Cost of capital for the UCLL and UBA pricing reviews

Draft decision

Date: 2 December 2014

Table of contents

List of defined terms and abbreviations

Act	Telecommunications Act 2001
CAPM	Capital asset pricing model
DGM	Dividend growth model
DRP	Debt risk premium
FPP	Final pricing principle
FTTH	Fibre-to-the-home
GFC	Global financial crisis
IMs	Input methodologies
IPP	Initial pricing principle
MRP	Market risk premium
ORC	Optimised replacement cost
PIE	Portfolio investment entities
RAB	Regulatory asset base
S&P	Standard and Poor's
TAMRP	Tax-adjusted market risk premium
TCSD	Term credit spread differential
TSLRIC	Total service long run incremental cost
TSO	Telecommunications service obligations
UBA	Unbundled bitstream access
UCLL	Unbundled copper local loop
UFB	Ultra-fast broadband
WACC	Weighted average cost of capital

Executive summary

1. This paper sets out our draft views on the weighted average cost of capital (WACC) for the unbundled copper local loop (UCLL) and unbundled bitstream access (UBA) pricing reviews. It should be read in conjunction with our draft determinations for the UCLL and UBA pricing reviews, which have been published at the same time as this paper.[1]

2. We are required to set forward-looking cost-based access prices for UCLL and UBA using a total service long run incremental cost (TSLRIC) methodology. WACC is one of the key inputs to the TSLRIC models for UCLL and UBA.

3. We have determined a forward-looking post-tax WACC estimate of 6.47% for the draft UCLL and UBA pricing reviews.[2] Given the similarities between the two pricing reviews, this consultation paper covers WACC for both the UCLL and UBA services.

We have used the cost of capital IMs as the starting point for determining WACC for UCLL and UBA

4. We have used the cost of capital input methodologies (IMs), which currently apply to electricity lines services, gas pipeline services and specified airport services regulated under Part 4 of the Commerce Act, as the starting point when estimating WACC for the UCLL and UBA services.

5. Although the cost of capital IMs and the UCLL and UBA pricing review determinations are set under different legislation, our view is that the general approach to estimating WACC in the IMs is also appropriate for the telecommunications sector. In our view, differences in the relevant price setting methodologies and purpose statements do not affect the underlying methodology for making our central estimate of WACC (our mid-point WACC estimate), since the cost of capital is determined by the return required by investors in the market.

6. Consistent with the analysis and reasons in the cost of capital IMs, we have used the simplified Brennan-Lally capital asset pricing model (CAPM) to estimate the cost of equity. Submissions generally supported this approach.

Changes in approach are required due to differences between UCLL and UBA and the IMs

7. While we have used the cost of capital IMs as the starting point for estimating the allowed WACC for UCLL and UBA, changes in approach on some specific points are required to address differences between Part 4 and the context for this decision. For example different services may have different risks and, therefore, a different required return. This is reflected in the beta estimate for each service.

8. To assist us in estimating WACC for the UCLL and UBA pricing reviews, we sought independent expert advice from Dr Martin Lally and Oxera Consulting Limited

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[1] Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014. And Commerce Commission "Draft pricing review determination for Chorus' unbundled bitstream access service" 2 December 2014.

[2] A post-tax WACC includes the post-tax cost of debt.

(Oxera). Dr Lally advised us on the cost of debt and tax-adjusted market risk premium (TAMRP), while Oxera advised us on asset beta, leverage, and the target long-term credit rating. Professor Ingo Vogelsang provided us advice which was relevant when considering whether an uplift should be applied to our mid-point WACC estimate for UCLL and UBA.

9.   When setting prices for UCLL and UBA we seek a WACC estimate relating to these services only. This is important as investors may seek a higher return on capital from providing other telecommunications services, due to differences in perceived riskiness. Therefore, our WACC estimate for UCLL and UBA may differ from our and other analysts' WACC estimates for Chorus (and other telecommunications providers), given these companies may also provide other services (for example, fibre-to-the-home (FTTH) or mobile services).

Our estimate of the cost of debt is 6.33%

10.   We have estimated a cost of debt for UCLL and UBA of 6.33%. Our estimate of the cost of debt comprises four components:

   10.1   a risk-free rate of 4.19%, estimated using the observed market yield to maturity of benchmark New Zealand Government bonds (for a five-year term);

   10.2   a debt premium of 1.85%, based on a seven year term and a BBB+ Standard and Poor's (S&P) long-term credit rating;

   10.3   an allowance for debt issuance costs of 0.25%; and

   10.4   an allowance for interest rate swap costs of 0.04%.

11.   The five-year term of the risk-free rate matches the proposed length of the regulatory period for the UCLL and UBA pricing reviews. This is consistent with the approach used in the cost of capital IMs.

12.   However, the cost of capital IMs recognise the additional debt premium and interest rate swap execution costs that can be incurred from issuing longer-term debt, to the extent that such debt is actually issued by regulated suppliers. This is achieved through an allowance known as the term credit spread differential (TCSD).[3]

13.   We have not applied a TCSD for the UCLL and UBA pricing reviews, because we are estimating WACC for a single, hypothetical, network operator. The TCSD was designed specifically in the context of the IMs, where we were determining WACC for multiple firms, but only those which issued debt with a term exceeding five years qualified for the allowance.

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[3]   Under the IMs, TCSD does not apply to all regulated suppliers, so is not part of the WACC. It applies only to regulated suppliers whose debt portfolio, as of the date of the most recent audited financial statements, has a weighted average tenor greater than five years.

14.   Although we have not included a TCSD for UCLL and UBA, the approach we have taken results in a similar outcome. In particular, we have estimated the debt premium using an average borrowing term in excess of the length of the regulatory period (as recommended by Dr Lally), and included allowances for debt issuance and swap costs which are consistent with the TCSD.

Our estimate of the cost of equity is 7.92%

15.   We have estimated a cost of equity for UCLL and UBA of 7.92%. Under the simplified Brennan-Lally CAPM, our estimate of the cost of equity comprises four main components:

15.1   a risk-free rate of 4.19%, estimated using the same approach as for the cost of debt;

15.2   an investor tax rate of 28%, set to reflect the maximum prescribed investor rate under the portfolio investment entities (PIE) regime;

15.3   an asset beta of 0.40, estimated using Oxera's refined sample of comparator firms; and

15.4   a TAMRP of 7.0%, as recommended by Dr Lally.

16.   When estimating the asset beta of 0.40 for UCLL and UBA we:

16.1   started with the asset beta estimate reported by Oxera for the most recent five-year period (2009-2014), using monthly sampling, for its revised sample of comparator firms. This resulted in an asset beta estimate of 0.33;

16.2   looked at other periods and sampling frequencies to check the initial asset beta estimate, and found that estimates from the most recent five years were consistently lower than the preceding five-year period (from 2005-2009). In determining an asset beta of 0.40 we placed some weight on the preceding five-year period, to reduce the risk that our initial estimate was too low;[4] and

16.3   then checked our estimate of 0.40 against other information, including asset betas for fixed-line telecommunications services used by other regulators, to ensure it was reasonable.

We have used notional leverage of 43%

17.   We have used a notional leverage of 43% for UCLL and UBA, which is the average of Oxera's refined comparator sample used when estimating asset beta. We have also assumed a zero debt beta. This approach is consistent with the cost of capital IMs.[5]

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[4]   In terms of sampling frequencies, the monthly and weekly estimates for the same periods were generally very close to each other.

[5]   We have determined leverage based on the average of the sample of comparator firms to address the 'leverage anomaly'. The leverage anomaly is a well-known counterintuitive characteristic of the simplified Brennan-Lally CAPM, where WACC increases with increasing leverage. Using the average leverage of the

Our mid-point post-tax WACC estimate for UCLL and UBA is 6.47%

18.   Overall, we have estimated a mid-point post-tax WACC of 6.47% for the draft UCLL and UBA pricing reviews. The parameters used to generate our WACC estimate for UCLL and UBA are summarised in Table 1 below.

Table 1 – UCLL and UBA WACC estimate (as at 1 August 2014)

Parameter	Estimate
Risk-free rate	4.19%
Debt premium	1.85%
Leverage	43%
Asset beta	0.40
Debt beta	0.00
TAMRP	7.0%
Corporate tax rate	28.0%
Investor tax rate	28.0%
Debt issuance costs	0.25%
Cost of executing interest rate swap	0.04%
Equity beta	0.70
Cost of equity	7.92%
Cost of debt	6.33%
Post-tax WACC (mid-point)	**6.47%**

19.   The WACC is estimated as at 1 August 2014, which is four months prior to the date of the draft UCLL and UBA pricing review determinations. This was necessary to enable us to complete modelling and other work prior to finalising our draft decision. We propose to update the risk-free rate and debt premium for the final decision, so that these parameters are determined as close as practicable to the date of the final decision (subject to our approach to backdating).

We have not applied an uplift to our mid-point WACC estimate

20.   We have not applied an uplift to the mid-point WACC estimate for UCLL and UBA. In reaching this view, we considered whether there is any reason to depart from the mid-point, which is our best parameter-based estimate of the cost of capital for UCLL and UBA.[6]

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comparator sample means that WACC is the same regardless of whether the debt beta is set at zero, or at a level to make the estimated cost of capital invariant to leverage (or any level in between).

[6]   Following our recently completed IMs WACC percentile review, the 67th percentile WACC estimate is now used for price-quality regulation of electricity lines and gas pipeline business under Part 4 of the

21.	When considering whether to depart from our mid-point WACC estimate, our primary concern was the asymmetric consequences of setting UCLL and UBA prices too low, relative to setting them too high. In particular, we considered the risk that setting prices too low could reduce migration to fibre-based services below the efficient level.

22.	However, our draft decision is that a WACC uplift is not required to address the asymmetric consequences of estimation error. In particular, we note Professor Vogelsang's advice that an uplift is not warranted, as our TSLRIC approach and specific decisions already mitigate against the risk of a low copper price reducing migration to fibre.

23.	We have also considered whether an uplift should be applied to the *overall* prices for UCLL and UBA, taking into account uncertainty in other parameters (in addition to WACC). An overall uplift is considered in detail in the draft determinations for the UCLL and UBA pricing reviews, released at the same time as this paper.[7]

We invite submissions on our approach to estimating WACC for UCLL and UBA

24.	In response to this paper, we invite submissions, supported by evidence, on:

24.1	our approach to estimating WACC for the UCLL and UBA pricing reviews, including our estimates for each of the parameters; and

24.2	the latest independent expert reports prepared by Dr Martin Lally and Oxera, released at the same time as this paper.[8]

25.	Submissions are due by **5pm on Tuesday 20 January 2014**. Please email submissions to telco@comcom.govt.nz, with the subject line 'Submission on WACC for UCLL and UBA pricing reviews'.

Commerce Act. Commerce Commission "Amendment to the WACC percentile for price-quality regulation for electricity lines services and gas pipeline services: Reasons paper" 30 October 2014.

[7]	Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014. And Commerce Commission "Draft pricing review determination for Chorus' unbundled bitstream access service" 2 December 2014.

[8]	Dr Martin Lally, Capital Financial Consultants Ltd "Review of responses to review of submissions on the cost of debt and the TAMRP for UCLL and UBA services" 20 August 2014 and Oxera "Review of expert submissions on the WACC for UCLL/UBA" 4 November 2014.

Introduction

27. This paper sets out our WACC estimate for the draft UCLL and UBA pricing review determinations, explaining how we reached our views on each of the parameters. It should be read in conjunction with our draft determinations for the UCLL and UBA pricing reviews, which have been published at the same time as this paper.[9]

28. The UCLL and UBA pricing reviews are conducted under the Telecommunications Act 2001 (Act).[10] The Act requires us to set forward-looking cost-based access prices for UCLL and UBA using a TSLRIC methodology.

29. WACC is one of the key inputs to the TSLRIC cost model for UCLL and UBA. WACC is used to estimate the return on capital component of the cost-based prices for these services.

The WACC is the financial return investors require

30. The cost of capital is the financial return investors require from an investment given its risk. Investors have choices, and will not invest in an asset unless the expected return is at least as good as the return they would expect to get from a different investment of similar risk. The cost of capital is an estimate of that rate of return.

31. There are two main types of capital: debt and equity capital. Both have a cost from the perspective of the entity that is seeking funds from investors. For debt, it is future interest payments. For equity, it is the expectation of dividend payments by the firm, and where profits are retained and reinvested, the expectation of larger dividend payments by the firm sometime in the future.

32. WACC reflects the cost of debt and the cost of equity, and the respective portion of each that is used to fund an investment. WACC cannot be observed directly. Rather it must be estimated. The relevant estimate is of the market's view of the cost of capital for providing the service, not the cost of capital specific to one supplier, or a supplier's view of its cost of capital for that service.[11]

Approach to estimating WACC for UCLL and UBA

33. We estimate the cost of debt by observing the interest rate on New Zealand Government bonds, and the additional interest rate paid by corporates above that paid by the Government. The premium above the interest rate on New Zealand Government bonds reflects the corporates' greater riskiness, relative to that of the Government.

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[9] Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014. And Commerce Commission "Draft pricing review determination for Chorus' unbundled bitstream access service" 2 December 2014.

[10] For further information see http://www.comcom.govt.nz/regulated-industries/telecommunications/standard-terms-determinations/unbundled-bitstream-access-service/uba-final-pricing-principle-price-review/.

[11] This point is discussed further in our IM reasons paper. That discussion is in the context of workably competitive market standard, rather than the hypothetical efficient operator test under the Telecommunications Act. However, in our view, similar logic applies.

34. We estimate the cost of equity using a financial model, the CAPM, which assumes the return on equity for any given investment reflects:

    34.1   the return from holding an asset with no risk; and

    34.2   the riskiness of the particular investment relative to the riskiness of the total market, multiplied by the return expected on the market portfolio (all risky stocks).

35. Figure 1 below illustrates the various components of WACC. We have produced our WACC estimate for UCLL and UBA by estimating each of these components.

Figure 1 – WACC and its components
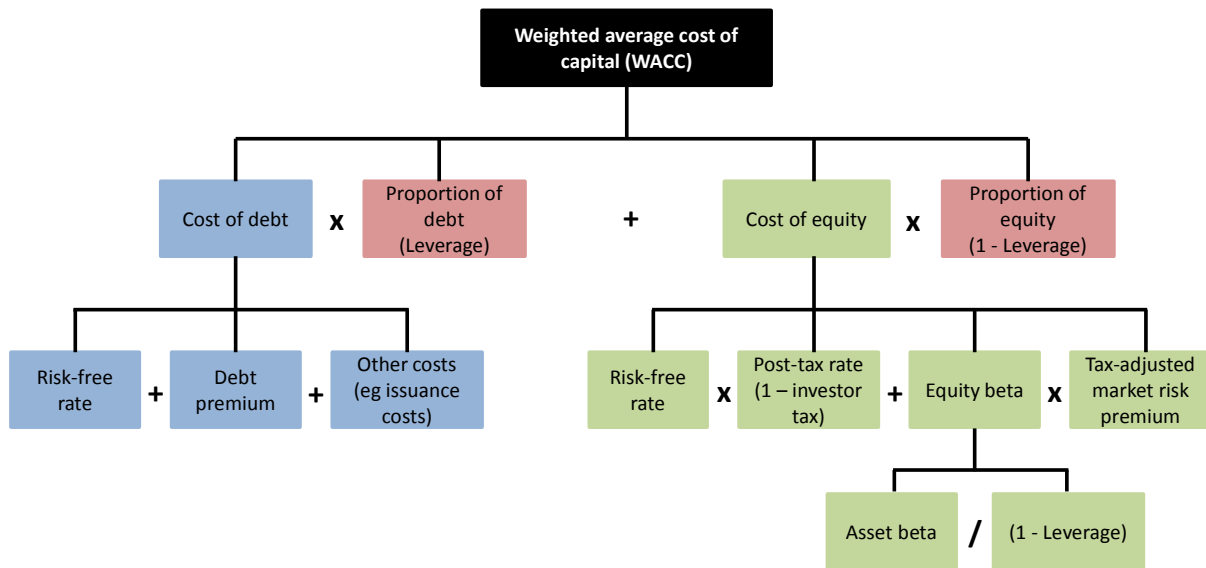
36. When setting prices for UCLL and UBA we seek an estimate of WACC relating to these services only. This is important as investors may seek a higher or lower return on capital from providing other telecommunications services, due to differences in perceived riskiness. As such, our WACC estimate for a hypothetical efficient operator for UCLL and UBA services may differ from our and other analysts' estimates of WACC for Chorus (and other telecommunications providers), given these companies also provide other services (for example, ultra-fast broadband (UFB) or mobile services).

