
Review of expert submissions on the WACC for UCLL/UBA

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New Zealand Commerce
Commission

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1 Introduction

Following the publication of Oxera's report on the review of the beta and gearing for UCLL and UBA services,¹ the Commission received a number of expert submissions on behalf of Chorus, Vodafone and Telecom Corporation of New Zealand (TNZ). These submissions raised a number of points regarding the appropriateness of Oxera's methodology in estimating the beta and gearing for the provision of UCLL and UBA services in New Zealand.

The relevant submissions are listed in Table 1.1.

Table 1.1 List of expert submissions received by the Commission

Submission number	Submitting body	Title
1.	Competition Economists Group on behalf of Chorus	'Review of Lally and Oxera reports on the cost of capital'
2.	Network Strategies on behalf of Vodafone	'Expert reports on WACC for UCLL and UBA FPP'
3.	PwC on behalf of TNZ	'Submission on Commerce Commission's Expert's paper: Review of the beta and gearing for UCLL and UBA services'
4.	Competition Economists Group on behalf of Chorus	'Cross submission UBA/UCLL cost of capital'
5.	Network Strategies on behalf of Vodafone	'Cross-submission: Commission expert reports on WACC'
6.	PwC on behalf of TNZ	'Cross-Submission on Commerce Commission Expert's paper: Review of the beta and gearing for UCLL and UBA services'

Note: Direct submissions have also been received from Chorus, Vodafone and TNZ. These mainly reiterate the issues raised by the companies' respective experts.

Oxera has reviewed these submissions and the concerns raised by the various experts. The submissions provide opinions on the alternative approaches that Oxera could have taken in determining the range that should be interpreted from the international comparator sample.

The choice of WACC for UCLL and UBA requires judgement

In reviewing the expert submissions, it is important to note that attempting to infer the beta for a hypothetical access operator based on comparator analysis is not an exact science and involves some degree of subjective assessment. Below, we present the 'on balance' arguments that support our recommendations. Where appropriate, these are guided by additional analysis.

A common concern in all the responses was the weight assigned by Oxera to the Chorus beta estimate. Oxera is not persuaded to change this approach. It has been recognised previously and in the expert submissions that there is no other comparator firm that mirrors the operational activities of a hypothetical operator providing UCLL and UBA access services. In fact, in several cases the difference in scope of business operations for comparator firms is not immaterial. Comparator analysis presents a valuable cross-check to Chorus's beta analysis,

¹ Oxera (2014), 'Review of the beta and gearing for UCLL and UBA services', 23 June.

but is not clearly 'better' for assessing the systematic risk assumed in setting a WACC for UCLL and UBA.

Furthermore, given that approximately 80% of Chorus' business activities are regulated;² its beta estimates are statistically robust; and the results from the comparator analysis are broadly consistent with the results from the analysis of Chorus' beta; Oxera would therefore continue to use the observed beta for Chorus as a focal point for the assessment of a beta for UCLL and UBA.

This conclusion was in the context that our analysis found that the comparator sample and the Chorus analysis pointed to consistent measures of asset beta. Respondents also questioned certain of the assumptions made in coming to a beta for the comparator sample.

In the context of the comparator sample, the key issues raised by the submissions were:

- choice of time period over which asset betas have been calculated (discussed in section 2 below);
- scope of comparator sample (section 3);
- choice of measure of central tendency in arriving at a range for the asset beta (choice of mean rather than median, section 4);
- credit rating implied by choice of gearing level (section 5).

The remainder of this document addresses these points, and then discusses other issues raised within the expert submissions (section 6).

² 2014 Chorus Annual Report available at: <https://www.nzx.com/files/attachments/199222.pdf>; last accessed 1 September 2014.

2 Comparator sample: time period of analysis

2.1 Summary of submissions and cross-submissions

One issue raised in submissions concerns the appropriate time period of the analysis. In his submission, Dr Hird, on behalf of Chorus, argues for the asset betas to be estimated over a 20-year period by primarily relying on what he asserts to be the Commission's approach for the energy sector. He states:

In its IMs Final Reasons Paper the Commission relied on 5 year asset betas estimated over the last 20 years to determine its preferred estimate of asset beta. The reasons given by the Commission for its reliance on such long term data relate to ensuring that its preferred estimate is as robust as possible, reducing the weight given to anomalous data or to unrepresentative periods³

He further suggests that Oxera's arguments around technological innovation in support of a shorter timeframe are inconsistent with the 'questionable' decline in comparator asset betas, and that the telecoms assets have long lives.

The other two submissions largely agree with allocating greater weight to the more recent data for the comparator analysis. Network Strategies (NS) notes the relatively small size of the comparator sample in the initial years:

in the absence of any analysis of the relationship between asset beta and environmental factors, we recommend that less weight be placed upon older data, as this may be less relevant to the time period associated with the FPP process, as well as being associated with greater sampling error.⁴

PwC agrees that the most recent period was the most relevant:

the older five year periods used in Oxera's analysis may be less relevant for the following reasons:

- a) five years to 2009 affected by the 2007-08 Global Financial Crisis;
- b) five years to 2004 affected by the 2000 internet boom / bust (the "tech wreck"); and
- c) five years to 1999 affected by the run up to the 2000 internet boom / bust.⁵

2.2 Oxera's analysis of submissions and cross-submissions

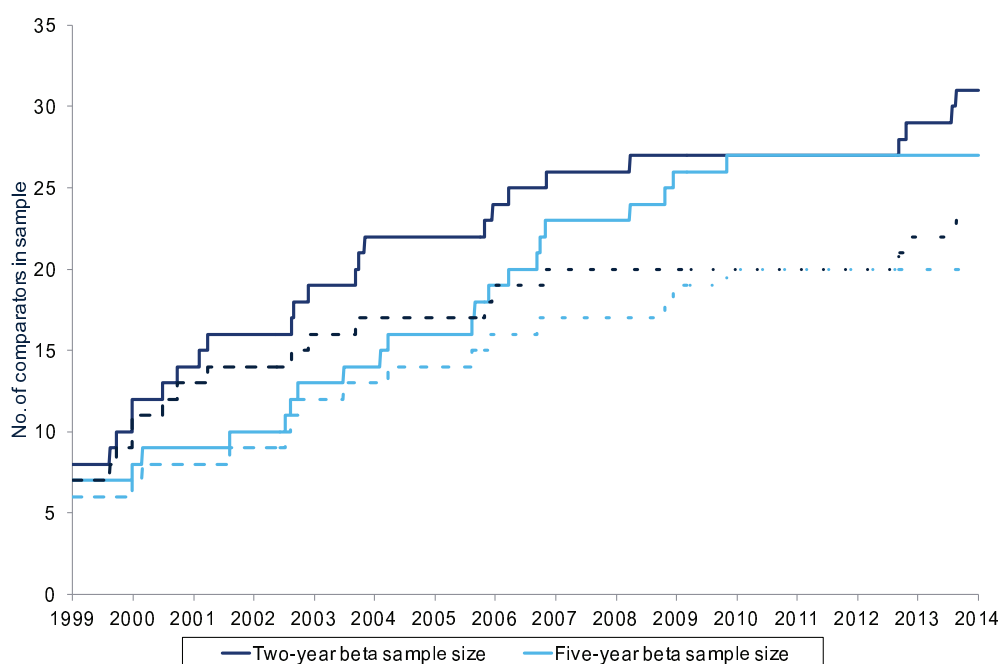
As noted by the other respondents, there are several valid reasons for excluding the older periods of the analysis in estimating the beta from the comparator sample.

One of the key reasons previously identified by Oxera, and also presented in the submission by NS, is the size of the comparator sample in the initial years of the analysis. Figure 2.1 shows the evolution of the comparator sample size over time.

³ Hird, T. (2014), 'Review of Lally and Oxera reports on the cost of capital', 21 July, para. 62.

⁴ Network Strategies (2014), 'Expert reports on WACC for UCLL and UBA FPP', 21 July, p. 23.

⁵ PwC (2014), 'Submission on Commerce Commission's Expert's paper: Review of the beta and gearing for UCLL and UBA services', 21 July, para. 26.

Figure 2.1 Comparator sample size

Note: Dashed lines represent betas for the refined comparator set. Solid lines represent betas for the entire comparator set.

Source: Oxera analysis based on Datastream.

