

Cost of capital for regulated fibre telecommunication services in New Zealand: Asset beta, leverage, and credit rating – Response to submissions

New Zealand Commerce Commission

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FINAL REPORT

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1. INTRODUCTION AND SUMMARY

The Commerce Commission (the Commission) is developing the upfront Input Methodologies (IMs) that will set the rules and processes that apply to the regulation of fibre fixed line access services (FFLAS). To inform development of the Cost of Capital IM, the Commission has asked CEPA to provide analysis and advice on the following two components of the weighted average cost of capital (WACC):

- An appropriate asset beta for the FFLAS that are regulated by the Commission. This includes consideration of whether it would be appropriate to estimate a different beta for Chorus and the Local Fibre Companies (LFCs).
- The long-term credit rating that would be appropriate for a FFLAS provider.

CEPA's report on these issues was published by the Commission in May 2019, alongside its fibre regulation emerging views paper. The Commission has subsequently received submissions and cross-submissions on CEPA's approach to estimating these WACC parameters.

The main themes emerging from the submissions relate to:

- The selection of the **comparator sample** used to derive the asset beta, leverage and credit rating estimates. Submissions presented a range of views on comparators that should be excluded, additional comparators that could be considered, and other filters that should be applied.
- Our approach to **assessing the relative systematic risk exposure** of the FFLAS providers, compared to the comparator sample.
- Whether it is appropriate to set **sector-wide or company-specific estimates** for the asset beta.
- More broadly, given the evidence from the comparator sample, the **appropriate range** for the FFLAS provider asset beta.
- Our recommended **notional leverage and credit rating** for an efficient FFLAS provider.

CEPA has considered the points raised in the submissions and cross-submissions. In relation to each theme described above:

- **Comparator sample:** We consider that it is appropriate to adopt a broad comparator sample (in line with the Commission's approach for industries regulated under Part 4 of the Commerce Act) and are still of the view that the wholesale service providers identified in our sample provide relevant evidence for assessing the asset beta of a FFLAS provider. After considering submissions in relation to the comparator sample, we have broadened the sample to include companies from developed countries in the Asia Pacific region (Singapore, Japan, South Korea) as well as firms drawn from a broader selection of Bloomberg industry classifications. We have also revised the sample to take account of feedback in relation to filters. Overall, these updates have brought the wholesale sample to 10 (a net increase of two) and the integrated company sample to 53 (a net increase of two). Further details are contained in **Section 3** and updated beta estimates are included in **Section 7**.
- **Relative risk assessment:** We still consider that the relative risk assessment set out in our May 2019 report captured the main relevant issues and provided a balanced view of the relative systematic risk exposure of the FFLAS providers relative to the comparator sample. Our detailed responses to submissions are contained in **Section 4**.
- **Sector-wide beta:** The issues raised in submissions have not altered our initial view that it is reasonable for the Commission to adopt a sector-wide rather than company-specific asset beta. We note that while a point estimate is required for application of the price-quality (PQ) regime, in the context of the information disclosure (ID) the Commission would be able to consider the asset beta range, and other relevant

evidence, in monitoring the profitability of the LFCs. Our detailed response to the issues raised in submissions is contained in **Section 5**.

- **Overall asset beta range:** Synthesising the issues outlined above, we still consider that an asset beta that lies between the mid-points of the wholesale and integrated comparator sets represents a reasonable estimate of the asset beta for an efficient FFLAS provider. Based on the updates to our comparator sample, the range of 0.41 – 0.49 is slightly lower than the range set out in our May 2019 report (0.42 – 0.50). Our updated asset beta estimates are provided in **Section 7** and **Appendix B**.
- **Leverage and credit rating:** Submissions on the credit rating and leverage have not persuaded us that our approach or proposed metrics were inappropriate. We have updated our analysis of the appropriate leverage and credit rating for an efficient FFLAS provider based on the revised comparator sample. Our updated leverage and credit rating analysis is contained in **Section 8** and **Appendix B**.