37. Given the similarities between the pricing reviews for UCLL and UBA, this paper covers WACC for both services.

38. We use a forward-looking, post-tax WACC estimate as an input to setting TSLRIC prices for UCLL and UBA. A forward-looking estimate is required by the Act and a post-tax WACC estimate is consistent with the assumptions of the TERA model.[12]

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[12]   The definition of TSLRIC in Schedule 1 of the Telecommunications Act refers to "forward-looking costs". A post-tax WACC includes the post-tax cost of debt.

We have used the cost of capital IMs as a starting point

39.   Our view is that the analysis and reasons in the cost of capital IMs provide an appropriate starting point for determining WACC for the UCLL and UBA pricing reviews. The IMs were developed through a thorough consultation process involving a range of stakeholders (including Telecom, prior to structural separation).

40.   The cost of capital IMs were based on our draft cost of capital guidelines, which were intended to apply to a range of services (including telecommunications). The cost of capital IMs were developed in parallel with consultation to revise the draft guidelines. Further information regarding our approach to cost of capital under Part 4 of the Commerce Act is available on our website, and in the IMs reasons papers.[13]

41.   On 7 March 2014 we released a consultation paper on the cost of capital for the UCLL and UBA pricing reviews.[14] That paper proposed using the IMs as a starting point for estimating the WACC for UCLL and UBA. Submissions have generally supported this approach, while noting that consideration also needs to be given to service-specific factors.[15]

42.   The cost of capital IMs for the energy utilities and airports were determined in 2010, and were subject to a merits review by the High Court. The Court dismissed all the appeals against our cost of capital IMs.[16]

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[13]   See http://www.comcom.govt.nz/regulated-industries/input-methodologies-2/cost-of-capital/ for further details regarding the development of the cost of capital input methodologies. The October 2005 draft cost of capital guidelines, and the June 2009 revised draft guidelines, both covered telecommunications. Commerce Commission "Input methodologies (electricity distribution and gas pipeline services): Reasons paper" 22 December 2010; Commerce Commission "Input methodologies (airport services): Reasons paper" 22 December 2010; Commerce Commission "Input methodologies (Transpower): Reasons paper" 22 December 2010.

[14]   Commerce Commission "Determining the cost of capital for the UCLL and UBA price reviews - Technical consultation paper" 7 March 2014.

[15]   Chorus "Submission in response to the Commerce Commission's Process and issues paper for determining a TSLRIC price for Chorus' unbundled copper local loop service in accordance with the Final Pricing Principle" 14 February 2014, p. 58, paragraph 288; Telecom "Submission on Process and issues paper for determining a TSLRIC UCLL price" 14 February 2014, p. 49, paragraph 172; Frontier Economics "Determining a TSLRIC price for Chorus' UCLL service" February 2014, p. 29; Vodafone "Comments on process and issues paper for the unbundled copper local loop (UCLL) final pricing principle" 14 February 2014, p. 29, paragraph I1.2. Although Telecom agreed that the cost of capital IMs provide the logical starting point, it submitted that different approaches to estimating the cost of capital should always be under consideration. It noted that the rate of technological change in telecommunications is much greater than the industries covered by the cost of capital IMs, so the Commission should remain open to other approaches: Telecom "Process and issues paper for determining a TSLRIC UCLL price" 14 February 2014, p. 50, paragraph 174.

[16]   Wellington International Airport Ltd & Ors v Commerce Commission [2013] NZHC, 11 December 2013. The High Court queried the evidential basis for our decision to use a WACC above the mid-point estimate when setting price-quality paths under Part 4. We reconsidered this issue during 2014, and issued our final decision in October 2014. Our reasons are set out in: Commerce Commission "Amendment to the WACC percentile for price-quality regulation for electricity lines services and gas pipeline services" 30 October 2014.

Differences between the Part 4 and telecommunications regulatory regimes affect WACC

43.　While we have used the IMs as the starting point for estimating the cost of capital for UCLL and UBA, changes in approach are required to address differences between Part 4 and the context for this decision. This reflects that:

43.1　UCLL and UBA are different services to those regulated under Part 4; and

43.2　regulated UCLL and UBA prices, and price-quality paths for energy utilities, are set under different statutory frameworks.

44.　Different services may have different risks and, therefore, a different required return. This is reflected in the beta estimate for each service.[17] If beta differs between services, the WACC too will differ.

45.　The cost of capital IMs and the WACC for the UCLL and UBA pricing review determinations are also used in different legislative contexts.

46.　We have considered whether differences in the purpose statements and price setting methodologies between the Telecommunications Act and the Commerce Act affect how we estimate WACC for the services we regulate. In our view, these differences do not affect the methodology for making our central estimate of WACC (ie, our mid-point WACC), since the cost of capital is determined by the return required by investors in the market. Our mid-point WACC is our best estimate of that return.

47.　However, the different purpose statements and price setting methodologies are relevant when deciding whether to apply an uplift to our mid-point WACC estimate. In particular, the Telecommunications Act specifies a TSLRIC methodology for setting service-based access prices, but price-quality paths under Part 4 of the Commerce Act are determined using a building blocks approach. This is discussed in paragraphs 198 to 252 below.

48.　The definition of TSLRIC in Schedule 1 of the Telecommunications Act specifies that forecast-looking costs are used. We generally prefer current (forward-looking) estimates of the value of the WACC parameters, but in some cases we also consider historic information, particularly where this provides reliable information to help inform the best estimate of the value of a parameter.

Process for estimating the cost of capital for UCLL and UBA

49.　The key steps in our approach to estimating WACC for the draft UCLL and UBA pricing reviews were as follows.

49.1　On 6 December 2013 we released a process and issues paper for the UCLL pricing review, which included several questions regarding the approach to estimating WACC.[18]

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[17]　See paragraphs 132 to 143 below for further discussion on beta for the UCLL and UBA services.

49.2 On 7 March 2014 we released a consultation paper on WACC for the UCLL and UBA pricing reviews.[19] Amongst other things this paper proposed to:

49.2.1 use the cost of capital IMs as a starting point;

49.2.2 use the simplified Brennan-Lally CAPM to estimate the cost of equity; and

49.2.3 estimate the cost of debt by reference to:

(a) the risk-free rate (to a term matching the length of the regulatory period);

(b) the debt premium (by reference to publicly-traded New Zealand dollar corporate debt); and

(c) the costs of issuing debt.

49.3 We then sought independent expert advice on beta, leverage, TAMRP and credit rating, and on the submissions and cross-submissions received in response to our March consultation paper. Specifically, we sought advice from Dr Lally on the cost of debt and TAMRP, and advice from Oxera on beta, leverage and the target long-term credit rating.

49.4 On 23 June 2014 we released the independent expert reports from Dr Lally and Oxera for consultation.

49.5 We received submissions (on 22 July 2014) and cross-submissions (on 6 August 2014) on the independent expert reports from Dr Lally and Oxera.

49.6 After receiving submissions and cross-submissions on these reports, we then sought revised independent expert advice from Dr Lally and Oxera in response to points raised.

50. This paper sets out our draft decision on WACC for the UCLL and UBA pricing reviews. We have also released updated expert reports from Oxera and Dr Lally with this draft decision.[20]

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[18] Commerce Commission "Process and issues paper for determining a TSLRIC price for Chorus' unbundled copper local loop service in accordance with the Final Pricing Principle" 6 December 2013, pp.42-45.

[19] Commerce Commission "Determining the cost of capital for the UCLL and UBA price reviews - Technical consultation paper" 7 March 2014.

[20] During consultation on the choice of WACC percentile under Part 4 of the Commerce Act we received some submissions which we consider are relevant to this process. In particular, we refer to submissions from Chorus and Spark, and their consultants. Chorus "Submission on further work on WACC IMs" 5 May 2014, with attached submissions from CEG and Professor Grundy. Chorus "Submission on Proposed amendment to the WACC percentile for electricity lines services and gas pipeline services" 29 August 2014. Spark "Cross-submission on Proposed amendment to the WACC percentile for electricity lines services and gas pipeline services" 12 September 2014.

Structure of this paper

51.   The rest of this paper sets out our views on WACC for the draft UCLL and UBA pricing reviews, including:

      51.1   our approach to estimating the cost of debt;

      51.2   our approach to estimating the cost of equity;

      51.3   our view on the appropriate mix of debt and equity (leverage);

      51.4   whether we consider it appropriate to apply an uplift to our mid-point WACC estimate; and

      51.5   whether our WACC estimate for UCLL and UBA is reasonable in light of other available information.

Approach to estimating the cost of debt

52.   Debt is an important source of capital for many businesses. We estimate the cost of debt by observing the interest rate paid by the New Zealand Government, and the additional premium corporate borrowers pay to compensate investors for the additional risks of lending to them (relative to the Government). We also allow for the costs of issuing debt (for example, to cover roadshows and brokerage), and the cost of entering a financial swap to shorten the term of part of the cost of debt.

53.   Our estimate of the cost of debt for UCLL and UBA comprises four components:

   53.1   the risk-free rate;

   53.2   the debt premium;

   53.3   debt issuance costs; and

   53.4   an allowance for swap costs.

Risk-free rate

54.   In this section, we:

   54.1   introduce the risk-free rate, noting that we have used the return on New Zealand Government bonds to estimate the risk-free rate;

   54.2   explain why we use a five-year term of the risk-free rate; and

   54.3   provide our estimate of the risk-free rate for a five-year term.

We have used the return on New Zealand Government bonds to estimate the risk-free rate

55.   The risk-free rate is the interest rate on an asset with no default risk. In practice, the risk-free rate cannot be observed; it is usually approximated by the return on a very safe asset such as a government bond. We have used the observed market yield to maturity of benchmark New Zealand Government, NZ$ denominated, nominal bonds to estimate the risk-free rate.

We have used a five-year term of the risk-free rate

56.   When estimating WACC for UCLL and UBA, we are estimating the cost of capital for a hypothetical efficient operator of these services. We require an estimate of the benchmark cost of capital for such a provider. Use of a five-year term of the risk-free rate provides the appropriate benchmark, given that we have used a five-year regulatory period for the draft UCLL and UBA pricing reviews.

57.   The level of the risk-free rate varies with the term of the investment. Sometimes, the yield increases with term, other times it declines.

58.   When prices are reset for each regulatory period, and those prices reflect the then prevailing interest rates, the supplier is not exposed to the risk of changes in the risk-free rate beyond the term of the regulatory period. Therefore, using a risk-free rate

with a term longer than the pricing period would compensate a supplier for an uncertainty it does not bear. We have set the length of the regulatory period for the UCLL and UBA pricing reviews at five years.[21] Accordingly, the term of the risk-free rate should also be five years. In the cost of capital IMs, we explained the reasoning as follows:[22]

> A fundamental concept in finance is that the interest rate applied to a set of cash flows should reflect the risk, and the term, of those cash flows. To illustrate, consider the pricing of a zero-coupon five year bond. The only discount rate that will correctly price this bond is the five year spot rate. Applying an interest rate with a term other than five years would generate either windfall gains or losses to the holder of the bond by mispricing it. The precise outcome will depend on the slope of the term structure of interest rates.

59. Suppliers can be over or under-compensated if the term does not match the length of the regulatory period. Matching the risk-free rate to the length of the regulatory period avoids under- or over- compensating suppliers of regulated services because, as we explained in the IMs, they can:[23]

> …reset their prices at the end of each regulatory period to reflect, among other things, changes in the risk-free rate if this has altered the cost of capital. Through the regular resetting of prices the premium for uncertainty over the level of long-term interest rates is being borne by users, rather than suppliers. Accordingly, suppliers' prices should not reflect a premium for the uncertainty of risk-free rates beyond the length of the regulatory period.

60. Network Strategies, on behalf of Vodafone, supported matching the risk-free rate to the regulatory period. Network Strategies submitted that it agrees "…with the High Court sentiments that the term of the risk-free rate should match the regulatory period…" noting that this "…achieves consistency of the WACC with relevant cash flows".[24]

61. In its submission on the UCLL FPP process and issues paper, Chorus proposed using a 10-year term for the risk-free rate, matching its proposed length of the regulatory period.[25] However, for the reasons discussed in the draft UCLL and UBA pricing review determinations, we have used five-year term of the regulatory period.[26]

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[21] Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014 Chapter 1, and Commerce Commission "Draft pricing review determination for Chorus' unbundled bitstream access service" 2 December 2014 Chapter 1.

[22] Input Methodologies (Electricity Distribution and Gas Pipeline Services) Reasons paper, 22 December 2010, p.439, H4.31.

[23] Input Methodologies (Electricity Distribution and Gas Pipeline Services) Reasons paper, 22 December 2010, p.442, H4.40.

[24] Network Strategies "Commission consultation on WACC for UCLL and UBA services - Final report for Vodafone New Zealand - Report Number 33022" 27 March 2014, p.15.

[25] Chorus "Submission in response to the Commerce Commission's Process and issues paper for determining a TSLRIC price for Chorus' unbundled copper local loop service in accordance with the Final Pricing Principle" 14 February 2014, p.62, paragraph 301.

[26] Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014 Chapter 1, and Commerce Commission "Draft pricing review determination for Chorus' unbundled bitstream access service" 2 December 2014 Chapter 1.

62. Suppliers of regulated services should not be compensated for risks that they are not exposed to, and therefore do not bear. By matching the term of the risk-free rate to the term of the regulatory period, we ensure that the supplier of the service is compensated for the risk they are exposed to during the regulatory period and that they are able to have the expectation of earning a normal return in the long-run.

Our estimate of the risk-free rate is 4.19%

63. We have estimated a risk-free rate of 4.19% for the draft UCLL and UBA pricing reviews.

64. We have used essentially the same methodology to estimate the risk-free rate for UCLL and UBA as was used in the cost of capital IMs. We have used current interest rates, rather than long-term averages.

65. Market interest rates are constantly changing. To enable us to complete modelling and other work prior to finalising our decision we need to settle on an estimate of the risk-free rate as this, and the estimate of WACC, are inputs into the UCLL and UBA prices. For the purposes of this decision, we have estimated the risk-free rate (and the WACC as a whole) as at 1 August 2014 (four months prior to the date of the draft decision). For the final decision, we propose to update the risk-free rate as close as practicable to the date of the final decision, taking into account timing constraints associated with finalising the TSLRIC models (and subject to our approach to backdating).

66. We estimated the risk-free rate by averaging the observed market yields on government bonds over one calendar month (July 2014) prior to when the cost of capital is being estimated (1 August 2014). This is the same approach as we use in the IMs. We consider this provides a suitable balance between reducing the degree of volatility which can affect daily data, and delivering a relatively up-to-date estimate of the risk-free rate.

Debt premium

67. In this section we:

    67.1 introduce the debt premium;

    67.2 identify the market information we used to estimate the debt premium;

    67.3 explain why we use a current estimate of the debt premium, rather than a historic average;

    67.4 explain why we have used a seven year term when estimating the debt premium;

    67.5 explain why we estimate the debt premium on bonds with a S&P credit rating of BBB+;

67.6   explain why we do not use a curve-fitting approach and foreign-currency bonds issued by New Zealand entities; and

67.7   provide our estimate of the debt premium for UCLL and UBA.

68.   We have estimated a debt premium of 1.85% (as at 1 August 2014), based on a seven year term and BBB+ S&P long-term credit rating. This debt premium estimate excludes allowances for debt issuance costs and swap costs, which are addressed separately in paragraphs 111 to 116 below.

What is the debt premium?

69.   The debt premium is the additional interest rate, over and above the risk-free rate, required by suppliers of debt capital to compensate them for being exposed to the risks of default in lending to a firm, plus an allowance for the inferior liquidity of corporate bonds relative to government bonds. In general, the longer the firm wishes to borrow the debt for, the higher the debt premium that the firm has to pay to the suppliers of debt capital.

Market Information used to estimate the debt premium

70.   We have estimated the debt premium by taking account of the average debt premium that would reasonably be expected to apply to publicly-traded vanilla New Zealand dollar denominated corporate bonds that are:

70.1   issued by a borrower that is neither majority owned by the Government nor a local authority; and

70.2   have a S&P long-term credit rating of BBB+ (or equivalent rating from Moody's or Fitch).[27] The target long-term credit rating is discussed in paragraphs 98 to 104 below.