As illustrated in the figure, only about half the total number of selected comparators are in the sample until 2003 and 2006, for the two- and five-year beta analyses respectively. Before 1999, there were fewer than ten companies within the sample. One direct effect of considering the entire period of the analysis is that it therefore introduces a bias by according more weight to firms with a longer trading history.

In contrast, in the IMs for electricity and gas pipeline services, the Commission identified 79 comparator firms, of which 59 had data available for the entire period of the analysis. In assessing the materiality of the change in comparator sample over time, the Commission noted the following:

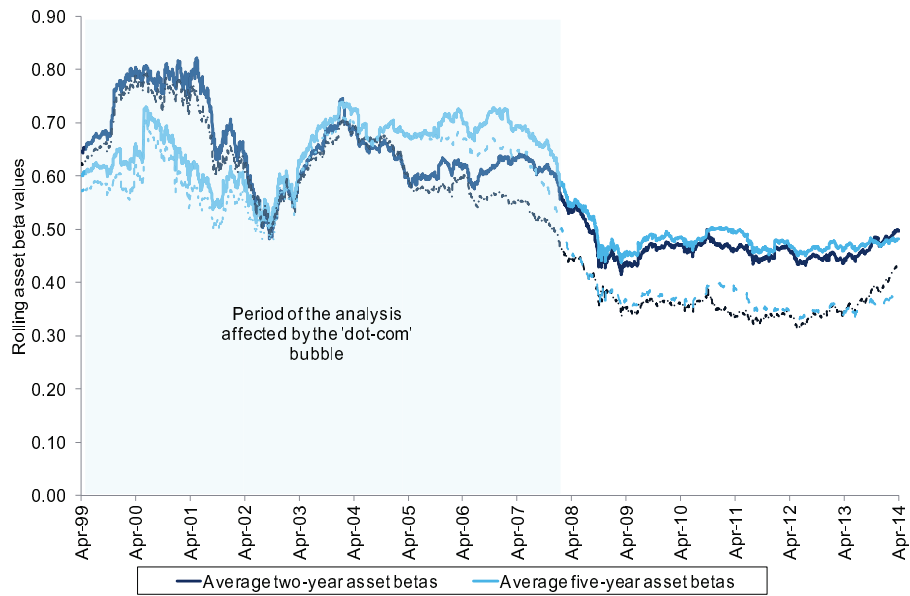
To determine whether the change in the sample over time had a material effect on the asset beta estimate for the total sample, the results from only those entities with a full 20 year history were also looked at. In the majority of cases, the asset beta estimates for the total sample (expressed to two decimal places) was unaffected. Where there was an effect, the majority of changes were 0.01.⁶

There is also a significant and structural decline in comparator beta values, which suggests that there is a shift in the risks perceived by investors for telecoms businesses. Figures 2.2–2.4 show this decline in asset betas for comparator firms since 1999 (the point at which five-year betas become available).⁷

⁶ Commerce Commission (2010), 'Input Methodologies (Electricity Distribution and Gas Pipeline Services)', December, p. 519, footnote 1162.

⁷ The availability of comparator data for stock price and gearing prior to 1994 is limited and unreliable, so rolling betas for the period prior to 1999 are not included in Figures 2.2–2.4.

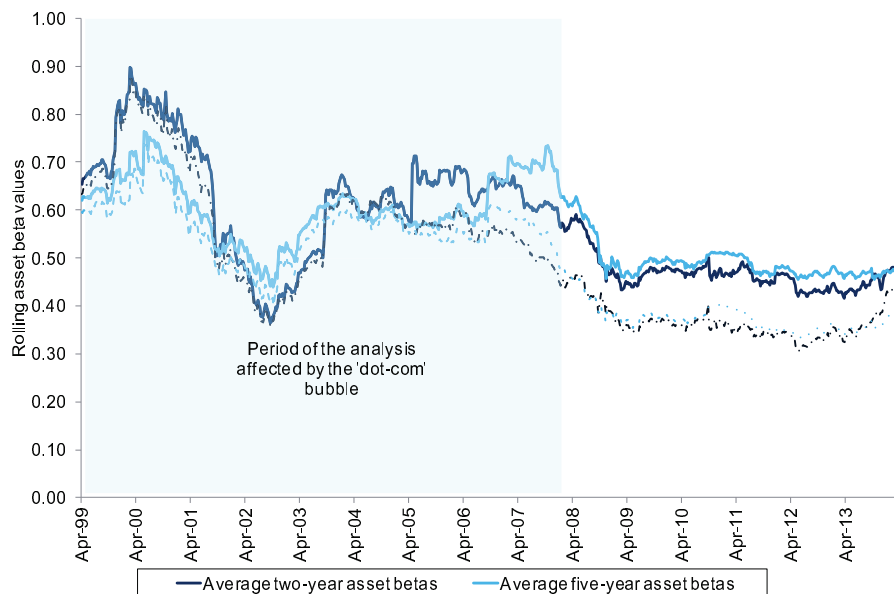
Figure 2.2 Evolution of average daily asset betas for comparator firms



Note: Dashed lines represent betas for the refined comparator set. Solid lines represent betas for the entire comparator set. The y-axis represents rolling asset beta values. The 'dot-com' bubble and subsequent stock market events are assumed to have ended in late 2002 when stock markets started to rise again. They affect the rolling beta calculations up until late 2007. For example, the five-year beta value in April 1999 represents a beta calculation that considers market data between April 1994 and April 1999.

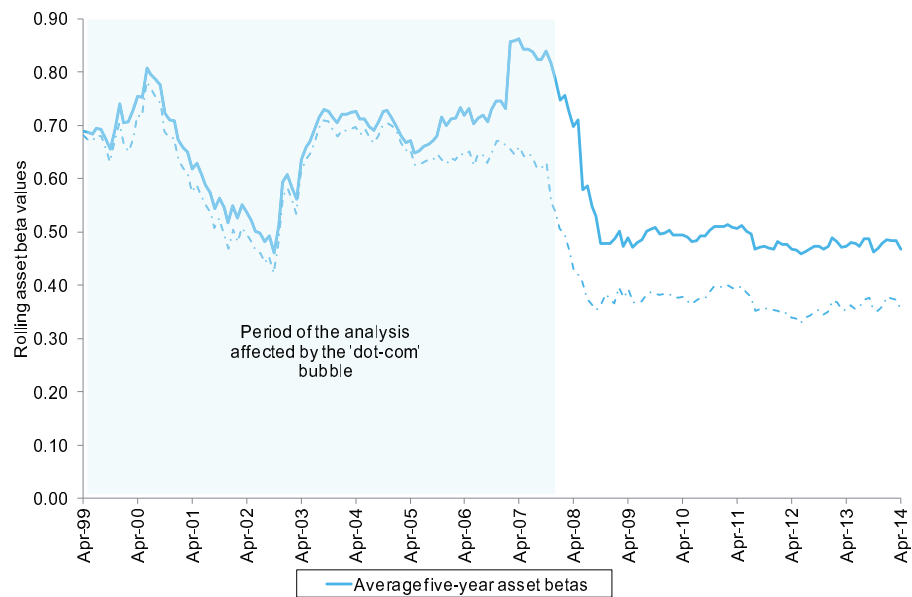
Source: Oxera analysis based on Datastream.

Figure 2.3 Evolution of average weekly asset betas for comparator firms



Note: Dashed lines represent betas for the refined comparator set. Solid lines represent betas for the entire comparator set. The y-axis represents rolling asset beta values. The 'dot-com' bubble and subsequent stock market events are assumed to have ended in late 2002 when stock markets started to rise again. They affect the rolling beta calculations up until late 2007. For example, the five-year beta value in April 1999 represents a beta calculation that considers market data between April 1994 and April 1999.

Source: Oxera analysis based on Datastream.

Figure 2.4 Evolution of average monthly asset betas for comparator firms

Note: Dashed lines represent betas for the refined comparator set. Solid lines represent betas for the entire comparator set. The y-axis represents rolling asset beta values. The 'dot-com' bubble and subsequent stock market events are assumed to have ended in late 2002 when stock markets started to rise again. They affect the rolling beta calculations up until late 2007. For example, the five-year beta value in April 1999 represents a beta calculation that considers market data between April 1994 and April 1999.

Source: Oxera analysis based on Datastream.