2. PURPOSE OF THE ASSET BETA

Many submissions commented on the degree of systematic risk faced by the FFLAS providers, relative to each other and the comparator sample. Before considering these comments in detail, it is helpful to first clarify two points:

- The nature of the risks that should be captured in the asset beta.
- The context in which the asset beta will be applied.

2.1. SYSTEMATIC AND NON-SYSTEMATIC RISK

The capital asset pricing model (CAPM) holds that investors are only be compensated for systematic risk:

“The equity beta indicates how volatile the returns on an investment are, relative to the equity returns on the stock market as a whole. The term is intended to cover systematic or non-diversifiable risk; that is, risk that investors cannot mitigate through diversifying into a broader portfolio of companies.”²

For the purpose of estimating the asset beta for an efficient FFLAS provider, systematic risk refers to the tendency of FFLAS provider returns to move in line with overall stock market returns. FFLAS risks that are not correlated with stock market movements may be addressed through diversification and should not therefore be captured in the asset beta. Non-systematic or business-specific risks are still important for investors in FFLAS providers, but they would not expect to be compensated for these through the asset beta. Submissions appear to accept this principle. For example, Oxera note that:

“When estimating the WACC, the widely used capital asset pricing model (CAPM) states that investors should be compensated only for the systematic risk that they face, as non-systematic or idiosyncratic risks are diversifiable.”³

We agree and note that it is important to maintain this principle when assessing whether differences in the risk profile of an efficient FFLAS provider and the comparator sample are relevant for the asset beta. That is, while there may be differences in the overall level of risk faced by the FFLAS providers and the comparators, only differences in systematic risk should be considered in determining the asset beta.

In practice, many risk factors may have both systematic and non-systematic elements, and this is reflected in the inconsistent treatment of systematic risk in the submissions. In particular, a number of submissions refer to broader ‘business risk’ and ‘company risk’ when discussing what the asset beta should capture and fail to clarify why the risks they identify are systematic in nature. For example, several submissions considered that the greater intensity of competition in the LFCs’ fibre footprint means that the LFCs face a higher degree of systematic risk relative to Chorus. However, these submissions generally failed to consider the extent to which the impact of competition may be a diversifiable risk and did not clearly establish how competition is linked to systematic factors (i.e., the degree of correlation with stock market returns in response to macroeconomic shocks).

While acknowledging the difficulty of separating systematic and non-systematic risk in practice, we nonetheless consider that the distinction is an important element of robustly applying the CAPM framework.

² CEPA (2019), page 16.

³ Oxera (2019a), page 1.

2.2. APPLICATION OF THE ASSET BETA

The Commission is required to develop input methodologies for both an information disclosure (ID) regime and a price-quality (PQ) regime. The new regulatory framework will initially apply for a three-year period over 2022 to 2025 ('the first regulatory period'). Subsequent regulatory periods may be between three and five years.

In the first regulatory period, the ID regime will apply to all FFLAS providers while the PQ regime will apply only to Chorus. This reflects the competitive constraint faced by the LFCs due to the Chorus copper network and Vodafone's HFC network in Christchurch. However, the Commission will be able to impose PQ regulation in the event that the ID framework does not provide effective constraints on monopolistic behaviour.

For the purpose of the asset beta estimates discussed in our May 2019 report and this paper, it is important to note that our proposed methodology would apply from the start of the first regulatory period in 2022. As noted by Oxera, at this point in time the fibre uptake rate is expected to be substantially higher than it is today and the capital expenditure to construct the ultra-fast broadband (UFB) network will be largely complete.⁴ Assessments of the systematic risk faced by the FFLAS providers relative to the comparator sample should be considered in this context.

⁴ Oxera (2019a), page 21. While Oxera consider that the systematic risk of the FFLAS providers will be lower during this 'steady state' phase relative to today, it nonetheless expects that systematic risk will still be higher than for the current Chorus copper network.

