

16 August 2002

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Dear Antony

APPLICATION OF A TSLRIC PRICING METHODOLOGY – DISCUSSION PAPER

1. You have commissioned PricewaterhouseCoopers New Zealand (“PwC”) to comment on Chapter 8 – “Return on Funds” and Appendix 1 – “Full Definition of Lally-Brennan CAPM” of the “Application of a TSLRIC Pricing Methodology” – Discussion Paper issued by the New Zealand Commerce Commission (“Discussion Paper”). We are pleased to provide our comments in this letter which we authorise you to submit in whole to the New Zealand Commerce Commission (“the Commission”).

General Comments

2. The Commission is advocating a conventional and generally applied definition of Weighted Average Cost of Capital (“WACC”) and a simplified Lally-Brennan specification for CAPM. This is consistent with the WACC specification and broadly consistent with the CAPM specification currently used by PwC and we support its application in these circumstances.
3. There are a few areas where PwC’s input parameters differ from that of the Commission. In this paper, we point out the main differences and support the PwC position.
4. The main area where debate is likely to arise is in the determination of the asset beta which is largely judgemental. PwC has significant experience in determining WACC and estimating asset betas, and we have done this for hundreds of New Zealand businesses. Globally and in New Zealand PwC is the largest provider of business and share valuations. Central to this service is the requirement to calculate a WACC in relation to the entity being valued.
5. To support the determination of WACC, we have a technical advisory group (both globally and in New Zealand) which ensures that we are at the forefront internationally and domestically in the theory and practice behind WACC and are fully aware of all recent developments and trends.

6. With respect to the asset beta, the Commission appears to be suggesting that the TSLRIC beta may be similar to that of a utility company. In this submission we suggest that determining an asset beta using a comparable industry, such as a utility company, may result in an understated beta. Our preliminary review which appears to be consistent with that of overseas regulators, is that the appropriate beta would be one closer to the TSO beta. Using the asset beta of a utility company may not properly recompense Telecom for greater undiversifiable risks rather than those suffered by the utilities company (for example, the effect of the economy, and competition).
7. In respect of asymmetric risks, we understand you have commissioned Charles River & Associates to undertake this response and we have not commented on it.
8. Our specific response to each matter raised by the Commission in Chapter 8 and Appendix 1 follows in an Appendix to this letter.
9. We look forward to discussing this report with you.

Yours sincerely

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TSLRIC

Return of Funds

The Commission seeks comment on the appropriate form of the WACC and CAPM.

WACC

1. PricewaterhouseCoopers (“PwC”) agrees with the Commission’s formula for determining WACC in nominal, post tax terms as described in Section 8.1 of the Discussion Paper. This is subject to the assumption that cash flows are modelled in a manner consistent with the WACC formula.

Simplified Brennan-Lally CAPM

2. The Brennan-Lally post investor tax CAPM has been derived by Dr Lally, based on prior work by Brennan to cater for the effect of dividend imputation and personal taxes in New Zealand. Under current New Zealand taxation law, this represents the appropriate CAPM specification to use to determine the cost of equity in New Zealand.
3. The Commission proposes to modify the Brennan-Lally specification with a simplifying set of assumptions, essentially:
 - (a) Dividends are effectively tax free to investors because they are assumed to be fully imputed and investors are able to fully utilise the credits.
 - (b) The average investor faces a 33% marginal tax rate on interest income.
 - (c) Capital gains are not taxed.
 - (d) The tax rate, t_{int} (as defined in Appendix I of the Commission’s Discussion Paper) is thus 33%.
4. The Commission has described this as the simplified Brennan-Lally specification.
5. PwC does not believe that the above assumptions are reasonable. In particular:
 - (a) the average individual share market investor is typically a wealthy individual, who is likely to be on the top marginal tax rate of 39%, this has the effect of raising the average investor’s marginal tax rate on interest above 33%;
 - (b) while New Zealand does not currently have a formal capital gains tax regime, we know that some investors are effectively taxed on realised capital gains (i.e. institutions actively managing New Zealand equity funds).

6. PwC also uses a simplified version of the Brennan-Lally CAPM, but based on the assumptions that:
 - (a) Dividends are effectively tax free to investors, providing they are fully imputed, as investors are able to utilise the credits to the extent that they almost exactly offset the tax investors face on the dividends (at the rate t_{div} , as defined in Appendix I of the Commission's Discussion Paper), ie currently for fully imputed dividends $t_{div}Div$ is assumed to have a value sufficiently close to zero that it can be ignored¹.
 - (b) Capital gains are taxed in the hands of some investors.
 - (c) The tax rate, t_{int} (as defined in Appendix I of the Commission's Discussion Paper) is thus 28%.
7. A further difference in the PwC approach is that the PwC PTMRP is measured including $t_{divm}Div_m$. Hence if the Commission's simplified Brennan-Lally CAPM specification were to be used then PwC's historical PTMRP estimate would need to be adjusted upwards by approximately 0.5%.