As noted by PwC, much of the initial period of analysis is affected by the 'dot-com bubble', and this period of turmoil appears to be reflected in the beta values. Additionally, Dr Hird's own analysis presented in his first response suggests a decline in average daily five-year comparator asset betas from 0.72 to 0.47 between March 2004 and March 2014, and an increase in sample size from five to 27 firms between March 1999 and March 2014.⁸

Oxera has performed a statistical test to compare the data from the first ten years of the sample against the data from the second ten-year period. It demonstrates that it is highly unlikely that the actual beta was unchanged over the period, and that the changes represent normal fluctuations in observed betas.⁹

Dr Hird also notes that technological change is generally synonymous with increased risk; however, in the case of telecoms, it may be argued that mobile telephony replacing landlines, and/or entrants building alternative networks, was a major threat to the viability of network access operators 20 years ago. The advent of broadband has provided a significant insurance to fixed networks and reduced the perceived business risk for legacy incumbent operators.

Betas are a forward-looking measure of risk as they measure share price fluctuations, and share prices represent the market value of the relevant companies' ability to generate profits into the future. This would indicate that the hypothesis that betas have fallen over the 20-year period appears to be

⁸ Hird, T. (2014), 'Response to Commerce Commission UCLL/UBA WACC consultation paper', March, Table 2. In March 2004 there were 16 firms in the sample.

⁹ Using a t-test, we reject the hypothesis that the betas for the two samples are from populations with the same mean.

consistent with the nature of technological change in the telecoms industry, as a forward-looking assessment of risk may indeed conclude that risk has been falling.

2.3 Oxera's assessment

This section has discussed the arguments for a longer-term dataset, as recommended by Dr Hird.

This is important in the case of telecoms. The use of a longer-term dataset would result in a higher value and range for the beta to be used for UCLL and UBA, as betas were materially higher in the first ten years of the sample period (1994–2004) than in the second ten years (2004–14).

The main arguments proposed for adopting a longer-term dataset are:

- **a richer dataset.** Longer-term time series provide more data and therefore should reduce the uncertainty around beta estimates;
- **consistency with precedent.** Dr Hird argues that precedent is indicative of a 20-year dataset, although in practice the IMs also gave weight to five-year data estimates.

However, there are also reasons for using a shorter dataset. The beta to be applied should be an estimate of the required returns into the future. In that context:

- **betas have fallen and there is no reason to believe that investors would expect them to rise to pre-2000 levels.** Statistical analysis demonstrates that betas have been lower in recent years, and a forward-looking analysis should not take into account data from a period when betas were different from those anticipated for the future;
- **market observation is consistent with the statistical evidence.** The period over which betas have fallen is consistent with a period when there has been less market disruption than in the earlier ten-year period, which was the time of the 'dot-com bubble' and sharp growth in mobile technology;
- **there is a richer comparator set for recent periods.** The use of data from over ten years ago would also require the use of a smaller dataset, which would be less reliable.

In summary, betas were more volatile and significantly higher in the earlier period, and it appears that the market has altered in its view of the risk of communications companies in the intervening period. On balance, Oxera therefore considers that the more recent data is more appropriate in setting a beta to be effective from 2014, and continues to advocate greater emphasis on the most recent five years of data.

Based on the analysis for two-year daily betas presented in section 3 of the Oxera report, and the analysis above, the use of ten years of data as an alternative to five years of data could also be supported, and would have relatively little impact on the results.¹⁰

¹⁰ Oxera (2014), 'Review of the beta and gearing for UCLL and UBA services', June, Table 3.4.

3 Definition of the comparator sample

3.1 Summary of submissions and cross-submissions

The main issue with the comparator sample revolves around Oxera's refinement of Dr Hird's original comparator set. As with the previous issue about the relevant time period for the beta analysis, NS and PwC largely agreed with Oxera's approach to selecting comparator firms.

NS had a minor objection to the inclusion of Deutsche Telekom (DT):

Oxera eliminated eight companies from the sample ... We concur with Oxera's view that these companies would be less reliable as comparators for Chorus ... However Oxera retained Deutsche Telekom even though it generates less than half of revenues from domestic operations ... We therefore do not believe that Oxera's criteria should have been relaxed in this instance to include Deutsche Telekom as a comparator for Chorus, however we note that excluding this company has very little effect on the results.¹¹

PwC concurrence of Oxera's approach is noted below:

Oxera's international telecommunications company comparator sample appears to have been selected and screened on a reasonable basis ... We concur with Oxera that no particular weight should be given to BT's observed beta.¹²

In contrast, while Dr Hird broadly agreed with the exclusion of Telefónica, TeliaSonera and Telenor, he raised a number of objections with the criteria used by Oxera in refining the comparator sample. He argued that the criterion to exclude companies not listed before November 2011 was redundant.

However, his key argument was that the exclusion of 'fibre-only' businesses was incorrect, on the basis that fibre represents the modern equivalent asset (MEA) for legacy copper networks. He also queried the exclusion of TNZ for the period before November 2011.

3.2 Oxera's analysis of submissions and cross-submissions

On Dr Hird's first point, while it is indeed the case that no comparator firm is excluded on the basis of trading history, the approach to refining the comparator set began by setting the criteria and then examining the data. The redundancy of a criterion due to non-exclusion of comparator firms does not invalidate the process of cross-checking the data against the criterion. Indeed, Dr Hird appears to implicitly advocate the exclusion of firms with a very short trading history in arguing for low reliance on Chorus' own beta estimates:

In my opinion reliance to this extent on the results from less than three years of trading data on a single firm is unreasonable.¹³

This is also recognised in the NS submission:

the disadvantage of the short time period is that there is insufficient information to smooth out any seasonal or cyclical effects, if present.¹⁴

Regarding the exclusion of 'fibre-only' businesses, our assessment was that all four excluded firms (Cogent Communications, Colt Group, Lumos Networks and TW Telecom) have a fundamentally different business risk profile to Chorus, or a

¹¹ Network Strategies (2014), 'Expert reports on WACC for UCLL and UBA FPP', 21 July, pp. 21–2.

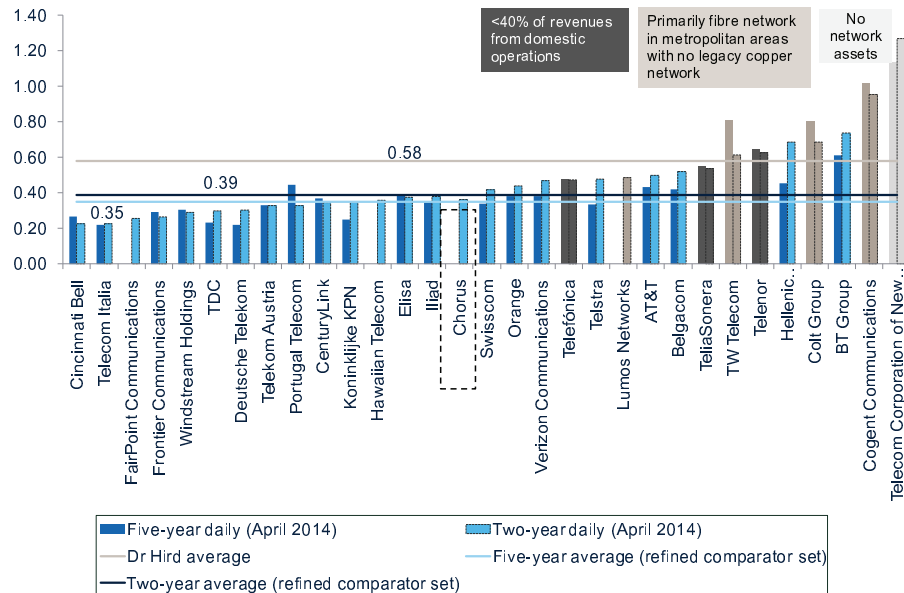
¹² PwC (2014), 'Submission on Commerce Commission's Expert's paper: Review of the beta and gearing for UCLL and UBA services', 21 July, para. 24.

¹³ Hird, T. (2014), 'Review of Lally and Oxera reports on the cost of capital', 21 July, para. 42.

¹⁴ Network Strategies (2014), 'Expert reports on WACC for UCLL and UBA FPP', 21 July, p. 19.

hypothetical network access operator. The Oxera report noted that the operational assets of these businesses were not national fibre networks that could be compared to the MEA, but that they were more akin to entrants competing with incumbents, and with business activity largely in metropolitan areas.¹⁵ This was shown by the significantly higher-than-average equity beta estimates, as presented in Figure 3.1.