71.   We excluded bonds issued by financial institutions and those issued by companies which undertake (or are part of a group which undertakes) a majority of its business activities outside New Zealand. This is consistent with the IMs for energy utilities.[28]

72.   The specific bonds we used are identified in the spreadsheet released with this draft decision.[29]

We have estimated the debt premium using prevailing interest rates at the beginning of the regulatory period

73.   We have estimated the debt premium from estimates observed around the start of the period, rather than using a long-term average of the observed debt premium.

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[27]   Vanilla bonds means senior unsecured nominal debt obligations denominated in New Zealand dollars without callable, puttable, conversion, profit participation, credit enhancement or collateral features.

[28]   See the definition of qualifying issue, in the various IM determinations, clause 1.1.4(2). The approach for airports is very similar except the specified credit rating is a Standard and Poor's long term credit rating of A-.

[29]   Commerce Commission "Cost of capital for the UCLL and UBA pricing reviews – WACC spreadsheet 2 December 2014.

74. This is consistent with our approach previously, including under the cost of capital IMs. This approach makes use of current, publicly available information to estimate the debt premium for New Zealand corporates. In particular, we can estimate the debt premium in a reasonably reliable way by estimating the yields on a range of publicly-traded, New Zealand corporate bonds. Given the availability of such information, we do not need to look at, for example, historic averages of the debt premium to estimate the debt premium.

75. Using historical rates reflects long-term average actual rates and leads to estimated costs of equity and debt which tend to be relatively stable over time. In a price setting context, this relative stability will tend to lead to relatively stable returns to suppliers and prices to consumers. However, this apparent stability could blunt the signals from structural changes in the financial markets with respect to new investment in infrastructure, as significant changes in interest rates only slowly affect the specified cost of capital.

76. The use of current rates, on the other hand, leads to estimated costs of equity and debt which more closely reflect changes in expectations in the financial markets. That is, they are more up-to-date estimates of interest rates and, therefore, the cost of capital. In a price setting context, using current rates means changes in expectations in the financial markets will be signalled more rapidly to suppliers, and to consumers.

77. In his original report, Dr Lally argued that using prevailing interest rates, as opposed to an historic average, better signals investment incentives and is simpler to implement:[30]

    …if the historical average DRP is below the current DRP, firms will be reluctant to engage in capex or to enter the regulated sector. Alternatively, if the historical average DRP is above the current DRP, capex and new entrants would be unjustifiably encouraged.

78. In response to CEG's proposed debt management criteria, Dr Lally recommended seven criteria for selecting the best regulatory approach to setting the allowed cost of debt. He then considered three separate options against those criteria, as outlined below:[31]

    Option A: The risk free rate at the beginning of the regulatory cycle (with a term matching the regulatory cycle) coupled with the DRP at the beginning of the regulatory cycle (with a term matching the average term for which firms borrow), plus the transactions costs of interest rate swap contracts to align the risk-free rate component of the firm's staggered debt with the regulatory cycle. This is similar to the current regime (but without the TCSD and with allowance for the transactions cost of the interest rate swaps).

    Option B: The risk free rate at the beginning of the regulatory cycle (with a term matching the regulatory cycle) plus the historical average DRP (over a period matching the average term

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[30] Dr Martin Lally, Capital Financial Consultants Ltd "Review of submissions on the cost of debt and the TAMRP for UCLL and UBA services" 13 June 2014, p.16.

[31] Dr Martin Lally, Capital Financial Consultants Ltd "Review of submissions on the cost of debt and the TAMRP for UCLL and UBA services" 13 June 2014, p.15.

for which regulated firms borrow), plus the transactions costs of interest rate swap contracts to align the risk-free rate component of the firm's staggered debt with the regulatory cycle. The historical average DRP may be updated annually.

Option C: The historical average cost of debt, over a period matching the average term for which firms borrow. The historical average cost of debt may be updated annually.

79. Based on his proposed criteria, and the above options, Dr Lally concluded that we should estimate the risk-free rate at the beginning of the regulatory cycle and match it to the term of the regulatory period (five years). He also concluded that we should match the term of the debt premium to the average term that firms borrow, and allow for swap costs, as we are not implementing a TCSD.[32]

80. Dr Lally acknowledged that the use of prevailing interest rates is likely to give rise to additional bankruptcy risk, but the empirical evidence in his original report suggested that the impact of this increased risk is trivial.

81. In its submission on Dr Lally's original report, CEG argued that the use of a trailing average cost of debt "...accurately compensates efficient debt raising costs over time".[33] However, Dr Lally's updated report dismissed this argument because "...a firm initially compensated at the trailing average of 1.5% but initially paying 3% would be discouraged from engaging in capex at this time."[34] Dr Lally also noted that CEG's proposed solutions to this problem increase complexity and are not "readily comprehensible".

82. CEG argued that Dr Lally's empirical evidence in his original report did not use a long enough data set to prove that the increased bankruptcy risk caused by using the prevailing rate is trivial: [35]

Seven and a half years is simply too short a time period to assess the potential future magnitude of errors in Option A as a proxy for the (viable/efficient) Option B.

83. In his updated report, Dr Lally acknowledged that a larger dataset is always better, but was not convinced by the longer US data set contained in CEG's submission, and did not change his opinion that bankruptcy risks would not be material: [36]

I agree that a longer series is better and it is almost inevitable that a much longer data set will generate a maximum annual shortfall that is larger. However, even CEG's maximum annual shortfall (3.5 times as large as that in Lally, 2014a) would only constitute 9% of the firm's NCF in that year (3.5 times that of the 2.5% in Lally, 2014a). So, even in CEG's longer time series, the maximum bankruptcy risk is not significant.

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[32] The term of the debt premium and the TCSD are discussed further in paragraphs 86 to 97 below.
[33] CEG "Review of Lally and Oxera reports on the cost of capital" July 2014, p.47.
[34] Dr Martin Lally, Capital Financial Consultants Ltd "Review of responses to review of submissions on the cost of debt and the TAMRP for UCLL and UBA services" 20 August 2014, p.22.
[35] CEG "Review of Lally and Oxera reports on the cost of capital" July 2014, p.43.
[36] Dr Martin Lally, Capital Financial Consultants Ltd "Review of responses to review of submissions on the cost of debt and the TAMRP for UCLL and UBA services" 20 August 2014, p.20.

84. Dr Lally argued that although Chorus is not yet subject to a regime that estimates its cost of debt (UCLL and UBA prices have previously been set by international benchmarking), Option B would require us to calculate a trailing average for the previous seven years, which is likely to be more contentious than estimating the prevailing rate at the start of the regulatory period (which does not require historical data).[37]

> CEG (2014b, paras 202-206) argues that there is no present regime applied to Chorus for estimating the cost of debt (because prices for the UCLL/UBA services have been set to date by international benchmarking), and therefore this concern does not arise. However, this claim is not correct. If the Commission switches from price benchmarking to a regime in which a DRP is required, Option B immediately requires a trailing average DRP for the previous seven years and efforts to estimate this are likely to be even more contentious than estimating the current DRP. In view of this problem, a transitional process towards the trailing average might be adopted, as the AER (2013) has. Furthermore, CEG (2014a, para 278) sheds no light on this matter because they do not estimate a trailing average DRP or cost of debt. By contrast, Option A does not require historical DRP data. Accordingly, in respect of this criterion, Option A is favoured.

85. We consider that the observed yields on publicly-quoted and publicly-traded bonds provide up-to-date and reliable information on the debt premium in New Zealand. We are not persuaded that there are any shortcomings of this established approach such that we should modify or amend it in favour of relying wholly or partly on historic averages of the debt premium. Therefore, we have based the debt premium on prevailing interest rates at the beginning of the regulatory period.

We have based the term of the debt premium on the average borrowing term

86. We have used a term of the debt premium of seven years. This is based on the assumption that the hypothetical firm that we are modelling would follow an efficient debt strategy, and seek to issue debt with long terms, thereby reducing re-financing risk. Available evidence suggests seven years is a reasonable estimate of term of borrowing for large New Zealand corporates.

87. Under the cost of capital IMs the term of the debt premium matches the length of the relevant regulatory periods (and the term of the risk-free rate). This is generally five years.[38]

88. Before setting the IMs we undertook a survey of debt management practices of energy companies, and the regulated airports. This survey highlighted that some of these companies were issuing debt with a tenor greater than five years, but most were not. We noted that while there were advantages to the firm and consumers from issuing such longer-term debt, only some firms were actually doing so.

89. In the IMs we were unwilling to set a term for the debt premium which was longer than the regulatory period when most firms were not incurring the additional cost of

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[37] Dr Martin Lally, Capital Financial Consultants Ltd "Review of responses to review of submissions on the cost of debt and the TAMRP for UCLL and UBA services" 20 August 2014, p.22.

[38] In some specific circumstances under Part 4, the regulatory period can be three or four years, rather than five.

longer-term debt. If we had used a longer term of the debt premium, we would have compensated regulated suppliers for a cost most were not incurring.

90.   On the other hand, we did not want the higher debt premium on longer-term debt to discourage firms from issuing such debt. To offset a possible disincentive to issuing long-term debt, we introduced a special allowance to compensate those firms for any additional costs involved in such borrowing. The special allowance was called the TCSD allowance.

91.   Only firms which issued debt with a term exceeding five years qualified for the TCSD allowance. In combination, a five-year debt premium and the TCSD produced an allowance for the cost of debt which matched the term of debt issued by firms.[39]

92.   Unlike under Part 4, where regulated suppliers had a wide divergence of debt management practices, when setting UCLL and UBA prices under the Telecommunications Act we only need to estimate WACC for a single hypothetical efficient operator. For a single firm we can estimate a debt premium with a term reflecting the assumed term of its debt, and therefore there is no need for a TCSD in the current decision.

93.   When considering the term of the debt premium for UCLL and UBA we took advice from Dr Lally. He referred to our confidential debt survey of energy utilities and airports, our TCSD, and CEG's submission that the term of the debt premium should be 10 years.

94.   In his original report, Dr Lally advised that:[40]

> CEG's belief that the average debt term for regulated firms is ten years (CEG, 2014, pp. 48-50) seems to conflict with the evidence presented by the Commerce Commission (2010, pp. 449-451). However most of the apparent conflict in evidence arises because CEG presents data from a range of markets whilst the Commission favours New Zealand data. New Zealand data is preferable, because it is more relevant. However it does suggest a figure of about seven years rather than five years.

95.   The term of seven years recommended by Dr Lally is consistent with the results of our 2010 survey. We agree with Dr Lally's recommendation.

96.   We are required to establish the WACC for a hypothetical efficient operator. We consider such a firm would issue long-term debt, and thereby incur a higher debt premium reflecting the longer term of its debt. We consider the average original tenor of around seven years observed for energy utilities and airports in the Commission's confidential survey in 2010 to be a reasonable proxy for the debt tenor of an efficient provider of UCLL and UBA services, as this was based on New Zealand suppliers of regulated infrastructure services. We therefore estimate the debt premium based on an assumed term of seven years.

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[39]   For those firms that issued debt with an original tenor exceeding five years. All other firms received a five year debt premium only.

[40]   Dr Martin Lally, Capital Financial Consultants Ltd "Review of submissions on the cost of debt and the TAMRP for UCLL and UBA services" 13 June 2014, p. 14.

97.   Although this decision does not include a TCSD, our approach is consistent with many of its principles. In particular, we have:

   97.1   estimated the debt premium using an average borrowing term in excess of the length of the regulatory period (which the combination of the TCSD and a five-year debt premium also achieves for qualifying suppliers);

   97.2   included an allowance for swap costs, consistent with the TCSD; and

   97.3   made consistent assumptions around annual issuance costs, which the TCSD also does.

We have used a target long-term credit rating of BBB+

98.   We have used an S&P long-term credit rating of BBB+ when estimating the debt premium for UCLL and UBA.

99.   We sought advice from Oxera on the appropriate credit rating to assume when estimating the cost of debt. Oxera's original report recommended a S&P long-term credit rating of A-/BBB+:[41]

   In the IM, NZCC used a target credit rating of BBB+ for gas and electricity, whereas for the airports it was determined to be A-. Consistent with the relative risk hierarchy of the different sectors, this further supports a recommendation to target a slightly higher credit rating for telecoms of A-. Equally, the differential between A- and BBB+ is small, and should not impact the choice of the equity beta, and therefore either of these precedents could potentially be appropriate.

100.   Submitters on Oxera's original report, including Spark (previously Telecom), agreed that a credit rating range of A-/BBB+ is appropriate, but also noted that Oxera had not provided analysis of the credit ratings for companies in the comparator sample it used when estimating beta:[42]

   Oxera conclude that a target Standard and Poor's target credit rating within a range of A- to BBB+ is considered appropriate. We think that this range is likely to be reasonable although an analysis of the credit ratings of the companies contained in the broader, or preferably the refined Oxera comparator set would provide material assistance in assessing the point within this range that represents the most appropriate assessment of a target credit rating.

101.   Oxera has addressed these comments in section 5 of its latest paper.[43] Table 5.1 of that paper illustrates the credit ratings and leverage for firms in CEG's comparator sample and Oxera's recommended refined sample.[44]

102.   As a result of its credit rating analysis, including assessing the credit ratings of the comparator sample, Oxera concluded that its "…recommended target credit rating of

[41]   Oxera "Review of the beta and gearing for UCLL and UBA services - Evidence and recommendations prepared for New Zealand Commerce Commission" June 2014, p.42.

[42]   Telecom "Expert reports on the cost of capital for UCLL and UBA price review" 21 July 2014, p.3.

[43]   Oxera "Review of expert submissions on the WACC for UCLL/UBA" 4 November 2014.

[44]   Oxera "Review of expert submissions on the WACC for UCLL/UBA" 4 November 2014, p.15.

A-/BBB+ is therefore consistent with the relevant evidence from the comparator data".[45]

103. In estimating the WACC UCLL and UBA, we seek to estimate the costs of a hypothetical efficient operator. We consider an efficient operator would seek to maintain a strong investment-grade credit rating so as to ensure satisfactory access to debt capital markets at reasonable cost. In selecting its target credit rating, an efficient operator would also prefer a strong investment-grade credit rating so as to provide it with a margin of safety.

104. We have assumed a S&P long-term credit rating of BBB+ as we consider this:

104.1 satisfies the criteria in paragraph 103 above (and does so better than alternative credit ratings such as the BBB- proposed by CEG (for Chorus);

104.2 is in the middle of the range of credit ratings held by New Zealand corporates issuing publicly-traded bonds (as evidenced by our WACC determinations under Part 4);

104.3 is consistent with the advice on credit rating from Oxera (which recommended a rating of between A- / BBB+); and

104.4 is consistent with the credit rating we assume for estimating the debt premium for electricity lines businesses and gas pipeline businesses under Part 4.

We have not included foreign-currency bonds issued by New Zealand entities when estimating the debt premium

105. We have estimated the debt premium from New Zealand dollar denominated bonds, and have not considered the yields on foreign-currency bonds. This is consistent with the approach used in the cost of capital, and advice from Dr Lally.

106. In its submission on our 7 March 2014 consultation paper, CEG argued for the use of foreign-currency bonds when estimating the debt premium because this will increase the data set and include more liquid markets.[46]

> My proposal involves widening the sample of data that is analysed when estimating the cost of debt to include bonds issued by New Zealand corporations into foreign currencies and to include bonds that do not have credit ratings (assigning these bonds the same credit rating as their issuer or the ultimate parent company (if the issuer is a wholly owned subsidiary)).

107. In his original advice Dr Lally did not support CEG's submission to include foreign-currency bonds:[47]

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[45] Oxera "Review of expert submissions on the WACC for UCLL/UBA" 4 November 2014, p.17.
[46] Competition Economists Group "Response to Commerce Commission UCLL/UBA WACC consultation paper" March 2014, p.25.
[47] Dr Martin Lally, Capital Financial Consultants Ltd "Review of submissions on the cost of debt and the TAMRP for UCLL and UBA services" 13 June 2014, p.9.

…I do not support CEG's recommendation to include foreign currency denominated bonds in the DRP estimation process due to concerns about liquidity, data quality, and the appropriate weights to place on different bond types. Lest this raise concerns about bias in estimating a firm's average DRP (over all sources), I understand that the DRPs on local currency bonds are not systematically above those on foreign-currency denominated bonds. Consequently, the use of only local-currency bonds in estimating a firm's DRP may sometimes be too high and sometimes too low but the average error will tend to zero over time.