Standard CAPM and Dividend Imputation

8. The Commission's Discussion Paper defines the "Standard CAPM" in the conventional Sharpe-Lintner form, but then goes on to say that this model allows greater flexibility about the assumptions relating to the distribution and use of imputation credits (paragraph 250). The introduction of an adjustment for the value of imputation credits is in fact a different model, the Officer model. Application of the Officer model requires not only a tax adjustment for gamma (γ), but also an adjustment to the Market Risk Premium - to include the value of tax credits in the market portfolio.
9. The Officer model makes simplifying assumptions about investor taxes, which are open to question. The full Brennan-Lally model is the preferred model if maximum flexibility is sought for analysing assumptions about investor taxes and imputation credits. A benefit sometimes claimed in using the Officer model is in not having to estimate investor tax parameters. However, this claim does not withstand close scrutiny as the data/assumptions required to estimate gamma (γ) for the Officer model can also be used to estimate all of the investor tax parameters for the full Brennan-Lally model².

¹ Note that this assumption is based on PwC's analysis of the mix of investors in the market and their tax status, which results in the assumed value of imputation credits (U , as defined in Appendix I of the Commission's Discussion Paper) being less than their face value. However, PwC's estimated value of t_{int} is such that the estimated value of t_{div} is close to zero. While the resulting conclusion that fully imputed dividends are effectively "tax free" is the same as that reached in the Commission's Discussion Paper's simplified Brennan-Lally CAPM there are subtle, but potentially significant, differences in the estimated values of t_{int} and PTMRP.

² Gamma (γ) estimates are typically derived by examining the "drop-off" behaviour of share prices at dividend payment dates, specifically for dividends carrying imputation credits. The same underlying data set can also be used to examine the drop-off behaviour of dividends that do not carry imputation credits – to provide a direct estimate of t_{int} . Alternatively γ may be estimated by analysing the mix of investors in the

The Commission proposes to estimate a post-tax WACC and to provide for company taxation liabilities as a separate cost.

10. PwC is in agreement with the Commission's proposal to estimate a post-tax WACC and provide for company taxation liabilities as a separate cost.

The Commission proposes to use a nominal post-tax WACC.

11. PwC is in agreement with the Commission's proposal to use a nominal post-tax WACC subject to this being consistent with the cash flows (ie the estimation of the TSLRIC) being prepared on a nominal basis.
12. At paragraph 215 in the Discussion Paper the Commission seeks views on using the tilted annuity approach as the depreciation methodology, in the event that assets are valued on the basis of optimised replacement cost. I.e. in effect a real basis may be used for measuring the asset base. If this is to be the case then the TSLRIC costing model algorithms will need to appropriately deal with translating a nominal post-tax WACC into (effectively) a pre-tax real WACC. PwC considers that these adjustments should be explicitly dealt with in the detailed costing calculations rather than trying to make adjustments to the WACC.

The Commission seeks comment on the appropriate government bond maturity for determining the risk-free rate.

13. The Discussion paper considers three approaches:
 - (a) Lifetime of the assets used to provide the regulated service.
 - (b) Duration of the Commission's determination.
 - (c) Bond rate used to estimate the market risk premium.
14. Choosing a risk free bond term to match the lifetime of the asset used to provide the service is consistent with the Commission's desire to use a forward looking approach. Hence the relevant question is what benchmark bond rate would an investor look at when investing in long life assets? Investors are likely to examine bond rate for terms matching the life of the assets being invested in. It is noted that asset life assessment should be economic life (i.e. allowing for early obsolescence) as opposed to engineering design life.
15. If the duration of the Commission's determinations were to be known with certainty then PwC agrees that it would be appropriate to use a term of risk free rate matching the duration of the determinations (as concluded in Lally, 2001). However, the duration of the Commission's determinations is unknown, hence this does not provide an acceptable, objective basis. As noted in the Discussion Paper (p. 113) "*...the Commission will be required to determine interconnection prices on the basis of TSLRIC only where either the access provider or the access seeker asks the*

market and their assumed tax status. Under this second approach the data/assumptions are also available to make an estimate of t_{int} .

