estimate for each service invariant to leverage, as it should be.
- A1.71 Most submissions continue to prefer that debt betas not be used (that is, they be set at zero), most regulators do not use debt betas, the Commission has not done so in the past, and there are practical difficulties in accurately estimating debt betas (but this is offset in part by the estimates available from regulatory decisions overseas, and the possibility of back solving for the debt beta). Further, and importantly, the Commission notes that service specific notional leverage based on leverage from the sample of comparator companies (Option B(ii)) and use of a non-zero debt beta (Option C) results in the same estimate of post-tax WACC at the leverage from the sample of comparator companies.
- A1.72 Accordingly, the final determination does not reflect the use of debt betas (as the debt beta is set at zero).
- A1.73 The IM specifies a service-wide notional leverage of 44% when estimating the cost of capital for EDBs, GPBs, and Transpower.

A2 Debt Beta

Decision - debt beta

A2.1 The IM assumes a debt beta of zero.

Commission's reasons – debt beta

Overview

- A2.2 The debt beta measures a firm's systematic risk associated with borrowing, and is measured by the sensitivity of the returns on corporate debt to movements in returns on the market portfolio of all assets.¹⁰⁵
- A2.3 Debt betas can affect cost of capital estimates in three ways: first, when converting estimated asset betas to equity betas; second, when converting estimated equity betas of comparators into asset betas; and, third, when estimating the firm's cost of debt (in particular, the debt premium).
- A2.4 Whereas considerable attention has been given to investigating the riskiness of common stocks, little empirical work has been done to measure the systematic risk of debt. The Commission recognises that the greater the riskiness of debt the more it resembles equity and therefore the greater the systematic risk of debt due to market conditions, the greater is the debt beta. Therefore, in principle, debt betas should be included in the cost of capital calculation.
- A2.5 The Commission notes that the Expert Panel recommended that the Commission should take account of empirical estimates of debt betas and if debt betas are significant they should be included in the cost of capital estimation.¹⁰⁶
- A2.6 The use of debt betas to address the counter-intuitive relationship between the cost of capital and leverage when applying the simplified Brennan-Lally CAPM was discussed in section Appendix A (from paragraph A1.56). As noted in that discussion, an assumption of a specific level for the debt beta could remove this anomaly. This feature of the cost of capital when applying the simplified Brennan-Lally CAPM could be viewed as suggesting that in considering what value for the debt beta should be used in the simplified Brennan-Lally CAPM a joint consideration of the empirical estimation of the debt beta and of its interaction with leverage in the simplified Brennan-Lally CAPM would be appropriate. The analysis considered here focuses on:
- i. the prior issue of the empirical estimation of the debt beta;
 - ii. the results for the equity beta given a non-zero debt beta; and
 - iii. leverage and the results on the cost of capital.

¹⁰⁵ In principle, the market portfolio should encompass all assets in the economy, including debt and equity securities, as well as those assets that are traded and untraded.

¹⁰⁶ Franks, J., M. Lally and S. Myers, *Recommendations to the New Zealand Commerce Commission on an Appropriate Cost of Capital Methodology*, December 2008, pp. 23-24.

Practical difficulties when estimating the debt beta

- A2.7 There are three common approaches to estimating the debt beta:
- i. estimate the debt beta using the structure of the CAPM (i.e. the systematic risk component of all outstanding debt with the same maturity, tenor and credit rating characteristics as the companies debt;
 - ii. consider the systematic risk component of the company's debt; and
 - iii. assume that the debt beta is either zero or a positive non-zero point estimate.
- A2.8 Using the CAPM based approach (approach i) debt betas can be estimated using a portfolio of traded corporate bonds aggregated by rating class and by maturity, and regressing the returns to this portfolio, against the returns of the overall market portfolio. The coefficient on the market factor would be the estimated beta for that risk and maturity class of bonds.
- A2.9 However, even the portfolio approach, which pools together information from several traded debt instruments, can be difficult to implement for small, thinly-traded markets such as New Zealand. Paucity of data can be a major hindrance to obtaining reasonably precise debt beta estimates.
- A2.10 In their submission for NZAA, LECG stated that, in practice, it would be very difficult to obtain a market estimate of the debt beta, especially when, as in New Zealand, there are few frequently traded debt securities on issue.¹⁰⁷
- A2.11 Dr Lally advised the Commission that using a debt beta that flattened the line entirely may be inappropriate as not all of the debt premium is entirely due to systematic risk.¹⁰⁸
- A2.12 With regard to estimating equity betas, the Commission noted that these would be inherently imprecise and involve a significant degree of judgement. Given the difficulty associated with obtaining reliable data for a portfolio of traded corporate bonds, the Commission considers that the estimation of debt betas would be even more imprecise and require an even greater degree of judgement.
- A2.13 An indirect method to estimate the debt beta involves decomposing the observed cost of debt into a number of smaller components to leave an estimate of the premium that lenders require as compensation for bearing systematic risk (approach ii).¹⁰⁹ The debt beta estimate would be decomposed using the following formula:

$$\begin{aligned} \text{Debt premium} &= \text{liquidity premium} + \text{default premium} + \text{systematic risk premium} \\ &= \text{liquidity premium} + \text{default premium} + \beta_d \cdot \text{MRP} \end{aligned}$$

¹⁰⁷ LECG, *Comments on the Commerce Commission's proposed approach to estimating the cost of capital*, Report on behalf of NZAA, 31 July 2009, p. 27.