108.   Dr Lally's updated report continues to recommend that we do not use foreign-currency bonds when estimating the DRP. Dr Lally noted that, in respect of using foreign-currency denominated bonds to estimate the debt premium for Australian regulated businesses, this is problematic because:

108.1   these bonds are not very liquid (because the holders of them typically hold until maturity) and therefore secondary market based estimates (from parties such as Bloomberg) would have low quality;[48]

108.2   some firms are unable to obtain foreign debt finance;[49] and

108.3   it would raise the contentious question of whether to include bank debt.[50]

We have not used a curve-fitting approach for estimating the debt premium

109.   We have not used a curve-fitting approach due to practical implementation difficulties. There is no agreed approach internationally to curve-fitting and we do not consider it provides a better approach to estimating the debt premium. This approach follows the advice of Dr Lally who noted:[51]

In respect of curve fitting, this suffers from the need to choose amongst competing curve-fitting functions.

Amongst the world's central banks, each of these approaches have their supporters and this implies that there is no professional consensus on the best approach.

Curve fitting also suffers from the need to obtain high quality DRP data over a wider range of maturities. Given the need for a wider range of maturities, the temptation to loosen standards (by admitting lower quality data) will be strong and the result of this is likely to be a biased estimate of the DRP of concern.

However, if there were a professional consensus that a particular model was best, a regulator could reasonably use it. In the absence of a professional consensus, a regulator could reasonably choose from amongst many models and the results could vary widely. I think this is clearly a disadvantage from curve fitting.

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[48]   Dr Martin Lally, Capital Financial Consultants Ltd "Review of responses to review of submissions on the cost of debt and the TAMRP for UCLL and UBA services" 20 August 2014, p.4.

[49]   Dr Martin Lally, Capital Financial Consultants Ltd "Review of responses to review of submissions on the cost of debt and the TAMRP for UCLL and UBA services" 20 August 2014, p.4.

[50]   Dr Martin Lally, Capital Financial Consultants Ltd "Review of responses to review of submissions on the cost of debt and the TAMRP for UCLL and UBA services" 20 August 2014, p.16.

[51]   Dr Martin Lally, Capital Financial Consultants Ltd "Review of submissions on the cost of debt and the TAMRP for UCLL and UBA services" 13 June 2014, pp. 11-12, 18.

However, improving data quality by filtering out lower quality data is time consuming, especially for curve fitting because the full set of potentially usable data is much larger and therefore the filtering effort required to achieve the same data quality used when averaging over bonds with residual terms to maturity of approximately the desired term is much greater.

Our estimate of the current debt premium

110. Using this methodology we have estimated a debt premium of 1.85% as at 1 August 2014, based on a seven year term and a S&P long-term credit rating of BBB+. Further details on this calculation are provided in the spreadsheet released with this draft decision.[52]

Debt issuance costs

111. We have included an allowance for debt issuance costs of 0.25% per annum in our cost of debt.

112. Firms which raise debt incur costs when issuing debt. These costs are in addition to the rate of interest payable on their debt. The cost of capital IMs included an allowance for debt issuance costs of 35 basis points per annum (0.35% p.a.). This was based on amortising the debt issuance costs over the same period as the term of the debt premium (ie, five years).

113. For the UCLL and UBA final pricing principles (FPPs), we have used a debt premium term of seven years. Therefore, to calculate the debt issuance costs we multiplied the 35 basis points by the five years and then divided by our seven year debt premium term, which equates to 0.25% p.a. That is, issuing longer-term debt reduces the frequency of incurring issuance costs for debt, and therefore the allowance per annum to cover these costs.

Swap costs

114. For the purpose of estimating the debt premium, we have assumed the hypothetical efficient operator would seek to manage re-financing risk by issuing long-term debt. Re-financing risk can also be managed by regularly issuing a portion of an operator's total debt (rather than issuing it less frequently, say, just once every seven years). This creates an interest rate risk, as interest rates when the debt is raised may be different to the rate prevailing when prices were set.

115. A supplier can manage interest rate risk by entering an interest rate swap that enables the supplier, if it wished to, to cover the cost of aligning the interest rate setting to the price setting. Accordingly, we have included an allowance for the cost of entering an interest rate swap.

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[52] Commerce Commission "Cost of capital for the UCLL and UBA pricing reviews – WACC spreadsheet" 2 December 2014.

116. We have estimated this cost as four basis points, using the approach specified in the cost of capital IMs. The IMs include an allowance for swap costs as part of the TCSD.[53]

Approach to estimating the cost of equity

117. Equity is the second main source of capital. The cost of equity is harder to estimate than the cost of debt. Most analysts use a financial model to arrive at an estimate of the cost of equity (the CAPM). In this section, we discuss:

117.1 the model we use to estimate the cost of equity; and

117.2 the value of the parameters we have used to estimate the cost of equity.

We have used the simplified Brennan-Lally CAPM to estimate the cost of equity

118. We estimate the cost of equity using the simplified Brennan-Lally CAPM. Under the simplified Brennan-Lally CAPM, the expected cost of equity is a function of the risk-free rate (after tax), plus the equity beta multiplied by the TAMRP.[54]

119. The CAPM was developed by Sharpe, Lintner and Mossin during the early 1960s. The classical version of the CAPM assumes that all forms of investment income are equally taxed, and therefore that both dividends and capital gains are not taxed more favourably than interest.

120. Since then a number of variations to the CAPM have been developed which incorporate different taxation considerations, including the Officer CAPM for the Australian taxation system and the Brennan-Lally CAPM for the New Zealand taxation system. A different variant, the International CAPM, takes into account international investors.

121. The Brennan-Lally CAPM (Lally's adaptation for New Zealand circumstances of a CAPM model elaborated by Brennan) was developed to reflect New Zealand's taxation system. Specifically, it recognises the presence of imputation credits and the general absence of taxes on capital gains. There is an extended form of the Brennan-Lally CAPM and a simplified version, but it is the simplified Brennan-Lally CAPM that has become the dominant form of the CAPM used in New Zealand.

122. In New Zealand the term simplified Brennan-Lally CAPM has become largely synonymous with the generic term CAPM, and the terms are frequently used interchangeably. It is reasonably rare to find a CAPM-based estimate of the cost of equity in New Zealand that does not rely on the simplified Brennan-Lally CAPM.

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[53] That is, an amount which is half of the wholesale bid and offer spread for an interest rate swap, for a notional principal amount equal to the principal amount of the debt. See clause 2.4.9(1) in the IM Determination and Input Methodologies (Electricity Distribution and Gas Pipeline Services) Reasons paper 22 December 2010, p.476, H6.14.

[54] Under the simplified Brennan-Lally CAPM the cost of equity = risk free rate × (1-investor tax rate) + equity beta × TAMRP.

123. In the New Zealand context, we have generally used the simplified Brennan-Lally CAPM in prior cost of capital decisions. The reasons for preferring the simplified Brennan-Lally CAPM rather than other versions of the CAPM are:

    123.1   the assumptions of the simplified Brennan-Lally CAPM are consistent with the New Zealand tax system, whereas the assumptions of other CAPMs are not. For example, the classical Sharpe-Lintner CAPM does not adjust for the effect of imputation credits and assumes the same rate of taxation on dividends as on capital gains. This is not representative of the New Zealand system of taxation. Professor Franks noted that the UK used a similar model to the simplified Brennan-Lally CAPM when it had a tax imputation regime that was similar to New Zealand's;[55]

    123.2   the simplified Brennan-Lally CAPM is very widely used and accepted in New Zealand, including by companies, investment analysts, practitioners, independent takeover appraisal reports, and advisors, and is the preferred method for estimating the cost of capital in New Zealand; and

    123.3   during the IMs, the continued use of the simplified Brennan-Lally CAPM was strongly supported at the cost of capital workshop.[56]

124. Submissions during the UCLL and UBA pricing reviews have also generally supported using the simplified Brennan-Lally CAPM.[57] For example, Spark submitted:[58]

> While the Brennan-Lally model is not without controversy, for practical reasons, we agree that the widespread use of the Brennan-Lally model in the New Zealand market, and the Commission's use of it across regulated firms in New Zealand mean that it is a reasonable basis for use in calculating the cost of capital for the UCLL service.

125. Although there are limitations of the simplified Brennan-Lally CAPM, notably the leverage anomaly (which is discussed in paragraphs 181 to 194 below), no viable alternatives have been proposed.

126. We consider the simplified Brennan-Lally CAPM is the best model for estimating the cost of equity in New Zealand. Like other models it has its imperfections. However, the simplified Brennan-Lally CAPM enjoys such widespread support, and competing models such limited support, that there is currently no credible alternative. Further

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[55]   Franks, J., Lally M., & Myers S "Recommendations to the New Zealand Commerce Commission on an Appropriate Cost of Capital Methodology" 2008, p. 11.

[56]   Commerce Commission "Cost of Capital Workshop Transcript" (12-13 November 2009) p. 38-40. After the workshop, Vector noted that "[h]istorically the Commission has adopted the simplified Brennan-Lally CAPM. It was evident from the workshop that there was little dispute that this is an acceptable approach to use." Vector "Cross Submission to Commerce Commission on the Weighted Average Cost of Capital Workshop" 2 December 2009, p. 7.

[57]   Chorus "Submission in response to the Commerce Commission's Process and issues paper for determining a TSLRIC price for Chorus' unbundled copper local loop service in accordance with the Final Pricing Principle" 14 February 2014 p. 63, paragraph 303; Frontier Economics "Determining a TSLRIC price for Chorus' UCLL service" February 2014, pp.32-33.

[58]   Telecom "Submission on Process and issues paper for determining a TSLRIC UCLL price" 14 February 2014, p.51, paragraph 178.

discussion on the simplified Brennan-Lally CAPM, and the CAPM more generally is set out in our IMs reasons paper.[59]

Parameters used to estimate the cost of equity under the simplified Brennan-Lally CAPM

127. The simplified Brennan-Lally CAPM requires us to estimate the following parameters:

   127.1   the risk-free rate;

   127.2   the investor tax rate;

   127.3   asset beta;[60] and

   127.4   the TAMRP.

128. This section explains our approach to estimating each of these parameters.

Risk-free rate

129. We have used the same approach to estimating the risk-free rate for both the cost of equity and the cost of debt. In particular, we have assumed a term for the risk-free rate of five years in both cases. This ensures that the overall cost of capital is estimated using a consistent approach, and that the term of the risk-free rate matches the regulatory period to which it will be applied.[61]

Investor tax rate

130. The investor tax rate has been set to reflect the maximum prescribed investor rate under the PIE regime. This rate applies to investors other than those investors on lower personal tax rates. Under the PIE regime taxes on profits in a PIE are capped at the maximum prescribed investor rate, which is 28%. Therefore, we have used these rates to determine the investor tax rate.[62]

131. Tax situations specific to particular investors do not in principle affect the cost of capital. Taxes are borne by the individuals themselves, not by the firms of which they are shareholders. Therefore, we have not provided for the tax circumstances of individual investors (for example, accumulated tax losses, inability to use imputation credits). This is consistent with the IMs.

Asset beta

132. Beta is a measure of exposure to systematic risk. Systematic risk measures the extent to which the returns on a company fluctuate relative to the equity returns in the stock market as a whole.

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[59]   Commerce Commission "Input Methodologies (Electricity Distribution and Gas Pipeline Services) Reasons Paper" 22 December 2010, paragraphs 6.4.17 – 6.4.19, H2.44 – H2.78.
[60]   Under the simplified beta leveraging formula for the simplified Brennan-Lally CAPM (ie, assuming a debt beta of zero), equity beta = asset beta/(1 - leverage).
[61]   See paragraphs 54 to 66 above for further discussion on the risk-free rate.
[62]   The corporate tax rate is used to estimate the post-tax cost of debt and the post-tax WACC. The corporate tax rates used in calculating the cost of capital mirror the statutory corporate tax rate of 28%.

132.1 If an investment had no systematic risk (ie, it showed no correlation with returns on the market), its equity beta would be zero.[63]

132.2 If an investment in the equity of a company is of average risk, the equity beta will be one. This means that the premium over the risk-free rate that equity investors expect will be the same as the average for the overall market (the TAMRP).

133. Beta is estimated empirically. As the cost of capital is intended to be forward-looking, forward-looking betas are required. As there is no reliable way to forecast betas, we, like other analysts, assume that historic beta estimates are indicative of future betas. Historic estimates of average betas are used because beta is expected to be relatively stable over time.

134. The equity beta measures a security's sensitivity to market risk (ie, beta is a measure of exposure to systematic risk). As neither asset nor equity betas are directly observable, they need to be estimated. For firms with traded stocks, the equity beta for the firm can be estimated directly from the historical returns on those stocks, relative to the market's return.

135. There are practical difficulties with reliably estimating beta, even historical betas, as:

135.1 Chorus, to our knowledge, is the only vertically separated telecommunications network business; and

135.2 other comparators have other businesses, the risks of which may not be directly comparable to the risks from providing UCLL and UBA services.

136. To estimate beta for providing UCLL and UBA services, we commissioned expert advice from Oxera. In its 23 June 2014 report (Oxera's original report), Oxera recommended:

136.1 an equity beta range, based on actual gearing, of 0.8–1.2;

136.2 a debt beta range, based on actual gearing, of 0.05–0.10;

136.3 a notional gearing of 40%, and a debt beta of zero at the notional gearing level; and

136.4 an equity beta range, based on notional gearing, of 0.55- 0.85.

137. We previously released Oxera's June 2014 report for consultation. In its final report, Oxera has addressed the points raised in submissions on its original report.

138. We have estimated an asset beta of 0.40 for the UCLL and UBA services. We reached our view on the appropriate asset beta for UCLL and UBA based on Oxera's advice, the points raised in submissions, and our own analysis of the available information.

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[63] We are not aware of any company that has a beta of zero.

We have based our asset beta estimate on Oxera's refined comparator sample

139. Oxera's original report placed primary weight on the observed asset beta for Chorus when estimating WACC, and used a sample of comparator firms to validate the Chorus estimate:[64]

> In the case of estimating a beta for UCLL and UBA, a particular difficulty is the lack of other publicly listed fixed access network operators, either in the New Zealand telecommunications industry or beyond. Chorus is the only 'pure-play' fixed telecommunications operator. Whilst the TSLRC model does not directly model Chorus' costs, the market risks taken by Chorus' actual businesses and those taken by a hypothetical efficient operator are likely to be very similar.

140. Almost all submissions disagreed with placing primary weight on the Chorus estimate, given the increased risk of estimation error from relying on a single asset beta estimate, and the Chorus estimate is based on less than three years of trading data. For example, PricewaterhouseCoopers (PwC) submitted:[65]

> ...there is still the significant estimation error from relying so heavily on only one comparator company's observed beta. Moreover, in Chorus' case there has been only a limited history of listing as a separate company - during which period there has been a significant downgrading of the company's share price around regulatory developments. The limited listing period, of just over two years, also precludes use of the more conventional use of monthly returns in the beta analysis.

141. Similarly, CEG submitted:[66]

> Having regard to only a single observation for Chorus' beta may be unbiased but is likely to provide a very imprecise estimate. Beta estimates for a single firm exhibit significant variability depending on the vagaries of the data. Random movements in a firms' share price on days of particularly large market shifts may have significant effects on its estimated beta. Using Chorus' empirically estimated beta as the 'focal point' gives it significantly more weight than individual observations from international benchmarking. In my opinion reliance to this extent on the results from less than three years of trading data on a single firm is unreasonable.

142. We acknowledge that the Chorus estimate is may be the closest comparator to the hypothetical efficient operator that we are modelling. However, we agree with submissions that a comparator sample is needed to minimise the risks of estimation error associated with basing the asset beta on a single firm. Accordingly, we have not based our asset beta estimate for UCLL and UBA on the observed asset beta for Chorus.

143. Instead, we have estimated asset beta using a sample of comparator firms. This approach:

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[64] Oxera "Review of the beta and gearing for UCLL and UBA services - Evidence and recommendations prepared for New Zealand Commerce Commission" June 2014, p.6.

[65] PwC "Submission on Commerce Commission Expert's paper: Review of the beta and gearing for UCLL and UBA services" 21 July 2014, p.3.

[66] CEG "Review of Lally and Oxera reports on the cost of capital" July 2014, p.9.