Figure 3.1 Comparator asset beta analysis



Source: Oxera analysis based on Bloomberg and Datastream.

Table 3.1 summarises the business activities of these excluded firms.

Table 3.1 Summary of business activities of excluded ‘fibre-only’ firms

Comparator firm	Business description
Cogent Communications	A next-generation optical Internet service provider focused on delivering ultra-high-speed Internet access and transport services. The company serves businesses in the multi-tenant marketplace and service providers located in major metropolitan areas across the USA.
Colt Group	A multinational telecoms , IT managed services , and data centre services company headquartered in London. Colt provides services to city-based large enterprise, small and midsize business and wholesale carriers in 22 countries across Europe.
Lumos Networks	A fibre-based service provider in the Mid-Atlantic region serving carrier, business and residential customers over a dense fibre network offering data, voice and IP services. With c. 5,800 miles of network, it serves metropolitan regions of Virginia, West Virginia and portions of Pennsylvania, Kentucky, Ohio and Maryland.
TW Telecom	A fibre facilities-based local exchange carrier in selected metropolitan areas across the USA. The company offers a wide range of business telephony services, mainly to medium- and large-sized business customers and other carriers.

Source: Oxera analysis, based on company websites and Bloomberg.

As shown in the table, 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

¹⁵ Oxera (2014), ‘Review of the beta and gearing for UCLL and UBA services’, 23 June, section 3.

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.

Oxera also notes that all of these businesses operate in highly populated metropolitan areas, mainly serving commercial customers. Again, this implies that they have very different exposures to market forces compared to Chorus. Both of these differences indicate that the four firms under question are not direct comparators and should therefore be excluded from the comparator sample.

If these 'fibre- only' comparators are excluded, this does not suggest that the Chorus beta estimate should be based only on comparator activities that specifically exclude activities in metropolitan areas relating to business users. These activities should be already captured within the beta estimate of Chorus and those other comparator firms with a diversified geographical and demographic reach. Similarly, 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.

3.3 Further assessment of TNZ and DT

Since the demerger, TNZ does not own any copper wire network assets. In the period prior to the demerger, its business activities were largely dominated by its retail activities, as can be inferred from the relative market capitalisation of TNZ and Chorus after the demerger.¹⁶ The exclusion of TNZ from the comparator sample prior to November 2011 therefore appears to be justified. Section 2.4 of Oxera's initial report argued that the pre-2011 access business of TNZ is reflected by the inclusion of Chorus (for the two-year beta analysis).

If TNZ were to be included over the longer period, the most appropriate measure of its beta as a comparator for UCLL and UBA services would be that for its access business. This measure of beta would therefore be comparable to that for Chorus. Oxera's report noted that the Chorus beta and the beta of the comparator sample were broadly consistent. Therefore, even if the implied Chorus beta within the TNZ data were included within the sample, this would again not have a material impact on the range.¹⁷

Following an assessment of DT's international activities, NS considered excluding this comparator from the sample. While Oxera notes that DT is a borderline case, we also recognise that it provides an example of a business largely dominated by its incumbent position. Our judgement was that the case for inclusion was stronger than the case for exclusion.

If DT were to have a significant impact on Oxera's conclusions then the points made by NS would further support the case that DT should be given less weight than some of the other comparators. In practice, the impact on the conclusions of excluding DT would be small (around 0.01). Overall, we have therefore not proposed a change to our approach.

¹⁶ Chorus had a market capitalisation of NZ\$1.2bn on listing, compared to NZ\$3.9bn for TNZ. As of April 2014, TNZ's market capitalisation was nearly seven times that of Chorus'.

¹⁷ TNZ owns some network assets in Australia, and the listing on the Australian Stock Exchange could theoretically be relevant. For the most recent five-year period, TNZ has not been actively traded on the Australian Stock Exchange, and hence this would not be sufficiently strong evidence to support TNZ's inclusion in the sample. Note that this is a secondary argument for excluding TNZ; the primary reason remains its lack of comparability with Chorus' activities.

3.4 Oxera's assessment

Oxera excluded four companies from the comparator sample because they had fibre-only networks. Dr Hird's report noted that fibre-only companies should not be excluded on principle, in particular given that fibre is the MEA for UCLL and UBA services.

However, the arguments about the relevance of 'fibre-only' networks need to be considered alongside the specific characteristics of the excluded firms. Oxera's analysis did not exclude fibre-only companies on principle, but because the systematic risks associated with fibre-only competing networks were likely to be different to those for an incumbent access provider.

The arguments for the inclusion of these firms in the sample are as follows.

- **Betas should be broadly neutral to the choice of technology.** There is no reason why fibre technology should have a different set of risks to the hypothetical UCLL and UBA operator, and Oxera's first report noted that, for an incumbent operator such as Chorus, the beta for its fibre and copper activities would not necessarily be different.¹⁸
- **Operational risks are likely to be similar for fibre and copper access providers.** The systematic risks relating to the costs of constructing and operating copper and fibre networks are likely to be similar.

These need to be compared against the following differences.

- **The fibre-only companies identified are not incumbent access operators and face different market risks.** The success of entrant companies will be significantly more uncertain and subject to risk (including systematic risk) than that of a hypothetical access operator.
- **Fibre-only entrants are reliant on customers switching to new technologies.** As such, the success of fibre-only entrants is linked to a series of wider market factors, including the capacity of customers to switch technology, and the development of content for the new technology platform. In addition, the betas of fibre-only companies lie towards the top end of the sample, which is an unlikely outcome if there were no fundamental differences in underlying risk.
- **Market data illustrates that these risks have indeed resulted in higher betas for the relevant firms.** Betas for these firms are among the highest in the sample, and this is consistent with the significantly higher commercial risk faced by the companies.¹⁹

In summary, the four firms excluded from the sample do not have a regulated access network, do not have an incumbent market position, and are reliant on displacing existing incumbents and existing technologies. These points imply that they will face a different nature of risks to a hypothetical access operator. It is intuitively consistent with the nature of systematic risks that actual market evidence points to such firms having a higher asset beta.

On balance, Oxera considers that, based on the evidence, excluding the 'fibre-only' businesses is consistent with the aims of establishing a comparator sample. The inclusion of these firms would give significant weight to betas for

¹⁸ See Oxera (2014), 'Review of the beta and gearing for UCLL and UBA services', June, pp. 55–6.

¹⁹ A t-test indicates that the hypothesis—that the betas for the 'fibre-only' network firms are samples from populations with the same mean—is strongly rejected.

companies which take very different risks to those for a hypothetical operator providing UCLL and UBA services.

4 Appropriate measure of central tendency (mean versus median)

The NS submission raises the issue regarding Oxera's adoption of the mean as the preferred measure of central tendency in constructing a range based on the comparator beta data. NS's primary concern is that, in averaging across time periods, equal weight was being attached to each five-year window for beta estimation. Given that the number of comparator firms changes significantly over time, NS states that using the mean to summarise the data will introduce a bias in the results. In particular, NS makes the following comment in advocating the use of the median rather than the mean:

A single company – BT Group – is highly influential for the 1999 time period. The use of averages rather than medians produces estimates that are affected by extreme values, such as that for BT Group. This effect is also more pronounced in situations with small sample sizes, such as the 1999 time period.²⁰

PwC also suggested that median values could also be instructive in analysing average betas for sample sets of companies.²¹

In theory, NS's concern could be valid, and Oxera does not disagree with the potential bias that may be introduced in the beta estimate, should the use of the mean give equal weight to some companies that are both relatively weak comparators and significantly different from the mean. The median is then a potentially suitable alternative to infer the central beta estimate from the comparator data.

In a given situation, the measure of central tendency should be the one that best summarises the data. The mean is more influenced by changes in the dataset, and to the betas of individual firms within the sample. It is also more representative of the dataset, as each data point within the sample is reflected equally. In contrast, the median value of a data sample is relatively independent of the absolute magnitude of individual data points and changes in the sample size.

The beta values for the comparator firms are spread over a relatively large range of values and therefore the mean value could be significantly affected by the inclusion or exclusion of data points at the extremes of the sample.