3. SAMPLE SELECTION

3.1. OUR APPROACH

As outlined in our May 2019 report, we have not identified listed ‘pure play’ providers of wholesale fibre services. This absence of directly comparable firms favours maintaining a relatively wide set of comparators, in order to ensure that the market evidence captures the experience of the communications sector as a whole. This is in line with the approach taken by the Commission to the industries regulated under Part 4 of the Commerce Act. A relative risk assessment may then be applied to understand variations in systematic risk across the broad comparator group.

Our starting point (Step 1) was therefore to identify a broad set of telecommunications sector comparators, based on companies domiciled in New Zealand, Australia, the UK, the US and continental Europe that fall within the Bloomberg Industry Classification Standard (BICS) Level 3 Telecom Carriers / Telecom Resellers category. From this initial sample, we then applied a series of filters to exclude firms that are less likely to be appropriate comparators. The filters that we applied are summarised below:

- Step 2: Exclude telecommunication resellers and data centres (per the BICS Level 5 categorisation).
- Step 3: Exclude companies with market capitalisation below US \$100 million, consistent with the approach taken by the Commission under the 2010 and 2016 Part 4 IM decisions.
- Step 4: Exclude companies with less than two years of trading history.
- Step 5: Based on further desktop research, exclude other companies that: do not appear to own physical communication network assets; operate mainly in markets outside our target geographic sample; were listed on over-the-counter trading platforms rather than exchanges (these were excluded due to liquidity concerns). As described in our May 2019 report, several satellite operators were also excluded because they provide mobile rather than fixed satellite services (and therefore serve very specific markets), or because we identified company-specific factors that may have distorted their asset betas.
- Step 6: Include mobile tower companies that, due to their corporate structure, are not included in the Bloomberg telecommunications category (these companies were also checked against the other filters described above).
- Step 7: Apply a liquidity filter that excluded companies with zero trading volumes on more than 20% of available trading days, in line with the metric previously applied by the Commission under the UCLL/UBA and Part 4 IM decisions.

Submissions included a range of comments on both the type of comparators that should be included in the initial sample and the filters that should be applied to refine the sample, which we discuss in turn below.

We have largely relied on Bloomberg data and have not checked the accuracy of the information extracted. In some limited instances, where we have noticed unusual results (such as for gearing levels), we have undertaken a further check.

3.2. COMPARATORS THAT SHOULD BE EXCLUDED

3.2.1. Submitters' views

Some submitters objected to the inclusion of mobile tower companies and satellite operators in the comparator sample.⁵ For example, Telstra Super noted that:

*“As investors, we consider tower and satellite companies to be a different investment prospect from Chorus. As the Cambridge paper acknowledges, those companies tend to have long dated contracts with their customers. Satellite companies carry their own peculiar technology risks, while tower companies are regarded more as income producing real estate.”*⁶

Similarly, Castalia considered that:

“betas for tower and satellite companies are entirely irrelevant to establishing the beta for FFLAS”

because:

*“Tower Companies [...] are in the business of owning real estate with basic tower structures that provide fittings to which telecommunications equipment can be attached. These firms do not own any telecommunications network equipment, and derive almost all of their revenue from leasing space on their towers to actual telecommunications companies. Satellite Companies [...] derive the overwhelming majority of their revenues from satellite television services.”*⁷

Other submissions considered that the sample should include only companies that derive most of their revenue from fixed line services. For example, Telstra Super suggested that this would be *“only logical given the services being considered by the Commerce Commission are fixed line fibre access services.”*⁸ This view is shared by Ubique Asset Management, Black Crane Capital and Investors Mutual.⁹ Ubique Asset Management also considered that providers of mobile and backhaul services should be excluded.¹⁰

A different view was expressed by Vodafone, who note that even if the satellite and tower companies do have lower systematic risk than the FFLAS providers:

*“this analysis has little value without comparing the risk profile of other firms in the sample”. Vodafone “strongly disagree with the suggestions from Chorus and its investors that any comparator with less risk than Chorus should be removed from the sample [as t]his would bias the sample upwards.”*¹¹

Finally, Oxera proposed that international companies who generate less than 50% of their revenues from their core geographies should be excluded, on the basis that *“exposure to exchange rate risks and various regulatory regimes is likely pollute the asset beta analysis”*.¹²

⁵ Submissions that commented on the weight placed on the wholesale comparators (but not their inclusion in the sample *per se*) are discussed in Section 0 below.