143.1 avoids placing undue weight on the beta estimate for Chorus, which is likely to be subject to significant measurement error (partly due to the short trading history); and

143.2 is consistent with the approach to estimating asset beta used in the IMs.

Firms included in the comparator sample for UCLL and UBA

144. In its submission on our March 2014 consultation paper, CEG proposed a comparator sample made up of 31 fixed-line telecommunications businesses from New Zealand, Australia, the United States and Europe. These businesses are listed in Table 2 below.

Table 2 – CEG's proposed comparator sample[67]

AT&T, United States	Frontier, United States	Telecom, New Zealand
Belgacom, Belgium	Hawaiian Telecom, United States	Telefonica, Spain
BT Group, United Kingdom	Hellenic Telecom, Greece	Telekom Austria, Austria
Centurylink, United States	Iliad, France	Telenor, Norway
Chorus, New Zealand	KPN, Netherlands	Teliasonera, Sweden
Cincinnati Bell, United States	Lumos Networks, United States	Telstra, Australia
Cogent Communications, United States	Orange, France	TW Telecom, United States
Colt Group, United Kingdom	Portugal Telecom, Portugal	Verizon, United States
Deutsche Telekom, Germany	Swisscom, Switzerland	Windstream, United States
Elisa OYJ, Finland	TDC, Denmark	
Fairpoint, United States	Telecom Italia, Italy	

145. In its initial report, Oxera conducted a similar exercise to establish a list of comparator companies, which aligned with CEG's proposed list. Oxera then refined the comparator sample, by applying the following criteria.[68]

145.1 *Availability of data*: data on each comparator must be available, at least for the time since Chorus started trading on 25 November 2011.

145.2 *Nature of network*: comparators with no copper network assets were excluded due to a fundamental difference in the core assets of the comparator firm, and therefore in the nature of the business risk.

145.3 *Share of revenues in country of main operation*: comparators with a majority of revenues from overseas operations were excluded, because exposure to exchange rate risks and various regulatory regimes is likely to pollute the asset beta analysis.

145.4 *Liquidity*: only those companies with non-zero trading volumes on at least 80% of all trading days were included in the sample.

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[67] CEG "Review of Lally and Oxera reports on the cost of capital" July 2014, Table 1, p.12.
[68] Oxera "Review of the beta and gearing for UCLL and UBA services - Evidence and recommendations prepared for New Zealand Commerce Commission" June 2014, p.25.

146. Applying these criteria led to Oxera removing Cogent Communications, Colt Group, Lumos Networks, Telecom Corporation of New Zealand, Telefonica, Telenor, Teliasonera, and TW Telecom from CEG's original comparator sample.[69]

147. PwC's cross-submission on our expert reports, on behalf of Spark, acknowledged that Oxera's refined comparator sample seemed appropriate:[70]

> Oxera presents both its full comparator set, based on stated selection criteria, and its refined comparator set (i.e. after applying its further screening criteria). Oxera's criteria seem appropriate - particularly those for liquidity and majority domestic operations (to include companies with majority overseas operations raises the issue of choosing the appropriate market index to measure beta against, among other things). Overall, we consider Oxera's comparator company sample selection criteria, in particular its "refined comparator set", to be reasonable.

148. Oxera made a number of clarifications regarding its comparator sample refinement in response to submissions, including points raised by Network Strategies (on behalf of Vodafone) and CEG. Oxera confirmed that Telecom NZ was removed from its sample because of its lack of comparability with Chorus' activities.

149. Oxera also explained that it excluded fibre-entrant (as opposed to fibre-only incumbent) companies because these companies face significantly different exposure to systematic risk compared to the hypothetical efficient operator:[71]

> …many of the business characteristics of these firms are likely to be similar to those of a hypothetical entrant competing with an incumbent access provider, rather than the incumbent access operator itself. In Oxera's judgement, an incumbent business access operator is likely to be exposed to significantly different business risks to a hypothetical entrant, and these are unlikely to be comparable from the perspective of systematic risk.

> …a fibre-only business which more closely resembled an incumbent legacy operator would have been more likely to have been included in the refined comparator set.

150. Despite the clarifications around its refined comparator set, Oxera was not convinced by submissions that it needed to alter the sample in its updated report. We agree with Oxera's refined comparator set and have used it when estimating asset beta and leverage for the UCLL and UBA services.

Time period and frequency of data for estimating asset beta

151. When estimating the asset beta for UCLL and UBA we have:

   151.1 used a combination of the last two five-year periods (2005-2009 and 2009-2014), with relatively greater weighting placed on the most recent five-year period; and

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[69] Oxera "Review of the beta and gearing for UCLL and UBA services - Evidence and recommendations prepared for New Zealand Commerce Commission" June 2014, p.26.

[70] PwC "Cross-submission on Commerce Commission Expert's paper: Review of the beta and gearing for UCLL and UBA services" 4 August 2014, p.3.

[71] Oxera "Review of expert submissions on the WACC for UCLL/UBA" 4 November 2014, p.10.

151.2   placed greatest weight on asset beta estimates derived from monthly observations, but have also looked at estimates using weekly data.

152.   We disagree with CEG's submission that we should use the average asset beta over the last 20 years as our primary asset beta estimate.

153.   The first ten of the last 20 years were impacted by the dot-com bubble (sometimes knows as the Telecommunications-Media-Technology, or TMT, bubble). The impact of the dot-com bubble is clearly illustrated in Figure 2 below which has been re-produced from Oxera's latest report.[72] The solid line shows the asset beta using monthly data for the entire sample, whereas the asset beta for the refined sample is shown as a dotted line. The significantly escalated observed asset betas during the global financial crisis (GFC) are clearly observable, so we have excluded them from our analysis.

Figure 2 - Evolution of average monthly asset betas for comparator firms
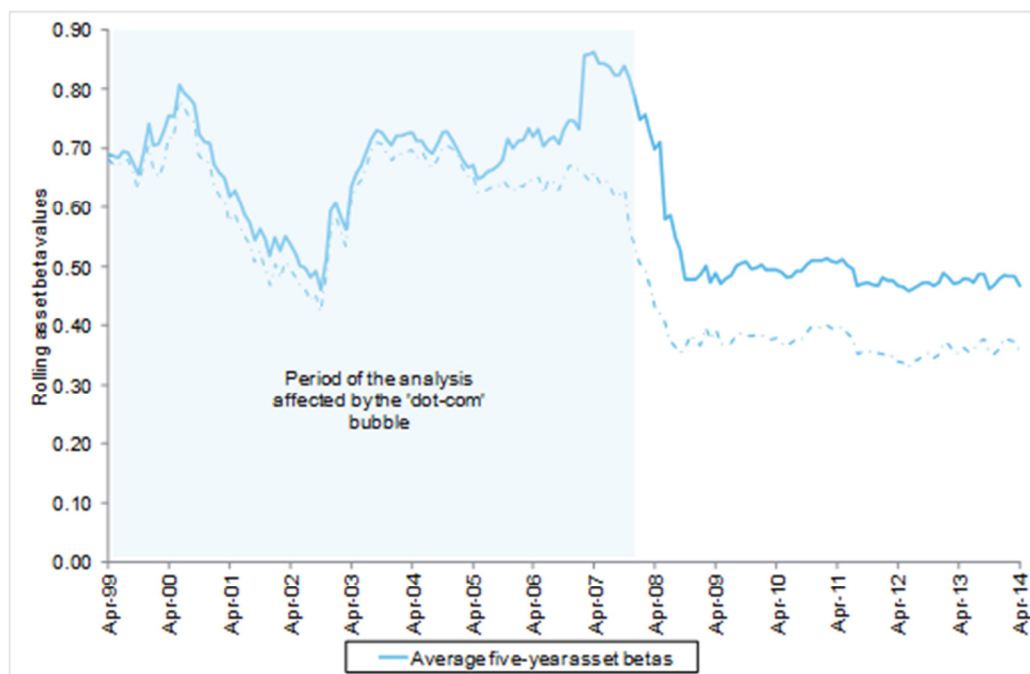
154.   The same pattern is evident also when looking at estimates using weekly data. This is shown in Figure 3 below, using the graph re-produced from Oxera's report.

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[72]   Oxera "Review of expert submissions on the WACC for UCLL/UBA" 4 November 2014, p.6.

Figure 3 - Evolution of average weekly asset betas for comparator firms
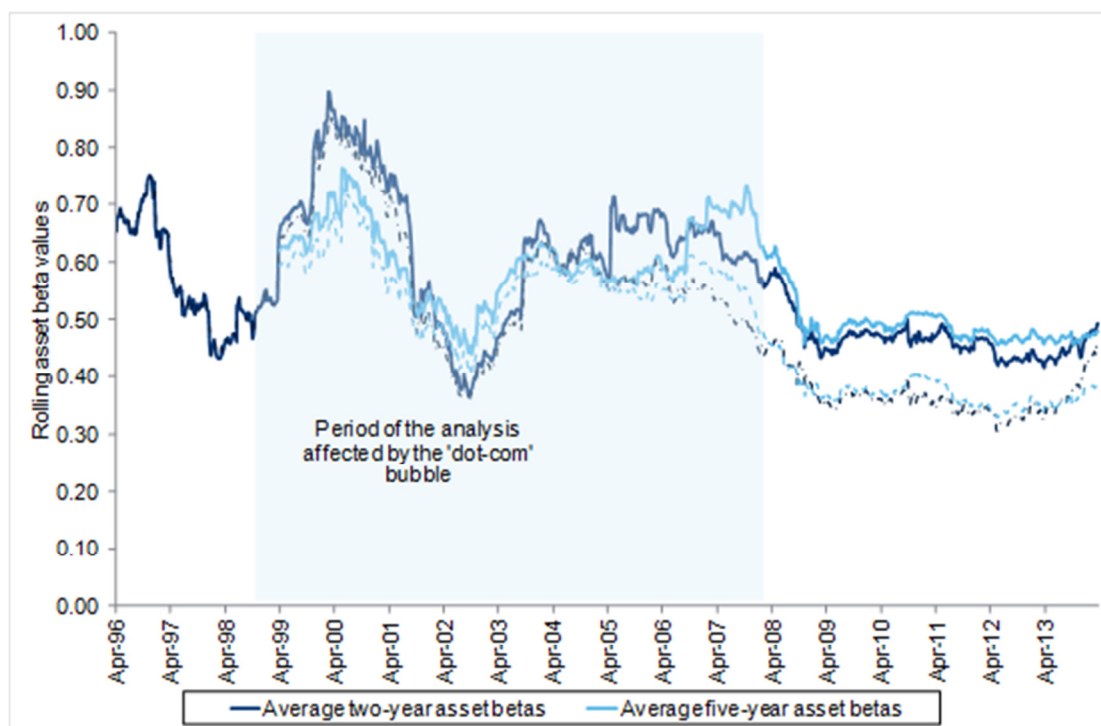
155. Accordingly, using data from the last 20 years would mean taking estimates from the dot-com bubble and subsequent bust, which in our view cannot be taken as good indicators of forward-looking estimates of beta for UCLL and UBA. Oxera and PwC share our view that beta estimates from a 20 year historic period are unlikely to produce appropriate forward-looking estimates of exposure to systematic risk for providers of UCLL and UBA services.[73]

156. CEG submitted that Oxera's approach to defining the time period of study is inconsistent with that adopted by the Commission during the IMs. CEG suggested that during the IMs we relied on five-year asset betas estimated over the last 20 years to determine our preferred estimate of asset beta.[74]

157. In our view, CEG has mischaracterised the approached used in the IMs. In our draft decision on asset beta for energy utilities we obtained an asset beta estimate of 0.34 based on monthly data for the (then) most recent five-year period. For our final decision we extended our analysis significantly and considered much more data, over more periods, and different frequencies. Based on this extensive additional analysis we considered there was no reason to change our draft decision that the asset beta should be 0.34 for electricity lines businesses.[75]

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[73]   Oxera "Review of expert submissions on the WACC for UCLL/UBA" 4 November 2014, pp.7-8.
[74]   CEG "Review of Lally and Oxera reports on the cost of capital" July 2014, paragraph 62.
[75]   Input Methodologies (Electricity Distribution and Gas Pipeline Services) Reasons paper 22 December 2010, p.158, paragraph 6.5.22.

Our view of the appropriate beta for UCLL and UBA

158. We have used a similar approach to the IMs when determining our asset beta estimate for UCLL and UBA. We started with the estimate of beta determined by Oxera from the most recent five-year period, using monthly sampling, for the revised sample of comparators. This produced an estimated asset beta of 0.33.

159. We then looked at other data periods, and other sampling frequencies, to test whether this initial estimate was out-of-line with beta estimates from other periods and sampling frequencies. We used estimates from the last year 10 years (that is, periods after the impacts of the dot-com boom and bust had passed). In Table 3 below these are shown as the estimates for the five years to 2009, and to 2014. We looked at estimates using both monthly and weekly data. These estimates, drawn from Oxera's analysis, are set out below.[76]

Table 3 – Summary of average asset beta estimates from Oxera's refined comparator sample

	Five years to 2009	Five years to 2014
Mean using monthly data (median)	0.50 (0.50)	0.33 (0.34)
Mean using weekly data (median)	0.47 (0.48)	0.36 (0.35)

160. Table 3 above shows that the monthly and weekly estimates for the same periods are generally very close to each other.[77] The mean and median for each period are also very similar.

161. However, there are quite significant differences between the estimates for the five years to 2009 and the five years to 2014. In particular, estimates drawn from the five years to 2014 are consistently lower than those in the preceding five-year period.[78] Given the absence of a simple explanation for these differences between adjacent time periods, if we were to simply adopt the most recent estimate, we might be using an asset beta that was too low.

162. Instead, we have placed some weight on estimates from the period to 2009 (in addition to those for the period to 2014), although we have placed more weight on the estimates for the period to 2014. Doing so, we determined an asset beta of 0.40. This falls near the mid-point of the estimates reported in Table 3.

163. We then checked our estimate against other information to ensure it was reasonable. In particular, we note that an asset beta of 0.40:

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[76] Oxera "Review of expert submissions on the WACC for UCLL/UBA" 4 November 2014, p.14, Table 4.1.
[77] Typically within 0.01. The mean and median estimates of beta using daily data reported by Oxera for each period are similarly close.
[78] This is in contrast to the corresponding analysis for the beta of the electricity lines services during development of the IMs. In that context, of older time periods and higher frequency sampling (particularly weekly data) strongly supported the appropriateness of our initial estimate.

163.1 is close to the estimates reported by Oxera for the refined comparator sample using daily data ending in 2009 and 2014, and estimates of beta from two year-long sampling periods;[79]

163.2 at the top of the range (0.35-0.40) recommended by Oxera based on its analysis of the asset beta for Chorus (noting that Chorus may be the best proxy of the beta for a pure-play provider of UCLL and UBA services);

163.3 is above the asset beta of 0.34 used for electricity lines services in the IMs. We think it is appropriate that there should be a higher beta for UCLL and UBA as there is greater risk from other services and technologies for those services, relative to electricity lines services; and

163.4 is near, but below, the average of the asset betas used by other regulators for fixed-line telecommunication services (as reported by Oxera).[80]

We have used the same asset beta for UCLL and UBA

164. We have used the same asset beta for UCLL and UBA. This is because:

164.1 although UCLL and UBA in principle may have different systematic risk, we note that:

(a) these are closely related services; and

(b) the Oxera analysis discussed below indicates that both the market data and theoretical analysis offers no evidence of a significant difference.

165. This is consistent with advice from Oxera. In Oxera's initial report it recommended that we use the same asset beta for UCLL and UBA:[81]

…not only does the analysis not suggest evidence for a particular value for the differential, but both the market data and the theoretical analysis suggest that the hypothesis that the beta for Chorus as a whole is consistent with that for the copper business cannot be rejected. There is no compelling approach to determining a beta for UCLL or UBA that is 'better' than assuming that these are the same as Chorus' beta, after assessment against relevant comparators.

166. As discussed above, we have decided not to place sole weighting on the Chorus beta, and have instead used the average of the refined comparator sample. However, Oxera's argument is still relevant.

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[79] Oxera "Review of expert submissions on the WACC for UCLL/UBA" 4 November 2014, p.14, Table 4.1.

[80] As illustrated in Oxera's analysis, telecom betas have been declining. However, we understand European regulators tend to allocate some weight to their previous decisions of beta and, as a result, the estimates of beta they have used have not tracked the downward trend in betas at the same pace. Also, European regulators may also be influenced by the observed beta values of the regulated companies.