Commission to revise an (initial) determination.” If the risk free rate is to be set at each determination based, say, on the period since the last determination (as a reasonable estimate of the time until the next determination) then the parties to the determinations have an incentive to "game" the timing of and frequency with which they seek determinations (based on the prevailing level and shape of the government bond yield curve). It would not be a desirable regulatory outcome to create such an incentive.

16. Longer term bond rates represent future expectations of a series of shorter term bond rates. Hence forward yields (for the term of the bond rate used to estimate the market risk premium) can be readily extracted from the market yield curve for the purpose of estimating WACC(s) over periods greater than the term of the bond used to measure the historical market risk premium. As such the choice of a risk free rate bond term to match the basis used to estimate the market risk premium is not necessary.
17. PwC favours the first approach, the lifetime of the asset used to provide the service.

The Commission seeks comment on the appropriate averaging of the government bond rate in determining the risk-free rate.

18. The Commission’s approach in the Airfield Activities Decision of using a six month average. Using a six month period is likely to avoid the impact of short term interest spikes. The six month period is arbitrary and may vary if circumstances change.

The Commission seeks comment on the appropriate approach for refining its estimates of the New Zealand PTMRP.

19. PwC considers that a range of methodologies and data from a range of markets can usefully be analysed in assessing a PTMRP appropriate for the New Zealand market. However, in the absence of any compelling evidence to the contrary we would place most weight on the historical PTMRP realised in the New Zealand market for as long a time period as data is available.
20. As the Commission is aware, PwC has undertaken extensive research into New Zealand share market returns and estimated a full, as opposed to simplified, Brennan-Lally PTMRP using data since 1925. In March 2000, we published a document which provided our then revised PTMRP of 8% (which represented a decline from 9% previously estimated by PwC). PwC has used 8% in cost of capital analysis undertaken since the publication of that report. We have now further updated our analysis and expect to shortly publish a revised PTMRP of 7.5%. We plan to issue an updated paper on our research, which will include a comparison with market risk premium estimates from other markets and from using other methodologies.

21. It is noted that the Commission's simplified Brennan-Lally CAPM differs slightly from the specification used by PwC in New Zealand. This means that PwC's PTMRP estimate would need to be adjusted upwards, by approximately 0.5%, before it could be used in the Commission's simplified Brennan-Lally CAPM specification.
22. The Discussion Paper (paragraphs 275-276) suggests a methodology for converting a standard MRP to a simplified Brennan-Lally PTMRP. It is noted that if the Brennan-Lally model is to be used an implicit assumption is that investors are concerned with after tax returns. The proposed approach ignores the historical impact of changes in investor tax parameters on post tax market returns³. Further, there is no reason to think that investor tax rates/parameters historically faced by investors in other markets (from which standard CAPM MRPs might be sourced) are the same as those currently faced by investors in the NZ market. Accordingly, the proposed basis for converting a standard MRP to a PTMRP should be treated with some caution.

The Commission seeks comments on the use of an estimate of access provider's equity beta from market data as a benchmark for the equity beta for assets used to provide fixed PSTN services.

The Commission seeks comments on the use of utilities in New Zealand as benchmarks for determining the appropriate equity beta for investments in fixed PSTNs. The Commission is particularly interested in which utilities are likely to provide the most appropriate benchmarks.

The Commission seeks comment on:

- the choice of comparable companies in overseas market for the purposes of determining an appropriate equity beta; and
- issues in adjusting the equity beta of comparable companies in overseas markets.

The Commission is particularly interested in solutions to difficulties in adjusting equity betas for differences in market risk.

23. The determination of the equity beta for TSLRIC will require considerable research which PwC has not yet completed. Once the research is complete, it is likely to indicate a significant range of equity betas and considerable judgement will be required in selecting the equity beta. To improve the judgement in selecting an equity beta, it is important to consider a range of sources. In light of this, research will focus on:
 - (a) Telecom and the TSO equity beta.
 - (b) Adjustments to Telecom's equity beta to remove business activities not related to the TSLRIC.

³ Lally (p. 47 in Estimating the Cost of Capital for Crown Entities and State-Owned Enterprises, October 1997, A Handbook Prepared for the Treasury) notes a problem with the approach proposed here is that tax changes over time impart less intertemporal stability to MRP than PTMRP and therefore more bias to a direct estimate of MRP than PTMRP.