¹⁰⁸ Lally, M., *WACC and Leverage*, Report to the Commerce Commission, 17 November 2009.

¹⁰⁹ The debt margin a borrower is required to pay primarily reflects three types of risk. These are default premium (credit risk of the borrower), liquidity premium (compared to government bonds) and uncertainty premium (compensation for lack of diversification).

- A2.14 This method involves a significant degree of judgement as it would require the Commission to attribute values to each of the parameters used.
- A2.15 The third approach, to assume a positive value for the debt beta, that would make the cost of capital invariant to leverage, would also require a significant degree of judgement from the Commission. As the Commission's debt premium is based on promised yields the estimate of the debt beta would need to reflect that not all of the risk associated with the debt margin is systematic.
- A2.16 Dr Lally advised the Commission that even if the debt beta were estimated to accurately capture the true systematic risk component of the debt premium, the cost of capital/leverage relationship might still be positive. This was because there was a liquidity premium for corporate debt (for which there is no counterpart in the cost of equity) and debt incurs bankruptcy costs which increase as leverage does (but again equity does not incur such costs). Furthermore, Dr Lally recommended that if debt betas were used the Commission should define the cost of debt as the expected yield (not the promised yield) plus an allowance for bankruptcy costs. As he noted, this is not easy. Dr Lally does not address whether the liquidity premium and bankruptcy costs factors are likely to be significant in practice (at moderate levels of leverage).¹¹⁰
- A2.17 The Commission notes that the majority of Australian and UK regulators apply a debt beta of zero in regulatory determinations.
- A2.18 In Australia, the Queensland Competition Authority (QCA) has consistently applied a positive debt beta. The QCA applies a mid-point debt beta value of approximately 0.1 as it considers that the historical debt beta estimate of 0.2, using the CAPM method, would overstate the estimate of systematic risk.¹¹¹
- A2.19 The UK Competition Commission applied the second approach in the assessment of the appropriate debt beta to be used in both its decisions on the price reviews of Heathrow/Gatwick in 2007 and Stansted in 2008.¹¹² This approach resulted in a range for the debt beta of 0.09 to 0.19 in 2007 and 0.10 to 0.22 in 2008. The UK Competition Commission considered that the appropriate point estimate of the debt beta was 0.10 in both decisions.
- A2.20 The majority of submissions considered that the estimation of debt betas for New Zealand firms is problematic and probably not feasible at present and preferred that the Commission set debt betas to zero.¹¹³

¹¹⁰ Lally, M., *WACC and Leverage*, Report to the Commerce Commission, 17 November 2009.

¹¹¹ For decisions relating to the use of debt betas see Queensland Competition Authority, *Gladstone Area Water Board: Investigation of Pricing Practices*, Final report, June 2010 and Queensland Competition Authority, *QR Network's 2010 DAU - Tariffs and Schedule F, Draft Decision*, June 2010.

¹¹² UK Competition Commission, *A report on the economic regulation of the London airports companies (Heathrow Airport Ltd and Gatwick Airport Ltd)*, Appendix F - Cost of Capital, pp. F21-F26, 28 September 2007; UK Competition Commission, *Stansted Airport Ltd - Q5 price control review*, 23 October 2008, Appendix L, pp. L33-L35.

¹¹³ References to submissions on debt betas are noted in paragraph A1.57.

A non-zero debt beta

- A2.21 BARNZ noted that the Commission described 0.1 as a conservative estimate of the debt beta; therefore adopting an estimate of zero is extremely conservative and highly favourable to the regulated suppliers.¹¹⁴
- A2.22 In a submission on the EDBs Draft Reasons Paper, Officer and Bishop (for Transpower) considered the assumption that the beta of BBB+ debt was zero was unrealistic. Officer and Bishop proposed a debt beta of 0.2.¹¹⁵
- A2.23 A debt beta of 0.2 is consistent with the debt beta recommendation of UK CAA to the UK Competition Commission in the assessment of the cost of capital for Heathrow and Gatwick airports in 2007.¹¹⁶ However, as discussed above, the UK Competition Commission used a debt beta of 0.1.¹¹⁷
- A2.24 PwC (for Transpower) produced a report during further consultation on leverage for Transpower in 2012. PwC stated that, in its view, the debt beta estimation issues are not insurmountable.¹¹⁸ PwC's report then sought to provide various estimates of the debt betas for investment grade corporate debt, with a particular focus on BBB+ rated utilities. Its resulting estimates for BBB+ rated debt ranged from 0.07 to 0.32. PwC preferred a point estimate of 0.08 and concluded that a rounded debt beta estimate of 0.1 could be used.¹¹⁹
- A2.25 We asked Dr Martin Lally to review the PwC estimates. His report identifies 'considerable problems' with both of the methods used by PwC to estimate the debt beta and concludes that he does not think that a high degree of reliance can be placed on PwC's estimate of the debt beta.¹²⁰
- A2.26 We note PwC has adopted different positions in its submissions on debt beta. On behalf of Transpower, PwC submit there is a sufficiently reliable estimate of the debt beta such that the Commission can rely on it, but PwC does not itself use debt betas when estimating the cost of capital¹²¹ and PwC had previously proposed that debt betas should not be used. For example, in its August 2010 submission on behalf of ENA, PwC stated:

¹¹⁴ Board of Airline Representatives New Zealand Inc, *Submission on Commerce Commission Input Methodologies (Airport Services) Draft Reasons Paper and Draft Determination*, 12 July 2010, p. 18.

¹¹⁵ Transpower Limited, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: Officer R. and Bishop S., *Independent Review of Commerce Commission WACC proposals for Transpower*, 5 August 2010, pp. 22-24 and p. 37.

¹¹⁶ UK Competition Commission (UK), *A report on the economic regulation of the London airports companies (Heathrow Airport Ltd and Gatwick Airport Ltd)*, Appendix F - Cost of Capital, paragraphs 88-90, 28 September 2007, Table 1, p. F6.

¹¹⁷ UK Competition Commission (UK), *A report on the economic regulation of the London airports companies (Heathrow Airport Ltd and Gatwick Airport Ltd)*, Appendix F - Cost of Capital, paragraphs 88-90, 28 September 2007, pp. F24-26.

¹¹⁸ PwC (for Transpower), *Transpower New Zealand Limited Leverage and the Cost of Capital*, 5 April 2012, at p.11.

¹¹⁹ At page 36.

¹²⁰ Lally, M., *Leverage and WACC for Transpower*, 18 June 2012.

¹²¹ See PwC, *Queenstown Lakes District Council, Issue of shares in Queenstown Airport Corporation Limited to Auckland International Airport, Detailed report on Fairness Opinion*, 15 March 2011. In that report PwC uses a notional leverage value which is not drawn from the sample from which the asset beta was estimated, without using debt betas (pages 74-75).

We concur with the Commission's decision to exclude estimation and application of debt betas in its WACC estimates, since for most companies this should have no material effect on their WACC estimates. Inclusion of debt betas would add additional complexity and parameter estimation issues, for no apparent gain in the accuracy of the resulting WACC estimates.¹²²

A2.27 Similarly, a previous submission from PwC, on behalf of Powerco, strongly advised against using non-zero debt betas.

We would advise against using a non-zero debt beta. Like practitioners, very few regulators assume a non-zero debt beta. In addition, empirical evidence for a significant debt beta is generally lacking ...¹²³

For regulatory consistency and predictability we believe it would be far better to ignore debt betas.¹²⁴

A2.28 The Commission recognises that the greater the riskiness of debt the more it resembles equity and therefore the greater the systematic risk of debt due to market conditions, the greater is the debt beta. Therefore, in principle, debt betas should be included in the cost of capital calculation. However, there are significant difficulties in reliably estimating the value of debt beta.

Overall Conclusion - debt beta

A2.29 In principle, the Commission considers the use of non-zero debt betas as conceptually sound. Debt premiums do have an exposure to systematic risk, and the use of non-zero debt betas addresses the anomaly that post-tax WACC can increase with leverage. That is, non-zero debt betas makes the post-tax WACC estimate for an individual service less variant or invariant to leverage.

A2.30 However, there are practical difficulties in accurately estimating the debt beta which are not easily overcome. These difficulties are offset in part by the regulatory precedents noted offshore for the use and level of non-zero debt betas. Even if the estimated values of debt beta were sufficiently robust to be relied upon, it would still be necessary to consider whether the cost of debt should be defined as the expected yield plus an allowance for bankruptcy costs, rather than the promised yield.¹²⁵ Notwithstanding those refinements, if the WACC calculated under the simplified Brennan-Lally CAPM continued to increase with leverage, the anomaly would still exist, and the Commission would still seek to set an IM which results in estimates of the cost of capital which do not increase with leverage.

A2.31 For the reasons set out in the Leverage section (see paragraphs A1.56 to A1.73), the Commission has assumed a zero debt beta in the Cost of Capital IM.

¹²² PwC, *Submission on the cost of capital parameter estimates in the Commerce Commission's (draft) electricity distribution services input methodologies determination 2010*, August 2010, page 56, paragraph 8.3

¹²³ PwC, for Powerco), *Revised Draft Guidelines Submission to Commerce Commission*, August 2009, at p.9.

¹²⁴ PwC, for Powerco), *Revised Draft Guidelines Submission to Commerce Commission*, August 2009, at p.25.

¹²⁵ Lally, M., *Leverage and WACC for Transpower*, 18 June 2012. Lally, M., *WACC and Leverage*, Report to the Commerce Commission, 17 November 2009.