[81] Oxera "Review of the beta and gearing for UCLL and UBA services - Evidence and recommendations prepared for New Zealand Commerce Commission" June 2014, p.56.

167. Submissions agreed with Oxera's view that the same asset beta should be used for the two services. PwC agreed with Oxera that it does not seem feasible to empirically estimate different betas for each service:[82]

> Given the challenges in assessing a fixed service operator's asset beta versus that of an integrated telecommunication operator it is unlikely to be practicable to empirically assess a further distinction between a UCLL and UBA asset beta. Making such an assessment based on subjective analysis is undesirable. This suggests that the best approach will simply be to treat the UCLL and UBA asset betas as being the same.

168. Network Strategies also agreed that there is no evidence to suggest that there should be different estimates of beta for the two services:[83]

> We agree with Oxera that there should not be separate asset betas for UCLL and UBA. While we recognise that there would be extreme practical difficulties in estimating different asset betas for the two services, due to the lack of suitable market data from Chorus and comparator companies, we agree that there is no compelling evidence to suggest that there should be separate betas.

Tax-adjusted market risk premium

169. We have used a TAMRP of 7.0%. This is based on advice from Dr Lally, and is the same value used in the cost of capital IMs.

170. The market risk premium (MRP) represents the additional return, over and above the risk-free rate, that investors look for to compensate them for the risk of holding a portfolio of average risk (more precisely, the market portfolio which is the average risk portfolio).

171. Under the simplified Brennan-Lally CAPM, the MRP is adjusted for tax faced by the investor on equity returns (therefore, tax-adjusted MRP, or TAMRP). The TAMRP can be derived from the MRP. Consistent with the use of a five-year term for the risk-free rate in the CAPM, Dr Lally used a five-year risk-free rate when providing his TAMRP estimate.

Approaches for estimating the TAMRP

172. The TAMRP is a forward-looking parameter which cannot be directly observed. A number of approaches can be used to estimate the TAMRP. These approaches include:

    172.1 studies of historic returns on shares relative to the risk-free rate;

    172.2 surveys of investors asking them to state their expected rate of return for the overall market; and

    172.3 empirical estimates of the MRP from share prices and expected dividends.

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[82] PwC "Submission on Commerce Commission Expert's paper: Review of the beta and gearing for UCLL and UBA services" 21 July 2014, p.7.

[83] Network Strategies "Expert reports on WACC for UCLL and UBA FPP: Final report for Vodafone New Zealand, Report number 34013" 21 July 2014, p.26.

173. Historically, including in the IMs, we have set a value of the TAMRP considering a range of information sources. The most common approach for estimating the TAMRP is to use historic returns on the market. While ex post returns have fluctuated significantly over time, regulators and practitioners have typically used or placed weight on estimates over long periods of time. Long-term estimates of historic returns are seen as useful predictors of future expected returns. Our TAMRP estimate is based on multiple methods, as recommended by Dr Lally

174. In his original report, Dr Lally calculated updated TAMRP estimates using five methods. He advised that we should use a TAMRP of 7%, stating:[84]

> Finally, I have estimated the TAMRP using five methods, comprising historical averaging of excess returns, correcting these returns for the 20th century inflation shock, historical averaging of real market returns coupled with the current risk free rate and expected inflation, the DGM favoured by CEG, and surveys. All five methods have been applied to both New Zealand and foreign data, and estimates are provided for both five and ten-year terms. In respect of New Zealand data and a five-year term, the estimates range from 5.9% to 8.2% with a median of 6.9%. Using foreign data and a five-year term, the estimates range from 6.3% to 9.7% with a median of 7.3%. So, even if rounded to the nearest 0.5%, an appropriate estimate is 7%, which matches that currently used by the Commission.

175. CEG challenged our treatment of TAMRP as a constant, unchanging value. CEG submitted that this is not consistent with CAPM and that historic measures of TAMRP may not be representative of the current TAMRP.

176. CEG used a dividend growth model (DGM) analysis of the return on equity required on the New Zealand stock market over time to estimate the value of TAMRP. Based on this analysis, CEG submitted that current estimates of the TAMRP are elevated and above 8%, relative to the current risk-free rate.[85]

177. We asked Dr Lally to review CEG's analysis, and other submissions on TAMRP. Dr Lally concluded that CEG's estimates are likely to be too high because of the inconsistent terms for the last two parameters, because changes over time in the risk-free rate and the TAMRP are less than perfectly offsetting, and because the risk-free rate is unusually low at the present time.[86]

178. In its subsequent submission on Dr Lally's original report, CEG challenged aspects of Dr Lally's analysis and conclusions. Among other things, CEG submitted:[87]

178.1 its approach to term introduces conservatism into its estimate;

178.2 in its view, a published academic report continues to supports its approach;

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[84] Dr Martin Lally, Capital Financial Consultants Ltd "Review of submissions on the cost of debt and the TAMRP for UCLL and UBA services" 13 June 2014, p.41.

[85] Competition Economists Group "Response to Commerce Commission UCLL/UBA WACC consultation paper" March 2014, section 6.4.

[86] Dr Martin Lally, Capital Financial Consultants Ltd "Review of submissions on the cost of debt and the TAMRP for UCLL and UBA services" 13 June 2014, section 6.4.

[87] CEG "Review of Lally and Oxera reports on the cost of capital" July 2014.

178.3 that Dr Lally places too much weight on historic estimates; and

178.4 that there are shortcomings of survey evidence.

179. In his revised advice, Dr Lally:[88]

179.1 disagreed that CEG's approach to term introduces conservatism into its analysis;

179.2 stated that evidence of the predictive ability of the DGM may be due to informational efficiency, rather than variations in the TAMRP over time;

179.3 repeated a range other drawbacks of the DGM;

179.4 continued to favour use of a variety of methods to estimate TAMRP, including both forward-looking and historic approaches;

179.5 acknowledged the limitations of survey evidence, but observed that better survey results are not available and omitting the survey evidence would not alter the median results reported in his original advice; and

179.6 continued to recommend we use a TAMRP estimate of 7%.

180. We have used a TAMRP estimate of 7% for the following reasons:[89]

180.1 given that the various approaches to estimating TAMRP produce significantly different estimates of TAMRP, and that no approach to estimating TAMRP is generally accepted as superior or free from methodological criticisms, we prefer to place weight on a wide range of estimates (as Dr Lally does), rather than strongly preferring one approach (such as CEG's DGM analysis) over others;

180.2 using a range of estimates is our long-standing approach, and this approach has produced a stable and predictable estimate of TAMRP. This has advantages for investors and consumer of regulated services;

180.3 we are sceptical that differences in the current TAMRP can be reliably estimated and, for the reasons discussed in Dr Lally's paper, we are not persuaded that CEG's DGM provides better estimates of the New Zealand TAMRP than our established approach;[90]

180.4 we consider historic estimates of equity returns are useful indicators of TAMRP, and understand that such methods are widely used by other analysts

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[88] Dr Martin Lally, Capital Financial Consultants Ltd "Review of responses to review of submissions on the cost of debt and the TAMRP for UCLL and UBA services" 20 August 2014.

[89] Dr Martin Lally, Capital Financial Consultants Ltd "Review of responses to review of submissions on the cost of debt and the TAMRP for UCLL and UBA services" 20 August 2014.

[90] We note this is consistent with the view of the Australian Competition Tribunal. See: Application by WA Gas Networks Pty Ltd (No 3) [2012] ACompT 12 (8 June 2012), from paragraph 88. We note Dr Lally identifies a wide range of MRP estimates in the academic paper which CEG relies upon (pp.28-29)

to estimate TAMRP, who continue to place weight on estimates of TAMRP derived from such approaches; and

180.5 we understand that an estimate of TAMRP of 7% remains more consistent with the estimates used by New Zealand investment banks (and a TAMRP of 8% does not).[91]

Leverage

181. We have used a notional leverage of 43% for the draft UCLL and UBA pricing reviews, which is the average leverage of the refined comparator sample used to estimate asset beta. We have also assumed a debt beta of zero.

182. 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 is to derive a WACC from the estimates of the cost of debt and the cost of equity.

183. 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.[92] This is because interest costs are tax deductible to the firm but dividends are not.

184. 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.

185. When the simplified Brennan-Lally CAPM is used to estimate the cost of equity (in conjunction with the simplified beta leveraging formula, ie, 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.[93]

186. 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

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[91] The TAMRP used by major New Zealand investment banks was set out in the IM Reasons paper, (22 December 2010), paragraph H7.75 and Table H11. Since then we are aware only that First NZ Capital has adjusted its rate (from 7.25% back to 7%), to reflect its long-term view of the TAMRP, post the global financial crisis. CEG provides no evidence that other analysts of New Zealand financial markets currently use estimates at or near 8%.

[92] 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.

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

increases.[94] This anomaly is created by the analytical models used to estimate the WACC, rather than simply reflecting unusual market conditions.

187. 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 competitive markets do issue debt and, so long as the debt levels are prudent, are considered to be acting rationally when they do so.

188. As part of the IMs consultation process, PwC (on behalf of the Electricity Networks Association and Telecom) identified two options to overcome the leverage anomaly: use the leverage of the sample of comparator companies, or use non-zero debt betas.

189. 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.[95] PwC submitted that:[96]

> 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.

190. We recognise that the greater the riskiness of debt, the more it resembles equity. Therefore, the greater the systematic risk of debt due to market conditions, the greater is the debt beta.[97] Consequently, in principle, debt betas should be included in the cost of capital calculation. The use of non-zero debt betas is theoretically more sound 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.

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[94] 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.

[95] 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.

[96] 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.

[97] While considerable attention has been given to investigating the riskiness of common stocks, comparatively little empirical work has been done to measure the systematic risk of debt. Many analysts also assume a zero value for debt beta when estimating the cost of capital.

191. However, we noted at the time of the IMs that most submissions preferred the use of zero debt betas, that most regulators do not use debt betas (though a minority do), and that we had not used non-zero debt betas in the past.[98] Further, there are practical difficulties in accurately estimating debt betas. Those challenges to the use of non-zero debt betas remain.

192. In its original report, Oxera proposed using a positive value for debt beta. In particular, Oxera noted that Chorus' actual gearing of over 60% (which had consistently risen over the period of analysis), was materially above a notional gearing assumption of 40%, that Chorus' gearing had risen over the period, and Chorus had a credit rating below Oxera's recommended credit rating (of BBB+/A-). Accordingly, Oxera considered there might be a sufficiently material impact on the analysis and proposed using a debt beta of between 0.05 and 0.10.

193. By contrast, we do not place primary weight on Chorus' beta, and Chorus' leverage has a much lesser influence on our analysis (which uses a sample of comparator companies), than it does on Oxera's analysis of beta (which focused on Chorus).

194. Further, as demonstrated in the IMs reasons papers, if we assume a value of leverage in line with that observed for the respective sample of comparator companies, then the cost of capital estimated will be the same for those services regardless of the value assumed for the debt beta.

195. Accordingly, we do not think there is any need for us to estimate an appropriate value for debt beta. Instead, we adopt the average leverage of the revised comparator sample (43%) and assume a zero debt beta.

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[98] 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. Ofcom, "Fixed Access Market Reviews: Draft Statement" 19 May 2014, Annex A14.109-A14.121.

Our mid-point post-tax WACC estimate for UCLL and UBA

196.   Overall, we have estimated a mid-point post-tax WACC of 6.47% for the draft UCLL and UBA pricing reviews. The parameters used to generate our WACC estimate for UCLL and UBA are summarised in Table 4 below.

Table 4 – UCLL and UBA WACC estimate (as at 1 August 2014)

Parameter	Estimate
Risk-free rate	4.19%
Debt premium	1.85%
Leverage	43%
Asset beta	0.40
Debt beta	0.00
TAMRP	7.0%
Corporate tax rate	28.0%
Investor tax rate	28.0%
Debt issuance costs	0.25%
Cost of executing interest rate swap	0.04%
Equity beta	0.70
Cost of equity	7.92%
Cost of debt	6.33%
Post-tax WACC (mid-point)	**6.47%**

Note: The cost of debt is calculated as the risk-free rate + debt premium + debt issuance costs + swap costs. The cost of equity is calculated as the risk-free rate × (1- investor tax rate) + the equity beta × the TAMRP. The mid-point post-tax WACC is calculated as the cost of debt × (1 – corporate tax rate) × leverage + cost of equity × (1 - leverage).

197.   The corresponding mid-point vanilla WACC estimate for UCLL and UBA is 7.24%.[99]

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[99]   The mid-point vanilla WACC is calculated as the cost of equity × (1 - leverage) + the cost of debt × leverage.

Should an uplift be applied to the mid-point WACC estimate?

198. This section considers whether an uplift should be applied to our best estimate of WACC for the UCLL and UBA services. As described earlier in this paper, our mid-point post-tax WACC estimate for UCLL and UBA is 6.47%.

199. The discussion in this section is restricted to whether an uplift should be applied to our mid-point WACC estimate for UCLL and UBA. We have also considered whether an uplift should be applied to the *overall* prices for UCLL and UBA, taking into account uncertainty in other parameters (in addition to WACC). An overall uplift is considered in detail in the draft decisions for the UCLL and UBA pricing reviews, released at the same time as this paper.[100]

200. Our view is that no uplift is required to our mid-point WACC estimate for UCLL and UBA. This section summarises why we reached this view, including an explanation of:

200.1 why we apply an uplift to our mid-point WACC estimate for price-quality regulation under Part 4 of the Commerce Act;

200.2 the reasons why we think no uplift to the mid-point WACC is required for UCLL and UBA, after considering migration to fibre-based services and Professor Vogelsang's assessment of our approach to TSLRIC modelling.

201. This section also discusses the main submissions we have received to date on whether a WACC uplift should be applied for UCLL and UBA.

We apply an uplift to the mid-point WACC under Part 4 of the Commerce Act

202. We apply an uplift to our mid-point WACC estimate for price-quality regulation under Part 4 of the Commerce Act. Following our recently completed review of the WACC percentile, the 67th percentile WACC estimate is now used for price-quality regulation of electricity lines and gas pipeline business.[101]

203. When deciding to apply the 67th percentile, we noted that the WACC applied under the cost of capital IMs is an estimate, because the actual cost of capital is not observable. Consequently, our WACC estimate could be higher or lower than the true cost of capital.

204. The cost of capital IMs specify a WACC above the mid-point estimate for price-quality regulation because we expect the costs to consumers of under-estimating WACC to be greater than the costs to consumers of over-estimating WACC. In our view, the potential costs of under-investment from a WACC that is too low are likely

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[100] Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014. And Commerce Commission "Draft pricing review determination for Chorus' unbundled bitstream access service" 2 December 2014.

[101] Commerce Commission "Amendment to the WACC percentile for price-quality regulation for electricity lines services and gas pipeline services: Reasons paper" 30 October 2014.

to outweigh the harm to consumers (including any over-investment) arising from a WACC that is too high.[102]

205. In the Part 4 context, the main reason for setting a WACC percentile above the mid-point is to mitigate against the risk of under-investment relating to service quality generally, and contributing to major supply outages in particular. Our expert advisor during the recent review of the WACC percentile, Oxera, noted that:[103]

205.1 the potential costs to consumers of major electricity supply outages are material, stating that "evidence from actual events and analysis of potential events in other countries suggests that a severe outage event resulting from underinvestment could result in a cost with an annualised economic value equivalent to over NZ$1bn"; and

205.2 some WACC premium for customers to reduce the risk of under-investment in network quality appears "reasonable and proportionate".

Reasons why no uplift to the mid-point WACC estimate is required for UCLL and UBA

206. We have not applied an uplift to the mid-point WACC estimate for UCLL and UBA. In reaching this view, we considered whether there is any reason to depart from the mid-point, which is our best parameter-based estimate of the cost of capital.

207. Different considerations are relevant when deciding whether to apply a WACC uplift for UCLL and UBA, compared to under Part 4 of the Commerce Act.

207.1 As described in paragraph 205 above, our main concern when considering a WACC uplift under Part 4 was the risk of under-investment in network reliability, leading to major supply outages.

207.2 For UCLL and UBA, the effect on competition from alternative networks, migration to fibre-based services, and investment from access seekers, are more relevant factors.