However, given the constraints in finding an ideal comparator firm, Oxera has already considered whether it is appropriate to exclude these data points. Oxera conducted a systematic refinement of the comparator set which led to the exclusion of firms that were not considered suitable comparators. As a result, it is not clear that any further exclusion of data points through the use of the median is warranted. Among the remaining firms, each was considered to be relevant to the analysis irrespective of the magnitude of the beta value. Given this context, the mean would serve as a more inclusive measure for summarising the data.

For illustration, Oxera has conducted analysis of the median values for the beta analysis. These are compared with the mean results in Table 4.1.

²⁰ Network Strategies (2014), 'Expert reports on WACC for UCLL and UBA FPP', 21 July, p. 23.

²¹ PwC (2014), 'Submission on Commerce Commission's Expert's paper: Review of the beta and gearing for UCLL and UBA services', 21 July, para. 29.

Table 4.1 Comparison of mean and median values of Oxera's asset beta analysis for comparator firms

Time period	All comparators		Refined comparators	
	Mean	Median	Mean	Median
Two-year daily beta analysis				
1999	0.63	0.53	0.60	0.47
2004	0.60	0.55	0.60	0.54
2009	0.50	0.48	0.42	0.43
2014	0.47	0.42	0.39	0.36
20-year period	0.55	0.47	0.48	0.44
Five-year daily beta analysis				
1999	0.58	0.51	0.54	0.47
2004	0.71	0.68	0.69	0.67
2009	0.54	0.52	0.47	0.46
2014	0.46	0.38	0.35	0.35
20-year period	0.57	0.49	0.48	0.43
Two-year weekly beta analysis				
1999	0.64	0.57	0.61	0.56
2004	0.54	0.45	0.54	0.43
2009	0.52	0.46	0.43	0.42
2014	0.46	0.45	0.41	0.44
20-year period	0.54	0.47	0.47	0.45
Five-year weekly beta analysis				
1999	0.60	0.58	0.56	0.57
2004	0.61	0.51	0.58	0.51
2009	0.55	0.49	0.47	0.48
2014	0.46	0.37	0.36	0.35
20-year period	0.55	0.49	0.46	0.43
Five-year monthly beta analysis				
1999	0.66	0.67	0.65	0.67
2004	0.71	0.66	0.68	0.65
2009	0.57	0.52	0.50	0.50
2014	0.45	0.37	0.33	0.34
20-year period	0.60	0.51	0.49	0.45

Source: Oxera analysis, based on Bloomberg and Datastream.

As can be seen from the numbers for the refined comparator set, in the initial period of the analysis, the difference between the mean and median values for the sample of comparator firms is at times not insignificant. However, as the analysis progresses, the increase in the size of the comparator set appears to reduce the gap between the two measures (see the figures in bold).

Given that the Oxera analysis draws its conclusions from the data pertaining to the refined comparators, and emphasises the latter period of the analysis, the choice of mean or median would have a moderate impact on the choice of asset

beta. On balance, we consider that it would be more appropriate to continue to use the mean in coming to an assumption for UCLL and UBA.

5 Credit rating

As part of the analysis discussed in its previous report, Oxera proposed a notional long-term credit rating consistent with the leverage and financial analysis. It was proposed that a rating of A–/BBB+ would be consistent with the choice of leverage and with the business activities associated with the provision of UCLL and UBA services.

PwC commented that Oxera had not provided analysis of the credit ratings of the companies in its comparator set, and that it would have been useful to infer the ratings for those comparator companies with leverage near the level of 40% recommended by Oxera for the UCLL or UBA service provider.²²

Dr Hird suggested that a target credit rating of BBB– was appropriate, and that Oxera's analysis had not considered evidence from comparator firms. In support, he claimed that Oxera implicitly assumed that financial risk profile is determined solely by gearing.

In practice, as discussed below, the credit ratings for the comparator set are determined by a wide range of factors, including factors that are not directly relevant to a hypothetical provider of UCLL and UBA.

Table 5.1 illustrates the financial leverage and credit ratings for all the firms in the comparator sample, highlighting those firms that have ratings comparable with our recommended level of A–/BBB+.

Table 5.1 Leverage and credit rating for comparator firms

Comparator firm	Two-year leverage (2014)	Five-year leverage (2014)	S&P credit rating
AT&T	26%	28%	A–
Belgacom	20%	18%	A
BT Group	29%	39%	BBB
CenturyLink	49%	43%	BB
Chorus	62%	n.a.	BBB
Cincinnati Bell	75%	77%	BB–
<i>Cogent Communications</i>	12%	17%	B+
<i>Colt Group</i>	(35%)	(34%)	BB
Deutsche Telekom	49%	51%	BBB+
Elisa	24%	24%	BBB
FairPoint Communications	80%	n.a.	B
Frontier Communications	64%	60%	BB–
Hawaiian Telecom	51%	n.a.	B
Hellenic Telecommunications Org.	48%	53%	BB–
Iliad	11%	13%	NR
Koninklijke KPN	58%	48%	BBB–
<i>Lumos Networks</i>	53%	n.a.	NR
Orange	56%	50%	BBB+

²² PwC (2014), 'Submission on Commerce Commission's Expert's paper: Review of the beta and gearing for UCLL and UBA services', 21 July, para. 46.

Comparator firm	Two-year leverage (2014)	Five-year leverage (2014)	S&P credit rating
Portugal Telecom	68%	55%	BB
Swisscom	28%	31%	A
TDC	39%	39%	BBB
<i>Telecom Corporation of New Zealand</i>	17%	25%	A–
Telecom Italia	78%	75%	BB+
<i>Telefónica</i>	53%	46%	BBB
Telekom Austria	56%	48%	BBB–
<i>Telenor</i>	17%	17%	A–
<i>TeliaSonera</i>	25%	22%	A–
Telstra	18%	23%	A
<i>TW Telecom</i>	20%	24%	BB–
Verizon Communications	25%	31%	BBB+
Windstream Holdings	63%	58%	BB–
Average (all comparators)	40%	36%	
Average (refined comparators)	47%	43%	

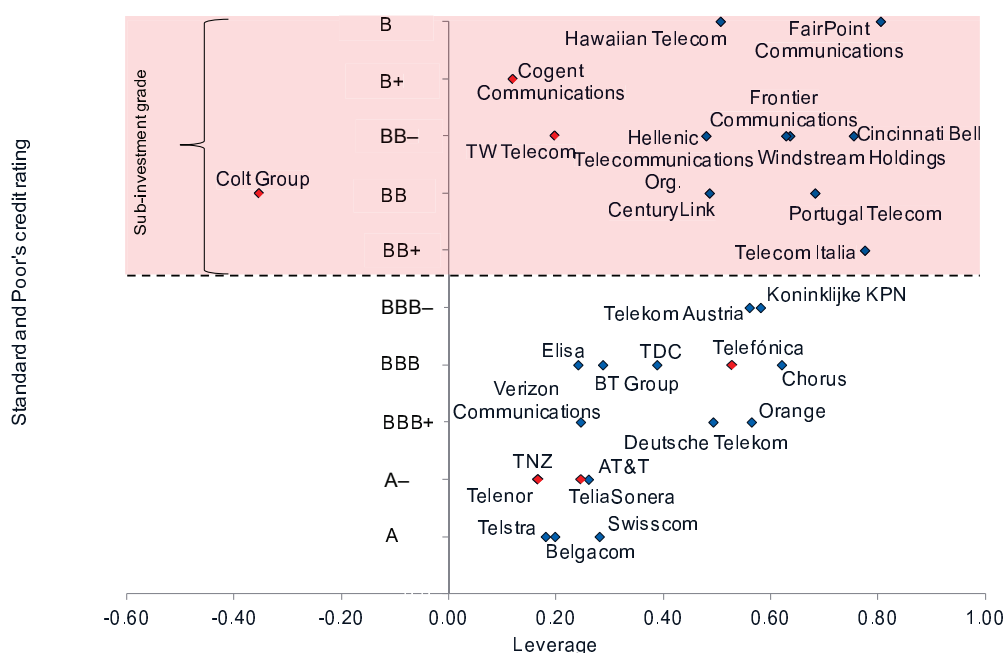
Note: Italics indicate firms that are excluded from the refined comparator set. Bold indicates firms that are rated A– or BBB+.

Source: Oxera analysis, based on Bloomberg, Datastream, Standard & Poor's, and company websites.