⁶ Telstra Super (2019), pages 2-3.

⁷ Castalia (2019), page 6.

⁸ Telstra Super (2019), page 3.

⁹ Ubique Asset Management (2019), page 4. Black Crane Capital (2019), page 3. Investors Mutual (2019), page 1.

¹⁰ Ubique Asset Management (2019), page 4.

¹¹ Vodafone (2019b), page 24.

¹² Oxera (2019a), page 4.

3.2.2. Our response

As outlined below, we do not agree that mobile tower companies, satellite operators and companies that do not derive the majority of their revenues from fixed-line assets should be excluded from the comparator sample. While there are differences between these companies and the FFLAS providers, it is more informative to consider these as part of the relative risk assessment, rather than removing relevant market evidence altogether.

Tower companies

Mobile tower companies do not own physical copper or fibre lines, or the telecommunications equipment that is attached to the towers by their tenants. Nonetheless, they provide access to a network of infrastructure (in this case, tower sites and towers) that supports delivery of voice and data services by downstream telecommunication companies to end-users. This suggests that the long-term value of these companies – and changes to value, which is relevant for beta – is likely to be driven by similar factors as for the FFLAS providers, namely end-user demand for data and high-bandwidth applications.

Satellite operators

The satellite operators included in our sample also provide services to wholesale clients, including telecommunication service providers and broadcasters. As Castalia note, a significant portion of their revenues is linked to satellite television services. However, the shift to online delivery of television is a significant driver of demand for high-speed broadband, and so in turn a determinant of demand for FFLAS. For example, Chorus note that 62% of New Zealanders now watch subscription video on demand (SVOD) and that this trend has been mirrored by uptake of unlimited broadband plans.¹³ Further, satellites are increasingly considered to face competition from fibre and wireless broadband, further supporting the proposition that the underlying drivers of demand for their services and the value of the companies may be similar to those of the FFLAS providers.¹⁴

Fixed-line network assets

As noted in our May 2019 report, there are differences between mobile and fixed-line networks that could theoretically contribute to different levels of systematic risk exposure. For example, mobile networks may have somewhat different cost structures compared to fixed-line networks, which could mean that they have a lower degree of operating leverage.¹⁵ However, recent studies have indicated that in practice, asset betas do not appear to vary significantly with the portion of company value derived from mobile services.¹⁶

In conducting our own analysis of the comparator sample, we observed that there are many practical difficulties involved in robustly identifying how much of a comparator's value is driven by the relative contributions of mobile and fixed line services.¹⁷ Oxera's 2014 report for the Commission in relation to the UCLL/UBA asset beta also acknowledged these difficulties, noting that *"given the differences between the forms of reporting implemented by the different firms, this distinction cannot be made very clearly"*.¹⁸

In considering this issue, we have noted that some firms included in the original sample do appear to derive a large fraction of their revenues from outside the telecommunications sector, across a diverse range of activities. We consider that unlike the fixed-line/ non-fixed line question, in this case a distinction between different sources of revenues can be made with a reasonable degree of confidence. We have therefore concluded that it would be

¹³ Chorus (2019), page 21-22.

¹⁴ Rakow (2015), Warf (2006).

¹⁵ GSMA/PWC (2012).

¹⁶ Schmitt et al. (2017), NERA (2017).

¹⁷ See CEPA (2019), page 40.

¹⁸ Oxera (2014), page 25.

appropriate to remove the firms described in the table below from the sample. This has not materially impacted our estimated asset beta range.