208. Consistent with the UBA IPP, when considering whether to depart from our mid-point WACC estimate, our primary concern was the asymmetric consequences of setting UCLL and UBA prices too low, relative to setting them too high. In particular, a price that is too low could slow migration to fibre-based services, with consequential impacts on the welfare benefits arising from migration to fibre networks, and adverse effects on incentives to invest in innovative services.

209. Our view remains that, in principle, we should give weight to erring on the high side to avoid the negative consequences of setting a price that is too low. However, for the reasons described in paragraphs 212 to 220 below, our draft decision is that a WACC uplift is not required to address the asymmetric consequences of estimation error. In particular, we accept Professor Vogelsang's advice that an uplift is not

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[102] Commerce Commission "Amendment to the WACC percentile for price-quality regulation for electricity lines services and gas pipeline services: Reasons paper" 30 October 2014, p. 11, paragraph X17.

[103] Oxera "Input methodologies: Review of the '75th percentile' approach" 23 June 2014, p.6.

warranted, due to our TSLRIC approach and decisions (ie, not taking into account asset re-use, and not making a performance adjustment for the FTTH modern equivalent asset (MEA)).

210. Other factors we have also considered regarding the case for applying a WACC uplift for UCLL and UBA are:

210.1 the likely costs to end-users of outages (relative to electricity networks), required service levels, and capital contributions, suggest there is no strong case that an uplift to the mid-point WACC estimate for UCLL and UBA is required to address the outage concern.

210.2 A WACC uplift for UCLL and UBA could potentially distort access seekers' investment incentives. Telecommunications regulation is based on an access regime, where both the access provider and access seekers undertake significant investment. TSLRIC-based access prices for UCLL and UBA are intended to incentivise efficient investment decisions from access seekers, promoting competition for the long-term benefit of end-users. However, the significance of this factor is reduced by our view that the argument for promotion of unbundling as a form of competition no longer has the same force.

211. Our reasons for not applying a WACC uplift for UCLL and UBA are explained in greater detail below.

A WACC uplift is not required to address asymmetric costs associated with migration to fibre-based services

212. In the UBA IPP, we decided it was appropriate under section 18 to choose a price point above the median to account for asymmetric costs:[104]

> Our view remains that the negative impacts on competition of under-estimating the forward-looking costs are greater than over-estimating the forward-looking costs. This implies that we should err on the higher side to avoid the negative consequences of setting a price that is too low.

213. In particular we noted that under-estimating the price would adversely impact on returns to investment in new and innovative services and these costs were likely to be greater than the likely costs of over-estimating the price. We noted:[105]

> The Commission considers that accelerated migration implies a welfare cost to end-users because they could have continued to consume the cheaper copper broadband services rather than the more expensive fibre broadband services. However, as discussed above, this cost needs to be weighed against the benefits of accelerated migration in bringing forward services dependant on UFB take-up. Thus over time we would expect the value of the

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[104]   Commerce Commission "Unbundled Bitstream Access Service Price Review, Decision [2013] Final determination to amend the price payable for the regulated service Chorus' unbundled bitstream access made under s 30R of the Telecommunications Act 2001" 5 November 2013, NZCC 20, paragraph 221.
[105]   Commerce Commission "UBA Update paper" 13 August 2013, paragraph 141.

additional capabilities of fibre to grow and benefits to end-users to accrue, offsetting the welfare costs of accelerated migration.

214.   Within the UBA IPP we referred to this concept interchangeably as both "asymmetric risk" and "asymmetric cost".[106] [107] In order to differentiate this concept from the asymmetric risks associated with asset stranding, throughout our FPP draft determinations we refer only to asymmetric costs in regards to this concept. To be clear, we use the term "asymmetric costs" to refer to the asymmetry of impact arising from the costs incurred when over-estimating versus under-estimating the regulated price. The term "asymmetric risk" is used in respect of asset stranding to refer to risks that truncate a firm's distribution of returns at the one extreme, without an offsetting truncation at the other end.

215.   We received expert advice from Ingo Vogelsang on the effects of the UCLL price on competition for the long-term benefit of end-users.[108] Professor Vogelsang noted that there may be positive network externality effects from higher UCLL (and therefore total UCLL plus UBA) prices:[109]

> Innovation benefits will come from the financial benefits for other networks and for content providers serving these networks. Additional externalities will accrue to the pre-existing subscribers of these services, who benefit from the additional or cheaper content made available to them.

216.   We note that in considering the section 18 purpose statement, we are considering whether an adjustment to our central TSLRIC estimate, of which our WACC estimate is a part, is required to promote competition for the long-term benefit of end-users. Therefore we must consider not only whether a section 18 adjustment promotes competition, but also whether it does so for the long-term benefit of end-users. Accordingly, the long-term impacts on end-users' welfare are relevant to this analysis.

217.   Our draft decision is that this asymmetric cost we were concerned with in setting the UBA IPP remains in respect of the UCLL FPP. In particular, the costs of mistakenly setting a price that is too high would include the welfare loss to end-users from higher retail prices for copper-based services. However, a price that is too low could slow migration to fibre-based services, with consequential impacts on the welfare benefits arising from migration to fibre networks. On balance, we continue to hold the view that, in principle, we should give weight to erring on the high side to avoid

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[106]   See, for example, Commerce Commission "Unbundled Bitstream Access Service Price Review, Decision [2013] Final determination to amend the price payable for the regulated service Chorus' unbundled bitstream access made under s 30R of the Telecommunications Act 2001" 5 November 2013, NZCC 20, paragraph 231.

[107]   See, for example, Commerce Commission "Unbundled Bitstream Access Service Price Review, Decision [2013] Final determination to amend the price payable for the regulated service Chorus' unbundled bitstream access made under s 30R of the Telecommunications Act 2001" 5 November 2013, NZCC 20, paragraph 10.

[108]   Ingo Vogelsang, "The effects of the UCLL contribution to the UBA aggregate on competition for the long-term benefit of end-users in New Zealand telecommunications markets", 2 July 2014.

[109]   Ingo Vogelsang "The effects of the UCLL contribution to the UBA aggregate on competition for the long-term benefit of end-users in New Zealand telecommunications markets" 2 July 2014, paragraph 29.

the negative consequences of setting a price that is too low, and adverse effects on incentives to invest in innovative services.

218. We note the expert advice received from Ingo Vogelsang that our modelling decisions imply that a uplift is not required:[110]

> If the Commission sticks to its preliminary decisions to stay with the classical TSLRIC approach and therefore not to consider re-use of civil works and not to make a performance adjustment for the FTTH MEA, then as compared to application of the modified TSLRiC [sic] methodology being advocated by the EU the NZCC classical application results in a higher price. This would likely offset any efficiency argument (Alfred Kahn), investment risk or lumpiness that would go against the classical TSLRIC. It would also take care of any net positive externalities from incentivizing migration to UFB. Thus, there would, in my view, be no case to be made for an uplift to the WACC or for a generous approach to any other cost components

219. As explained within the UCLL pricing review draft determination, in respect of our draft decision to not apply a performance adjustment when modelling a FTTH MEA and to not apply an alternative asset valuation to optimised replacement costs (ORCs) for re-usable assets, the basis of these draft decisions was not specifically to err on the high side.[111]

220. Nonetheless, we recognise that Professor Vogelsang has assessed that the outcome of our decisions is, in his view, enough response to the asymmetry in the cost of under or over-estimating the price.[112] We agree with his conclusions. Our draft decision is not to apply an uplift. We consider that the unadjusted central estimate of the TSLRIC price produced by our model is likely to best give effect to the section 18 purpose statement.

221. Accordingly, our draft decision is that a specific WACC uplift to address asymmetric consequences of estimation error is not required. This issue is also discussed when considering whether an overall uplift should be applied to UCLL and UBA prices.[113]

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[110] Ingo Vogelsang "Current academic thinking about how best to implement TSLRIC in pricing telecommunications network services and the implications for pricing UCLL in New Zealand" 8 September 2014, paragraph 118.

[111] Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014.

[112] We also note that our estimated TSLRIC price for UCLL and UBA is, in combination, greater than the current entry level wholesale price for UFB. Where we are concerned about the potential welfare costs of lower migration to alternative networks, most notably the UFB, we would expect the level of those welfare costs to relate to the relative price of UCLL (and UBA) and the UFB price. In the situation that the price of an existing service is already higher than the alternative (higher quality) service, the extent of potential welfare losses associated with a lower level of migration is expected to diminish. We see a strong distinction to be made here with any consideration that a specific level of relative prices should be established between the combined price of UCLL and UBA and the UFB prices, which we reject as inconsistent with s.18 and the promotion of competition.

[113] Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014. And Commerce Commission "Draft pricing review determination for Chorus' unbundled bitstream access service" 2 December 2014.

Other factors also suggest there is no strong case for a UCLL and UBA WACC uplift

222. In the Part 4 context, the WACC uplift is intended to mitigate the risks of under-investment in electricity lines and gas pipeline networks, which will continue to serve consumers for the foreseeable future. However, in the context of UCLL and UBA, UFB is being deployed to replace Chorus' copper network.

223. Further, the costs to end-users of outages for UCLL and UBA are likely to be significantly less than for electricity lines services. A major electricity outage impacts on almost every home and business in the affected region, leading to significant welfare losses for end-users. Substitutes for fixed-line telecommunications services are more readily available than for electricity lines, reducing the impact on end-users of network outages (relative to electricity lines services).[114]

224. We have also considered the potential role of other factors, apart from a WACC uplift, in incentivising investment by Chorus in UCLL and UBA. Factors which may influence incremental investment decisions for UCLL and UBA include the following.

    224.1 *Investment to avoid negative repercussions from failure to meet performance standards*. There are required service levels under the standard terms determinations for UCLL and UBA, and associated performance penalties.[115] Further, Chorus is ultimately required to maintain its copper network under the telecommunications service obligations (TSO), although we understand its current network footprint is wider than the TSO boundaries.[116]

    224.2 *Investment which attracts incremental volume.* We understand that Chorus can charge the capital cost of connecting new sub-divisions to developers. Given that TSLRIC prices are based on average cost, regulated price-caps will be above marginal cost, and there should be a strong incremental volume incentive for such investment to occur.

225. The factors in paragraphs 222 to 224 above suggest that there is no strong case for applying a WACC uplift to incentivise maintenance of the copper network, or connecting new customers to the network.

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[114] For example, if there is an outage on the fixed-line telecommunications network, mobile networks can be used instead.

[115] Commerce Commission "Standard terms determination for Chorus' unbundled copper local loop network service – Schedule 3: UCLL service level terms" 7 November 2007, updated to incorporate Commerce Commission decisions, amendments, and clarifications through 30 November 2011; and Commerce Commission "Standard terms determination for Chorus' unbundled bitstream access service – Schedule 3: UBA service level terms" 12 December 2007, updated to incorporate Commerce Commission decisions, amendments, and clarifications through 17 May 2012.

[116] Principle 3 of the TSO Deed requires local residential telephone service to be made as widely available as it was at 20 December 2001. Telecommunications service obligations (TSO) deed for local residential telephone service November 2011, p.2, clause 5.3. For properties outside the TSO boundaries, we are allowing operating expenditure (but not capital expenditure) within the TSLRIC models for UCLL and UBA. Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, Attachment A.

226. We also considered the role of innovative new services when considering whether a WACC uplift should be applied. In particular, we considered a 2011 paper by Professor Ian Dobbs, which was relevant in our recent IMs WACC percentile review.[117] However:

    226.1 consistent with the IMs WACC percentile review, we have placed little weight on Professor Dobbs' model because it does not address the risk of misestimating the WACC (and instead addresses the risk created by fixing the allowed WACC over the regulatory period);[118] and

    226.2 as discussed above, we agree with Professor Vogelsang's advice and our draft decision is that our TSLRIC modelling decisions have sufficiently addressed the potential asymmetric consequences of under or over-estimating UCLL and UBA prices, so no WACC uplift is required.

The impact of a WACC uplift on both Chorus and access seekers needs to be considered

227. Telecommunications regulation is not focused solely on investment by the incumbent network operator, but also on investment by access seekers (and the wider industry). As discussed earlier, the purpose of the Act is to promote *competition* for the long-term benefit of end-users.[119]

228. Part 4, on the other hand, regulates businesses where there is little or no competition, and little or no likelihood of a substantial increase in competition. Consequently, Part 4 is focused on investment incentives faced by regulated suppliers.

229. In the telecommunications context, access seeker investment is important in promoting competition. For example, access seekers have invested in digital subscriber line access multiplexers (DSLAMs), backhaul, and other infrastructure, to provide competitive fixed-line telecommunications services. CallPlus has stressed the importance of access seeker investment, stating:[120]

> When the Commission considers incentives to invest in the telecommunications context it needs to take into consideration, amongst other things, that there can be multiple competing networks and technologies and investment by both Access Providers and Access Seekers.

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[117] Dobbs, I., 2011. "Modelling Welfare Loss Asymmetries Arising from Uncertainty in the Regulatory Cost of Finance", *Journal of Regulatory Finance* 39, p.1-28.

[118] Commerce Commission "Amendment to the WACC percentile for price-quality regulation for electricity lines services and gas pipeline services: Reasons paper" 30 October 2014, Attachment B.

[119] See paragraphs 45-48.

[120] CallPlus "Submission to the Commerce Commission on the technical consultation paper 'Determining the cost of capital for UCLL and UBA price reviews'" 28 March 2014, p.8, paragraph 24.

230. As noted in Chapter 1 of the draft UCLL and UBA pricing review determinations, one of the main aims of TSLRIC pricing is to promote efficient investment, by ensuring that access seekers face efficient build or buy signals.[121]

231. An uplift to the mid-point WACC could potentially reduce or distort access seekers' incentives to invest. An access seeker's decisions regarding whether to invest in UCLL, UBA, alternative network platforms, or not invest at all, are directly related to the access prices it faces.[122]

232. For the reasons described in the draft UCLL and UBA pricing review determinations, we are not seeking to actively promote unbundling when setting UCLL and UBA prices under the FPPs.[123] Remaining at the mid-point WACC estimate will avoid additional impacts on access seekers' investment incentives.

Submissions we have received on whether a WACC uplift should be applied for UCLL and UBA

233. We have received several submissions on whether a WACC uplift should be applied for UCLL and UBA. These submissions can be broadly grouped into two main categories:

    233.1 those that support an uplift to the mid-point WACC for UCLL and UBA, including Chorus (and its expert advisors, CEG and Professor Grundy), Vector, and Enable Services; and

    233.2 those that do no support an uplift to the mid-point WACC, including Orcon, CallPlus, Wigley and Company, Vodafone (and its expert advisor, Network Strategies), and Spark (and its expert advisor, PwC).

234. Chorus also submitted on our recent IMs WACC percentile review, arguing that a larger uplift is required for telecommunications than energy services regulated under Part 4.

235. These submissions are discussed below.

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[121] Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014. And Commerce Commission "Draft pricing review determination for Chorus' unbundled bitstream access service" 2 December 2014.

[122] This is discussed further in the draft price review determinations for UCLL and UBA, when considering whether to apply an uplift to the overall UCLL and UBA prices, see Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014. And Commerce Commission "Draft pricing review determination for Chorus' unbundled bitstream access service" 2 December 2014.

[123] Commerce Commission "Draft pricing review determination for Chorus' unbundled bitstream access service" 2 December 2014, Chapter 3.

Submissions supporting an uplift to the mid-point WACC for UCLL and UBA

236.   CEG and Professor Grundy considered two rationales for applying an uplift to the mid-point WACC:[124]

      236.1   cash flow asymmetries not accounted for elsewhere (for example, lost revenues and/or increased expenditure due to a major earthquake); and

      236.2   asymmetries in the social consequences from under/over compensating investors, due to uncertainty in the WACC parameters.

237.   In respect of asymmetric risks to cash flows (due to natural disasters, technological obsolescence and regulatory stranding), CEG noted that these risks should be addressed separately from the cost of capital.[125] Similarly, Vector submitted that demand uncertainty should be addressed in cash flow projections (rather than WACC), noting that this is why the WACC should not be determined in isolation from other elements of the UCLL and UBA pricing reviews.[126]

238.   Enable Services, on the other hand, submitted that an uplift to the cost of capital should be applied to reflect asymmetric risks:[127]

> ESL strongly submits that the unique risks facing the telecommunications industry, and in particular the industry's transition to UFB fibre should be reflected in the risk components used to arrive at an appropriate cost of capital unique to UCCL and UBA pricing. More specifically, the telecommunications industry faces Type II asymmetric risks, such as the threat of competitive entry or asset stranding from technical innovations. In ESL's view, an uplift to the cost of capital is necessary to the extent any asymmetric risks are not fully recognised in any cash flow expectations under a pricing model (for example, by way of an accelerated depreciation charge).