From the data presented in the table, it is not straightforward to draw a link between the leverage ratios and credit ratings of comparator firms. For example, Deutsche Telekom has a credit rating of BBB+ and a leverage ratio of 49%. In comparison, Hellenic Telecommunications Org. has a comparable leverage of 48% but a credit rating of BB–, which is several notches lower. This is not surprising as the credit rating of Hellenic Telecommunications Org. will be adversely affected by the national credit risk associated with Greece, which illustrates that there is no simple relationship between financial ratios (including leverage) and credit rating across such an international comparator dataset.

Similarly, Elisa and Chorus have the same credit rating (BBB), but vastly different leverage ratios (24% and 62% respectively). This is illustrated in Figure 5.1.

Figure 5.1 Relationship between leverage ratios and credit ratings



Note: Red data points indicate firms excluded from the refined comparator sample.

Source: Oxera analysis, based on Bloomberg, Datastream and Standard & Poor's credit reports.

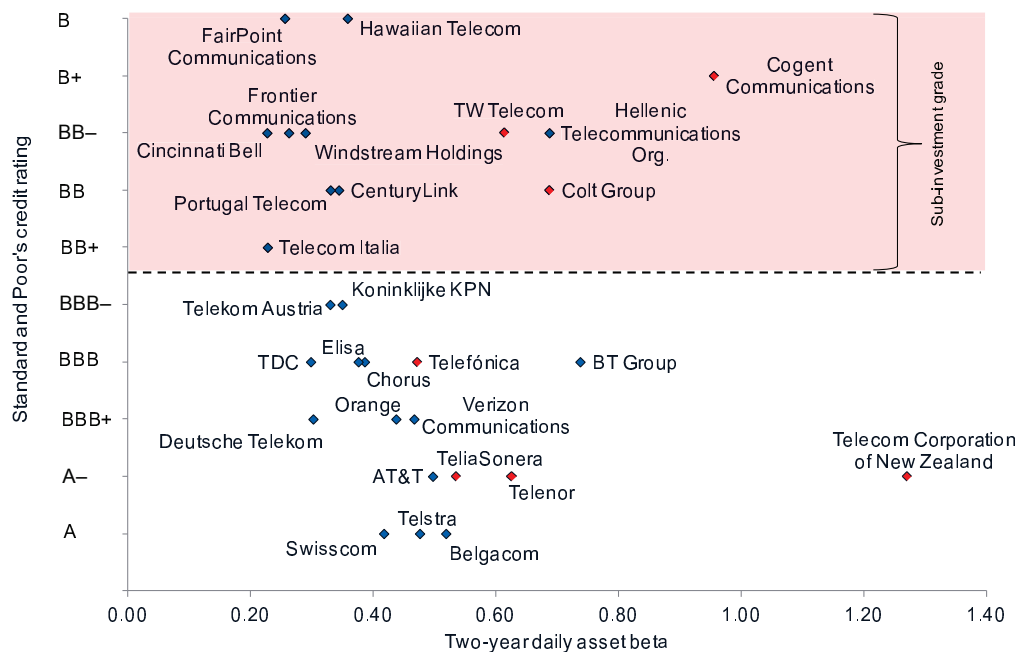
As can be seen from Figure 5.1, the link between credit rating and leverage ratio across the comparator sample is relatively weak. While leverage ratios are one of the components analysed by credit rating agencies in determining the credit rating for a firm, there are also several other internal and external factors.

One example is the sovereign credit rating.²³ As many of the comparator firms are European, and given the recent eurozone crisis, it may be that the credit ratings for some of the comparators based in affected countries are affected by the crisis at the sovereign level.

Figure 5.2 compares the credit ratings of the comparator firms to the asset beta estimates to test whether there is any systematic relationship between them.

²³ In accordance with Moody's guidelines, infrastructure and utility companies would not normally be expected to have a rating more than two notches higher than that of the government of the country in which the majority of their business is located. See Moody's Investors Service (2011), 'Rating Action: Moody's downgrades Bord Gáis to Baa3 from Baa1, negative outlook (Ireland)', 14 July.

Figure 5.2 Relationship between asset betas and credit ratings



Note: Red data points indicate firms excluded from the refined comparator sample.

Source: Oxera analysis, based on Bloomberg, Datastream and Standard & Poor's credit reports.

As is evident from Figure 5.2, there is no obvious systematic relationship between asset beta and credit rating for the firms in the comparator sample. Furthermore, a large proportion of the firms have a sub-investment-grade credit rating. It could be argued that it is appropriate to focus only on firms with investment-grade ratings, as the Commission is estimating the WACC for a hypothetical efficient provider of the UCLL and UBA services.

Even if these anomalies were ignored, simply analysing the credit ratings of the comparator firms indicates that only two of the firms in the refined comparator set are rated BBB– (the suggested credit rating in Dr Hird's analysis), and both have leverage in excess of 55% (which is above his notional gearing assumption of 40%).²⁴

The other 13 firms with investment-grade credit ratings are fairly evenly distributed between A and BBB.²⁵ Four of these firms share the target credit rating of A–/BBB+, and their average leverage ratio is 39%. Oxera's recommended target credit rating of A–/BBB+ is therefore consistent with the relevant evidence from the comparator data.

²⁴ Even if the entire comparator set were considered, the number of firms rated BBB– would remain unchanged.

²⁵ BBB– is considered the lowest investment-grade credit rating. See Standard & Poor's website: <http://www.standardandpoors.com/ratings/definitions-and-faqs/en/us>; last accessed 17 August 2014.

6 Other issues

6.1 Alternative approaches to beta estimation

This section considers some additional issues raised in the expert submissions.

Dr Hird queried Oxera's estimation of weekly and monthly betas:

I note that Oxera presents daily, weekly and monthly betas. However, it does not explain the basis on which these are measured (i.e., there are many alternative ways that a weekly or monthly beta could be measured), or consider the variation that the arbitrary selection of a start date may potentially give rise to.²⁶

Oxera acknowledges the concerns regarding the variability around estimating weekly and monthly beta estimates for comparator firms. While these may be partly attributed to trading patterns in the market, there is no definitive explanation for this variability. That is why Oxera mainly relies on daily beta estimates. The purpose of presenting weekly and monthly estimates in Oxera's original report was merely as a cross-check to the daily analysis.

PwC suggested that Oxera's comparator analysis could have been refined by conducting a beta decomposition analysis:

Concerns around the comparability of the activities of these companies to those of a UCLL or UBA service provider have partially been addressed by Oxera identifying a "refined comparator set". Residual concerns around comparability could, if deemed necessary, be addressed by undertaking a beta decomposition analysis - whereby line of business beta estimates for those companies are "decomposed" from the observable weighted average company betas. It is acknowledged that such analysis is costly to undertake, with no certainty of obtaining usable results²⁷

Oxera agrees in principle that beta decomposition analysis could form part of an analysis of betas. However, as noted by PwC, there are practical constraints to carrying out such analysis. It may be feasible to conduct a detailed 'decomposition' analysis for a handful of firms. Indeed, Ofcom conducts a simple decomposition analysis between Openreach access services and other services in determining the beta for BT. However, a majority of the firms in the comparator sample for Chorus are sufficiently diversified that any such analysis would be subject to significant uncertainty, and any estimate would have a wide standard error.

²⁶ Hird, T. (2014), 'Review of Lally and Oxera reports on the cost of capital', 21 July, para. 95.

²⁷ PwC (2014), 'Submission on Commerce Commission's Expert's paper: Review of the beta and gearing for UCLL and UBA services', 21 July, para. 12.

7 Conclusion

In this note, Oxera has reviewed the expert submissions and cross-submissions provided to the Commission and, in particular, the argument that the comparator sample applied by Oxera has not been interpreted correctly.

Our analysis of the evidence provided by the submissions on the choice of range based on the comparator sample is as follows.