- (c) Review of equity betas of companies comparable to Telecom overseas.
 - (d) Equity Betas determined appropriate by other overseas regulators.
 - (e) Review of equity betas of companies undertaking activities in New Zealand which may be comparable to Telecom's TSLRIC business (we have not yet completed our research in this area).
24. Determination of the equity beta will lie within the range of equity betas determined for the above entities and will depend on the persuasiveness of the data. Whilst no one element above is likely to be sufficient on its own, it is our experience that the use of betas derived from companies operating in different industries generally provides the least persuasive evidence and is generally used as a last resort. This is because it is often difficult to find different industries with identical risks.
25. Some specific responses to the Commission's discussion points are:
- (a) Using Telecom's equity beta as a benchmark for the beta for assets used to provide fixed PSTN services appears to be consistent to the approach taken by regulators overseas. Some adjustment to the equity beta may be considered to reflect different risks of, say, Telecom's Australian, Mobile or Internet operations.
 - (b) Our preliminary view is that using utilities in New Zealand as benchmarks for the appropriate equity betas should only be considered as having minor applicability to the TSLRIC WACC. We see significant differences in the utilities business to TSLRIC as being:
 - (i) TSLRIC is likely to have a greater exposure to the New Zealand economy than the utilities as the use of electricity is less discretionary than for toll calls, internet usage etc.
 - (ii) The telecommunication network is more susceptible to competition than utilities as evidenced by the growth of parallel telecommunication networks versus no parallel electricity networks. Utilities operate in a more monopolistic environment than Telecom.
 - (iii) Voice and data transmission have greater growth prospects than electricity transmission.
- Given these differences, we would be surprised if the equity beta for TSLRIC was not significantly greater than that of a utility.
26. The Discussion Paper (paragraph 306) suggest that adjustments should be made for differences in market risk, such adjustments might involve determining the correlation between the market returns across countries and adjusting the betas of international firms accordingly.

27. PwC notes that differences in market risk are likely to already be substantially allowed in the WACC through using a New Zealand risk free rate input and a New Zealand market PTMRP estimate. The beta adjustment proposed is effectively moving towards an international CAPM (as opposed to a domestic CAPM) and, as noted elsewhere in the Discussion Paper it is problematic to estimate all of the parameters for such a model. Some adjustment to beta data sourced from the markets may be warranted for differences in market-wide leverage and tax rates.
28. The Commission has an objective of ensuring consistency in beta estimation with its other, previous regulatory decisions (paragraph 310). This objective is not seen as relevant or necessary from the TSLRIC provider's perspective. With respect, if the Commission erred in estimating the beta for the purpose of another decision keying the TSLRIC beta estimate to an incorrect beta estimate from another decision may simply result in another incorrect beta estimate.
29. In summary, the estimation of the equity beta is as much an "art" as it is "science". Using information gathered from all the above sources, without pre-bias towards the source, is an appropriate approach.

The Commission seeks comment on the appropriate approach to estimate the debt risk premium.

30. To calculate the cost of debt, PwC believes Telecom's actual borrowing margin should be capable of precise determination and is appropriate for the purpose of determining WACC. The cost of debt, for the same duration as the risk free rate used in the CAPM, can then be estimated as the risk free rate plus a borrowing margin. The actual borrowing margin should be weighted for the different tranches of debt on issue and should reflect all the costs of borrowing including, the cost of swapping floating interest to fixed interest rates, swap costs for US dollar denominated debt and swap costs to match the duration of debt with the duration of the risk free rate used in the CAPM.

The Commission seeks comment on the appropriate approach to determining the gearing level.

31. Under an imputation tax system, the WACC is not particularly sensitive to the gearing selected. Under these circumstances, and assuming Telecom's gearing can be considered to be at roughly an efficient level (and also equivalent to the gearing in a TSLRIC business), then the gearing ratio should be calculated at Telecom's market value of debt, divided by Telecom's market value. PwC will undertake sensitivity analyses on the gearing ratio when calculating the WACC.
32. It may also be appropriate to ensure that Telecom's gearing ratio falls within the range observed for other companies for which beta data is also being reviewed.

The Commission seeks comment on the appropriate corporate tax rate.

33. PwC recommends use of the statutory 33% corporate tax rate in the WACC calculation.
34. In addition notional cash tax payable should be allowed for when estimating the TSLRIC costs (e.g. in the tilted annuity calculations). It is noted that the notional tax depreciation shield may not necessarily match, over time, the asset depreciation implicit in the tilted annuity.

The Commission seeks comment on the relevance of asymmetric risks for determining interconnection prices under the Act. The Commission specifically seeks comments on:

- sources(s) of asymmetric risk;
- the asset to which they should apply;
- the practical relevance of these risks and any factors that may offset these risks;
- the extent to which these risks are or can be compensated for in other aspects of TSLRIC (such as the equity beta or depreciation rates); and
- practical ways of estimating the costs of these risks.

35. We understand these issues are separately considered.

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