239.   We agree with CEG and Vector that the risks of natural disasters, asset stranding, and demand uncertainty, should not be addressed as part of the allowed WACC. Rather, asymmetric cash flow risks are considered separately in our draft determinations for the UCLL and UBA services.[128]

240.   In respect of uncertainty in the WACC parameters, CEG and Professor Grundy submitted that setting the regulatory WACC at the mid-point estimate will only result in positive investment incentives around half the time. CEG argued that an uplift

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[124]   CEG "Cross-submissions on UCLL/UBA WACC - on behalf of Chorus" April 2014, p.5-7; Professor Bruce Grundy "The logic and economics underlying the use of a 75% rule in a regulatory environment" 25 March 2014.

[125]   CEG "Response to Commerce Commission UCLL/UBA WACC consultation paper" March 2014, p.7, paragraphs 38-39.

[126]   Vector "Vector submission on cost of capital for UCLL and UBA reviews" 28 March 2014, p.4, paragraph 14.

[127]   Enable Services Limited "Submission from Enable Services Limited on the Commerce Commission's 'Determining the cost of capital for the UCLL and UBA price reviews'" 28 March 2014, p.2, paragraph 2.1(c).

[128]   Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, Chapter F. And Commerce Commission "Draft pricing review determination for Chorus' unbundled bitstream access service" 2 December 2014, Chapter D.

from the mid-point WACC is required to ensure an efficiently managed regulatory regime, noting that:[129]

> If the cost of capital is set at the midpoint WACC then the regulator must lean hard on penalties and coercion and, ultimately, the threat of stranding of sunk assets in order to engender efficient levels of investment. This may be possible in some circumstances but, ultimately, is likely to lead to perverse and inefficient results.

241. Vector submitted that it is "…not aware of any reason for telecommunications services to require a WACC percentile to be set differently from the WACC percentile in the IMs", arguing that "…a WACC set at the 75th percentile (or another adjustment with a similar effect) is a materially better way of determining the cost of capital in the long-term interest of consumers".[130]

242. We disagree with these submissions, for the reasons explained in paragraphs 206 to 232 above. In our view, the case for applying an uplift to the mid-point WACC is much weaker for UCLL and UBA, compared to electricity lines and gas pipelines regulated under Part 4.

Submissions that do not support an uplift to the mid-point WACC for UCLL and UBA

243. Orcon, CallPlus, and Wigley and Company argued that the WACC percentile for UCLL and UBA should be lower than for electricity lines and gas pipelines. They submitted that:

243.1 there should only be departure from the mid-point WACC if this is justified by "robust empirical examination, well-guided by theory, of the actual facts of any particular case";[131]

243.2 incentives to invest are largely irrelevant for copper services, due to the limited future investment in copper (opposed to fibre and other technologies);[132]

243.3 it is not appropriate to inflate the prices for one service (copper) to provide revenue that can be invested in another service (fibre), particularly given that Chorus is already receiving a substantial subsidy for fibre roll-out;[133]

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[129] CEG "Response to Commerce Commission UCLL/UBA WACC consultation paper" March 2014, p.7, paragraph 40.

[130] Vector "Vector submission on cost of capital for UCLL and UBA reviews" 28 March 2014, p.2, paragraphs 6-7.

[131] Orcon "Submission to Commerce Commission by Orcon Ltd in response to consultation paper: 'Determining the cost of capital for the UCLL and UBA price reviews'" 28 March 2014, paragraph 11.1.

[132] Wigley and Company "Cross-submission to the Commerce Commission in response to the Commission's expert reports on the cost of capital for UCLL and UBA price reviews AND submission on the Part 4 review of WACC uplift" 4 August 2014, paragraph 34(a).

[133] CallPlus "Submission to the Commerce Commission on the technical consultation paper 'Determining the cost of capital for UCLL and UBA price reviews'" 28 March 2014, p.15, paragraphs 49, 51-53.

243.4 the WACC percentile under Part 4 has no precedent value for UCLL and UBA – instead the mid-point is the relevant precedent, as used in TSO net cost determinations and the draft PSTN TSLRIC determination;[134]

243.5 consideration needs to be given to the impact of higher copper prices on the uptake of broadband services by end-users;[135] and

243.6 demand for copper services is substantially more elastic than for electricity services, so the deadweight loss impact of a high WACC percentile will be substantially greater than for electricity.[136]

244. Network Strategies submitted that "…there is no evidence that the social costs of under-estimation might outweigh the social costs of over-estimation in the case of UCLL and UBA services".[137] They stated that it is important to consider service-specific features in determining whether to deviate from the mid-point WACC estimate, noting that:[138]

> …there may be an argument for selection of a value lower than the mid-point for UCLL services to promote investment by access seekers which will also promote the long-term benefit of end-users. Nevertheless as in the case of selecting the 75th percentile, this approach would increase the risk of error, and as such we do not recommend it.

245. PwC submitted that "…the UCLL and UBA price reviews are based on a forward looking assessment of a 'market price' for services provided using what are largely sunk investments…" and "…the rationale for selecting a regulatory WACC above the mid-point would appear to be less compelling in these circumstances".[139]

246. We agree that the mid-point WACC estimate is appropriate for the UCLL and UBA services, although not necessarily for the reasons contained in the submissions outlined above. Our main reasons for using the mid-point WACC estimate in the draft UCLL and UBA pricing reviews are explained in paragraphs 206 to 232.

247. Many of the issues raised in these submissions are also relevant when considering whether an overall uplift to the UCLL and UBA prices is appropriate, rather than

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[134] Wigley and Company "Cross-submission to the Commerce Commission in response to the Commission's expert reports on the cost of capital for UCLL and UBA price reviews AND submission on the Part 4 review of WACC uplift" 4 August 2014, paragraph 34(b); CallPlus "Submission to the Commerce Commission on the technical consultation paper 'Determining the cost of capital for UCLL and UBA price reviews'" 28 March 2014, p.15, paragraph 54.

[135] CallPlus "Submission to the Commerce Commission on the technical consultation paper 'Determining the cost of capital for UCLL and UBA price reviews'" 28 March 2014, p.15, paragraph 50.

[136] Wigley and Company "Cross-submission to the Commerce Commission in response to the Commission's expert reports on the cost of capital for UCLL and UBA price reviews AND submission on the Part 4 review of WACC uplift" 4 August 2014, paragraph 34(c).

[137] Network Strategies "Commission consultation on WACC for UCLL and UBA services: Final report for Vodafone New Zealand" 27 March 2014, p.1.

[138] Network Strategies "Commission consultation on WACC for UCLL and UBA services: Final report for Vodafone New Zealand" 27 March 2014, p.12.

[139] PWC "Telecom Corporation of New Zealand Limited Submission on Commerce Commission's technical consultation paper: Determining the cost of capital for the UCLL and UBA price reviews, 7 March 2014 - submission" 28 March 2014, p.5, paragraph 34.

considering a WACC uplift in isolation from other parameters. Overall uplifts to the UCLL and UBA prices are considered separately in the draft pricing review determinations.[140]

Submissions on telecommunications received during our IMs WACC percentile review

248. During our recently completed review of the WACC percentile for electricity lines and gas pipeline businesses regulated under Part 4, we received submissions from telecommunications companies regarding the relevance of our IMs approach to the UCLL and UBA pricing reviews.

249. In particular, Chorus submitted that a larger increment to the WACC is justified for investors in regulated telecommunications services than energy businesses, reflecting greater exposure to:[141]

249.1 competition in the provision of regulated telecommunications services;

249.2 a regulatory regime that is generally accepted to be inherently less predictable than RAB-based regulation; and

249.3 technological change, which compounds other regulatory risks.

250. In response, Spark submitted that many of the issues raised by Chorus relate to non-systematic risks, which should not be compensated for in the allowed WACC (and instead should be borne by shareholders, who are able to mitigate these risks through diversification). Spark noted that risks associated with technological change are usually dealt with in the structure of a TSLRIC model, rather than in the WACC.[142]

251. For the reasons explained in paragraphs 206 to 232 above, we disagree with Chorus' view that a larger WACC uplift is required for regulated telecommunications services than energy businesses regulated under Part 4 of the Commerce Act.

252. Further, we agree with Spark that the factors raised by Chorus relate to non-systematic risks, which should not be compensated for with a WACC uplift. As noted in paragraph 239 above, we have considered asymmetric cash flow risks (such as asset stranding and demand uncertainty) separately in our draft decisions for the UCLL and UBA pricing reviews.

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[140] Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014. And Commerce Commission "Draft pricing review determination for Chorus' unbundled bitstream access service" 2 December 2014.

[141] Chorus "Submission on input methodologies WACC uplift draft decision" 29 August 2014, paragraphs 37-49.

[142] Spark "Proposed amendment to the WACC percentile for electricity lines services and gas pipeline services: response to Chorus submission" 12 September 2014, pp.2-3, paragraphs 12, 18.

Reasonableness tests of our UCLL and UBA WACC estimate

253. This section considers whether our WACC estimate for UCLL and UBA is reasonable, relative to other estimates of post-tax WACC.

254. The available evidence is limited, but we have not seen anything that would cause us to conclude our WACC estimate is not reasonable. This section summarises why we reached this view, including an explanation of:

    254.1   the purpose of reasonableness tests;

    254.2   other WACC estimates that might be useful comparators for our estimate; and

    254.3   how our WACC estimate for UCLL and UBA compares to this other information.

Purpose of reasonableness tests

255. Reasonableness tests are intended to check whether our WACC estimate is reasonable in light of other estimates. Significant differences with other estimates may reveal an oddity with our estimate. Conversely, if our estimate is close to other estimates for services with comparable risk, this increases confidence in the appropriateness of our WACC estimate.

What other WACC estimates should we compare our estimate to?

256. Our WACC estimate relates to the provision of UCLL and UBA services only. There are also published estimates of WACC for telecommunications providers, especially listed providers, but these providers typically offer a much broader range of services.

257. Care is required when comparing our WACC estimate with other published WACC estimates. For example, there are published WACC estimates for Chorus from research analysts employed by major investment banks, but Chorus is also rolling out UFB services, which likely has greater risks (especially execution risks, at present).[143] Accordingly, the WACC for UCLL and UBA services is likely to be lower than the WACC for all of Chorus.[144]

258. There are also WACC estimates for overseas integrated telecommunications companies. However, international estimates of WACC for other companies can be affected by a number of country-specific factors including differences in tax regimes, monetary conditions, regulatory regimes, and investors' relative risk aversion.

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[143]   Analogously, Oxera excluded new fibre networks operators from its sample used to estimate beta as these businesses had higher exposure to systematic risks than a UCLL or UBA company would. This was noted at paragraphs 146 to 149 above.

[144]   When estimating a WACC for regulating the prices of BT's copper services, Ofcom used a lower WACC for Openreach (defined as the regulated copper-based services), than for the BT Group itself, or the rest of BT. Ofcom, "Fixed Access Market Reviews – Annex A14, Cost of Capital, Table A14.1. This was due to the copper-based services having both a lower beta and lower debt premium.

Accordingly, we prefer to focus on using New Zealand estimates when assessing the reasonableness of our WACC estimate.

259.   We have used the following WACC estimates for assessing the reasonableness of our WACC estimate for UCLL and UBA:

259.1   estimates of WACC for the New Zealand market, on average. These are based on the historic returns reported for the New Zealand market since 1900, the expected return using our CAPM and an equity beta of 1, and the market-weighted average WACC estimates published by PwC. These estimates set an upper bound on the WACC for regulated services like UCLL and UBA, which should have lower risk than that of the average New Zealand investment;

259.2   independent WACC estimates for Chorus. These were provided to us by Chorus under a section 98 notice we issued.

260.   Some of these estimates assume different interest rates, including using 10-year estimates of the risk-free rate. As discussed earlier in this paper, a five-year term is more appropriate for regulating UCLL and UBA prices, and is therefore used in our analysis. The other estimates were also made when risk-free rates were higher than they are currently are. Therefore, we have standardised these WACC estimates for differences in the risk-free rates.[145]

How our WACC estimate for UCLL and UBA compares to this other information

261.   Our WACC estimate for UCLL and UBA is below the available forward and backward-looking estimates of the return on the New Zealand market. As discussed, this is appropriate since the market average likely has exposure to greater systematic risk than a regulated service like UCLL and UBA.

262.   We have also looked at WACC estimates sourced from reports published by investment banking research analysts on Chorus. In particular, we have looked at the WACC estimates included in these reports over two time periods:

262.1   around the time of Chorus' separation from Telecom;[146] and

262.2   in early 2014.[147]

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[145]   Specifically, our standardisation takes the independent estimate of WACC and adjusts it for the difference between the risk-free rate we use, and the risk-free rate used by independent analysts, less the impact of tax. The same approach was used in our recent decision on the appropriate WACC percentile for regulated energy utilities: ComCom, "Amendment to the WACC percentile for price-quality regulation for electricity lines services and gas pipeline services" 30 October 2014, paragraph D11.

[146]   The reports we included were as follows: First NZ Capital / Credit Suisse First Boston "Chorus' structural separation has arrived" 17 November 2011; Deutsche Bank "Chorus - Downgrade to Hold", 12 March 2012; Forsyth Barr "Chorus De-merged To Participate In UFB Project" 1 December 2012; Goldman Sachs "Chorus - Singing In The Rain" 16 December 2011. Estimates from other brokers were not used as they did not specify the risk-free rate assumptions used in their analysis.

[147]   Deutsche Bank 17 February 2014; and Forsyth Barr 18 February 2014 and 24 February 2014. Estimates from other brokers were not used as they did not specify the risk-free rate assumptions used in their analysis.

263. Estimates from the first period, around the time of separation, are based on analysts' initial views of the returns investors require from Chorus. Estimates from the second period, in 2014, are potentially affected by Chorus-specific events which have subsequently occurred.

   263.1 The estimates made around the time of Chorus' separation ranged from 6.76% to 7.78%, and averaged 7.32%, after adjusting for differences in the risk-free rates used by these analysts compared to those adopted in this draft determination.

   263.2 The estimates made in early 2014 range from 7.46% to 8.59%, and average 8.04%, after adjusting for differences in the risk-free rates used.

264. Our WACC estimate for UCLL and UBA is 6.47%. The broker estimates for Chorus, both from the time of separation and from earlier this year, are above our estimate of WACC for UCLL and UBA (after adjusting for differences in risk-free rates). One explanation for this is, as noted above, that Chorus provides a range of services with greater risk characteristics than UCLL and UBA, and Chorus therefore has a higher WACC for its total business than for UCLL and UBA.[148]

265. The broker reports include commentary on the risks facing Chorus, and in particular the risks from the UFB initiative. Deutsche Bank, for example, notes that the:[149]

   UFB risks relate to network deployment costs and construction risks, uncertain end-user demand for fibre (uptake and ARPU), failure to meet UFB milestones around deployment, product and systems delivery and service and operational availability. Failure to meet the 20% UFB uptake threshold by FY25 and/or failure to maintain an investment grade credit rating would result in less favourable UFB Crown funding arrangements than we currently forecast.

266. The UFB initiative is the material driver of Chorus's value. For example, UBS estimates that by 2030 Chorus's $2.9 billion of invested capital will be made up of $2.3 billion in fibre assets and $0.6 billion in copper assets.[150]

267. There is little commentary in the broker reports on how they have estimated WACC, how they have estimated beta for Chorus (for example, given its short period of share-market trading)[151], and in particular whether or how they have factored in any difference in risks from the UFB initiative into their estimate of WACC for all of Chorus. None of the brokers appears to have estimated WACC for Chorus' different service lines.

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[148] A second explanation is that Chorus has a higher cost of debt than the assumed efficient provider of UCLL and UBA services, which reflects that Chorus' credit rating is below the BBB+ rating assumed for our hypothetical efficient operator of UCLL and UBA services.

[149] Deutsche Bank 19 April 2012, p.18.

[150] UBS Investment Research, "Free at last" 23 Nov 2011, p.14, and p.19.

[151] PwC do not estimate beta or WACC for Chorus. This appears to be because Chorus is a company that "has been listed for less than three years [and] there is insufficient trading history for calculation of beta used in the calculation of WACC." PwC "Appreciating Value" June 2014, p.17, 19.