- **Betas have fallen in the telecoms sector, and it is more appropriate to rely on data from the last five to ten years.** The data identified for the comparator sample suggests that the betas observed from the 1994–2004 period were significantly different to those observed in more recent periods. Our assessment is that it would be more appropriate to use more recent data in estimating a beta for UCLL and UBA services.
 - **The Oxera refined comparator set is more suitable than the wider comparator set in estimating the beta for an access business.** The risks associated with competing fibre-only companies are very different to those faced by an incumbent access operator, both in theory and in practice, as demonstrated by materially higher betas for these companies.
 - **The credit rating proposed by Oxera (A–/BBB+) appears to be consistent with the proposed leverage for an access operator comparable to Chorus providing UCLL and UBA.** While many of the operators do have different (and often lower) credit ratings, these are driven by factors that are not relevant to the choice of credit rating for the hypothetical provider of UCLL and UBA services.
-

A1 Update on regulatory precedents

Figure A1.1 presents updates to Figure 3.4 in Oxera's original report.²⁸ In particular, since Oxera conducted its analysis, the Irish regulator (ComReg) has published a new decision for the asset beta of eircom.²⁹ The asset beta for fixed-line telecoms, as determined by the regulator, has decreased from 0.57 (as determined in 2008) to 0.50, suggesting an implicit recognition of declining beta values for telecoms operators.³⁰

Additionally, in France, regulators adopt a tax-adjusted relationship (Modigliani–Miller approach) between levered and unlevered beta. In the UK and New Zealand, regulators adopt the 'Miller equation' to define the relationship between levered and unlevered beta. The two equations are described below:

Modigliani–Miller equation

$$\beta_a = \beta_e \div [1 + ((1 - t) * \frac{D}{E})]$$

Miller equation

$$\beta_a = \beta_e \div (1 - \frac{D}{D + E})$$

where:

β_a = asset beta;

β_e = equity beta;

t = tax rate;

D = net debt; and

E = equity.

Adjusting the calculations to account for this methodological difference lowers the asset beta estimate from 0.70 to 0.60.

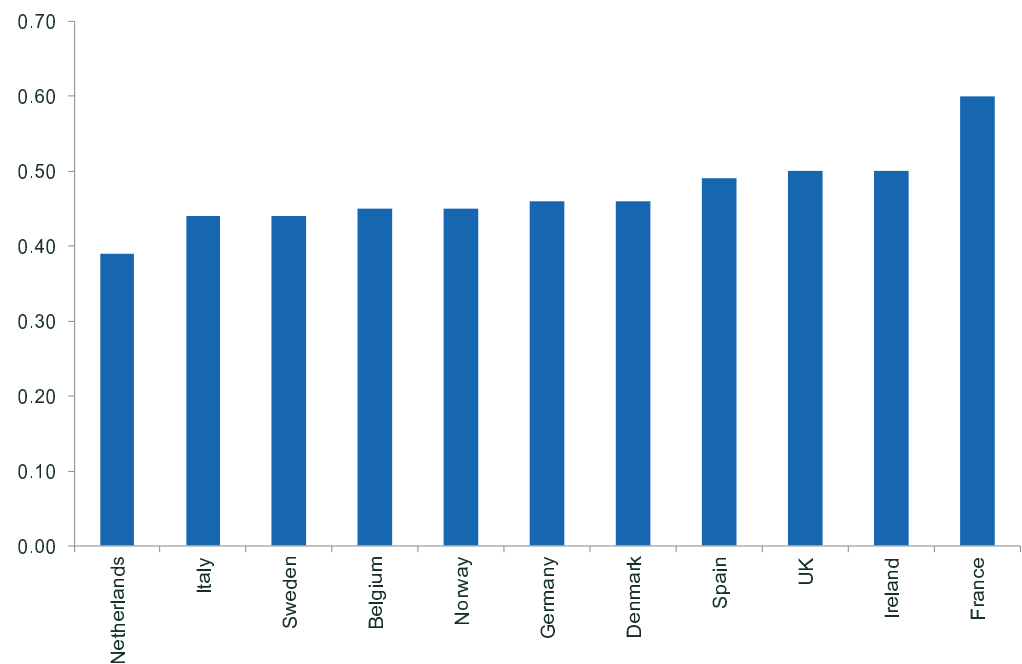
Figure A1.1 presents the updated European regulatory precedents for asset beta determinations of fixed-line operators.

²⁸ Oxera (2014), 'Review of the beta and gearing for UCLL and UBA services', June.

²⁹ See ComReg (2014), 'Review of Cost of Capital', 11 April.

³⁰ See ComReg (2008), 'Eircom's Cost of Capital', 22 May.

Figure A1.1 European regulatory precedent on asset betas



Note: The UK refers to Ofcom's 2014 determination for BT Openreach. See Ofcom (2014), 'Fixed access market reviews: wholesale local access, wholesale fixed analogue exchange lines, ISDN2 and ISDN30', 19 May. The asset beta value for France represents calculations based on the Miller equation.

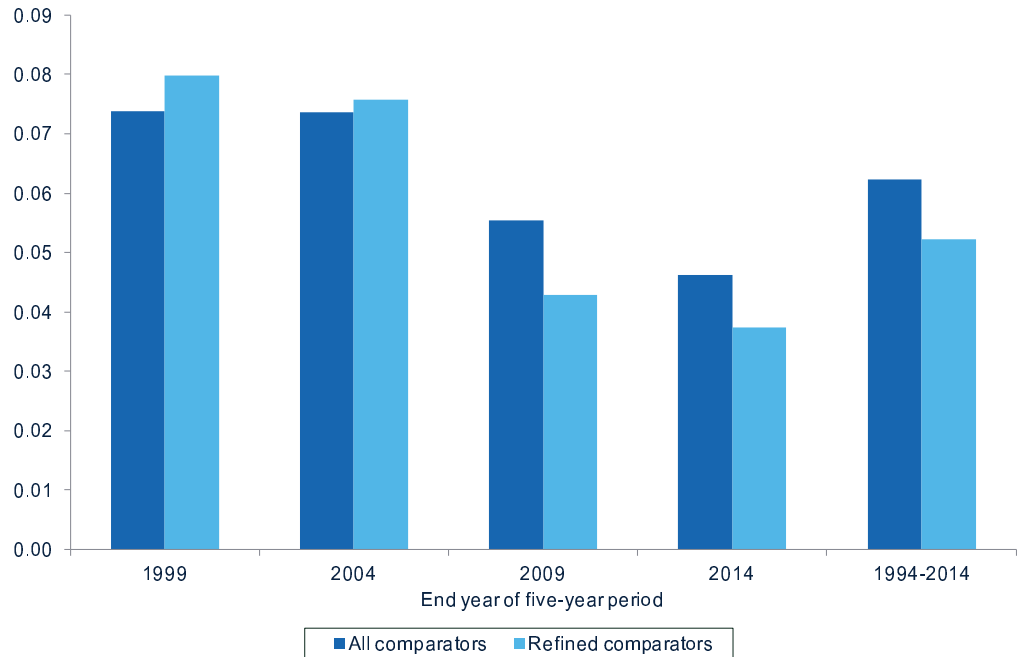
Source: Oxera analysis based on various regulatory determinations.

The revised range for regulatory determinations is 0.38–0.60, with an average determination of 0.47.

A2 Telecoms comparators: analysis of equity and asset beta standard errors

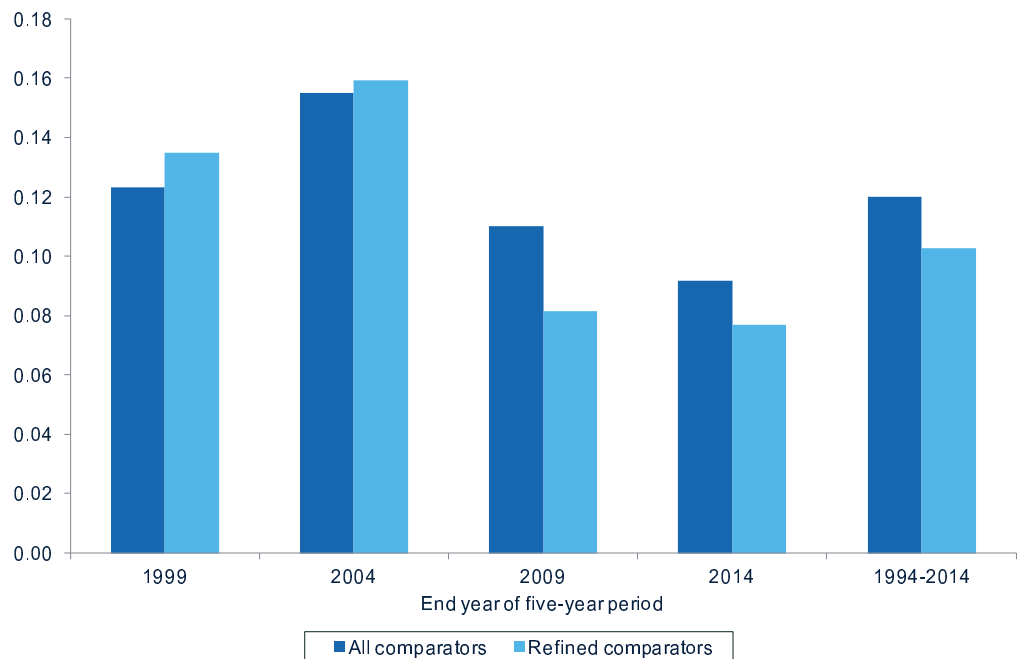
This appendix reviews the standard errors for the equity and asset betas for the comparator set, as shown in Figures A2.1–A2.4.

Figure A2.1 Current and historical weekly standard errors for asset betas of the comparator sample



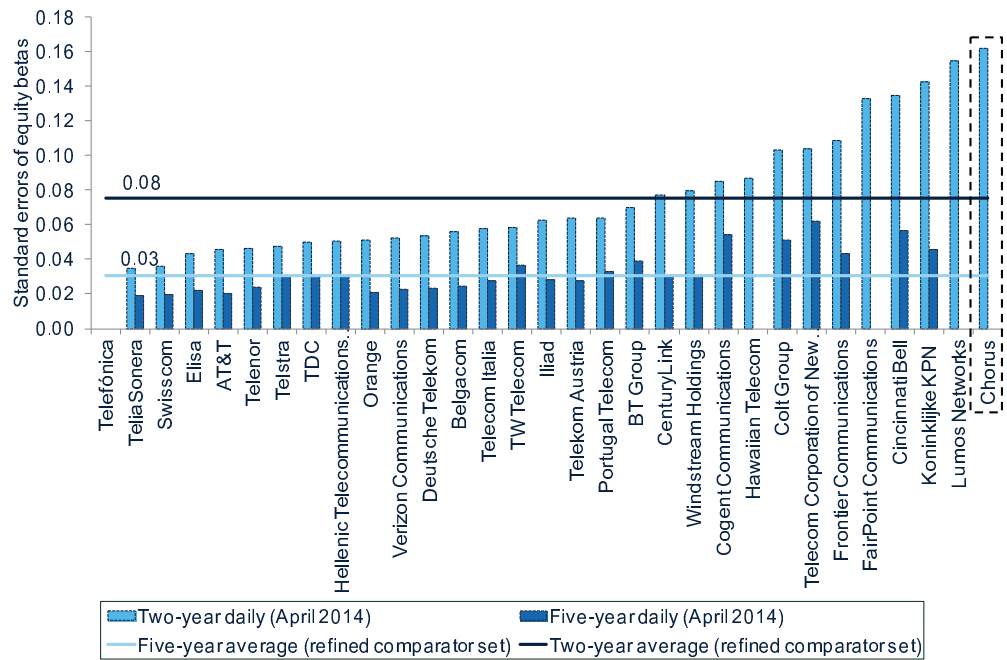
Source: Oxera analysis based on Bloomberg and Datastream.

Figure A2.2 Current and historical monthly standard errors for asset betas of the comparator sample



Source: Oxera analysis based on Bloomberg and Datastream.

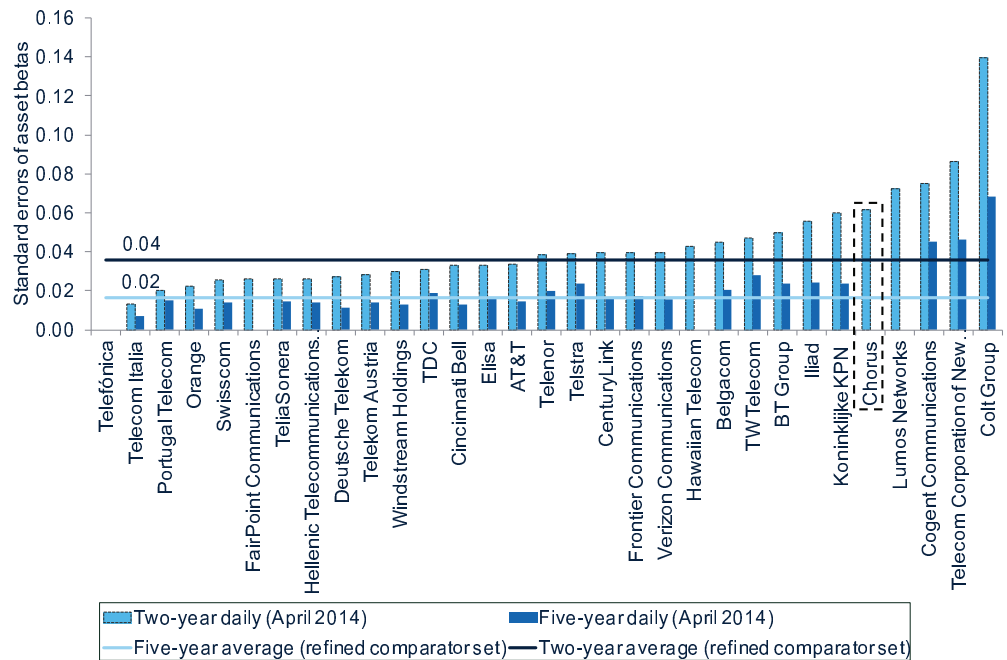
Figure A2.3 Current and historical standard errors for the equity betas of the Chorus comparator set



Note: The horizontal lines indicate averages as at April 2014.

Source: Oxera analysis based on Bloomberg and Datastream.

Figure A2.4 Current and historical standard errors for the asset betas of the Chorus comparator set



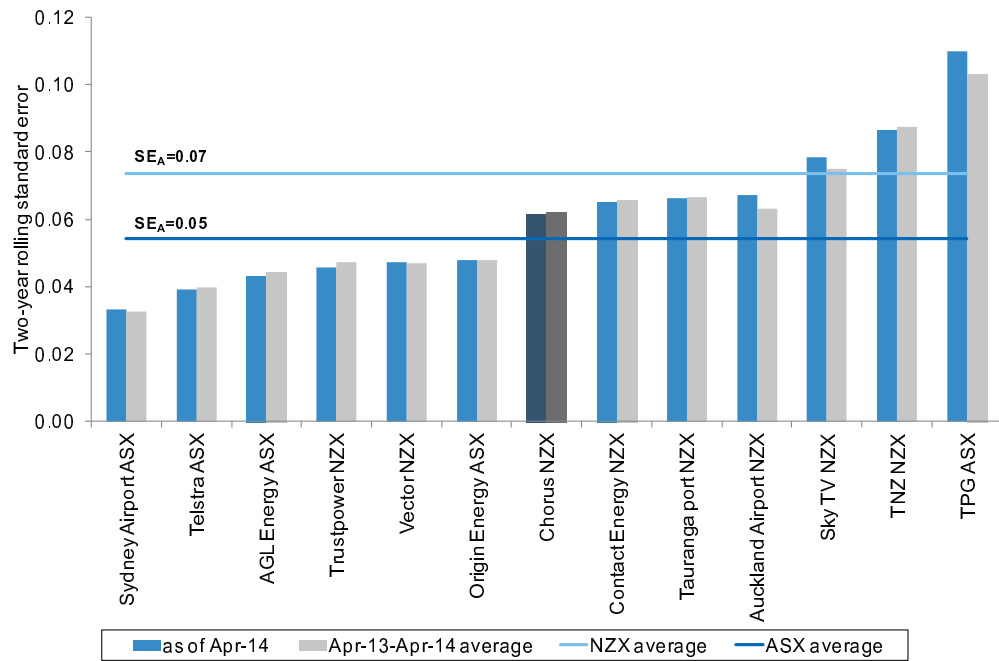
Note: The horizontal lines indicate averages as at April 2014.

Source: Oxera analysis based on Bloomberg and Datastream.

A3 Update to standard error analysis

Figure A3.1 presents updated analysis for Figure 2.11 of Oxera's report, 'Review of the beta and gearing for UCLL and UBA services'. The updated analysis does not alter the inferences or conclusions of Oxera's findings.

Figure A3.1 Current and historical standard errors for the New Zealand and Australian comparators' asset betas



Note: The horizontal lines indicate averages as at April 2014. The asset beta standard error was derived by multiplying the equity beta standard error by (1 – average gearing) for the relevant period.

Source: Oxera analysis based on Bloomberg and Datastream.

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