Table 3.1: Companies with high proportion of non-telecommunications revenues

Company	Description	Market Cap US\$b	Main country of operation	Revenue split
Integrated communications companies (predominantly mobile or highly diversified)				
AT&T	AT&T Inc. is a communications holding company. The company, through its subsidiaries and affiliates, provides local and long-distance phone service, wireless and data communications, internet access and messaging, IP-based and satellite television, security services, telecommunications equipment, and directory advertising and publishing.	224.6	USA	2018 revenue: <ul style="list-style-type: none"> • 54% communications • 22% TV • 13% equipment • 12% media and advertising
Cincinnati Bell	Cincinnati Bell Inc. is a local exchange and wireless provider serving residential and business customers. The company provides a range of telecommunications products and services to customers in Ohio, Kentucky, and Indiana. Acquired Hawaiian Telecom in 2018.	0.5	USA	2018 revenue: <ul style="list-style-type: none"> • 47% communications • 40% IT services and hardware • 13% TV
KCOM Group	KCOM Group PLC provides information and communications technology (ICT) and telecommunications services to businesses regionally in the UK. The company also works with selected UK consumer markets with internet and telecommunications services.	0.5	UK	2018 revenue: <ul style="list-style-type: none"> • 35% communications • 65% consulting, managed services and network connectivity
QSC	QSC AG offers small and mid-size enterprises a range of ICT services from telephony, data transfer, housing and hosting through to IT outsourcing and IT consulting. The company offers its services on the basis of its own Next Generation Networks (NGN) and operates an open access platform, which unites a range of broadband technologies.	0.2	Germany	2017 revenue: <ul style="list-style-type: none"> • 53% communications • 28% IT outsourcing • 11% consulting • 8% cloud

Source: Bloomberg, company accounts, CEPA analysis

Geographically diversified companies

Oxera have highlighted exposure to exchange rate risk and different regulatory regimes as factors that could distort the asset betas of companies with a wider geographic footprint, although Oxera do not explain why. Nonetheless, there are arguments that could support their proposal to exclude these comparators from the sample. For example, if the value of a company is derived from jurisdictions that fall outside the market index used to estimate the beta, the beta could be misleading because the index and countries of operation reflect different macroeconomic conditions. On the other hand, the magnitude of this effect could be offset if there is correlation between the economies or stock markets of the various countries in which earnings are based. The analysis set out in our May 2019 report indicates that removing comparators with more than 50% of revenues sourced outside their main country of operation would have minimal impact on the asset beta ranges.

3.3. COMPARATORS THAT SHOULD BE INCLUDED

3.3.1. Submitters' views

Some submissions proposed that additional comparators could be included in the sample:

- Oxera suggest that integrated telecommunication services providers from Japan (Nippon Telegraph & Telephone Company, KDDI Corp), Singapore (StarHub, Singapore Telecommunications) and Hong Kong (HKBN) should be included in the comparator sample.¹⁹
- Castalia note that Australian-listed firm Superloop appears to be as valid as the other comparators, and query why it is not included in our sample. Castalia also expressed a general concern that the basis for excluding comparators had not been made transparent.²⁰
- Vodafone and Spark consider that including more public private partnerships in the comparator sample would better reflect the role of the Crown in the UFB initiative. Vodafone argue that the involvement of the Crown has reduced risk for private investors, for example, because *“if the Crown is an investor, it typically shields private investors from the most extreme downside risks.”*²¹ Spark also consider that the Crown’s involvement mitigated key deployment risks.
- Spark also proposed *“relaxing the decision to exclude Government owned comparators as these likely have informative value for determining the appropriate beta”*.²²

3.3.2. Our response

Our original sample included firms from New Zealand, Australia, the UK, US, and continental Europe. While noting that comparators – including some wholesale-only comparators – could be drawn from other jurisdictions, we considered that differences in operating conditions were likely to make these firms less comparable to a FFLAS provider in New Zealand. The geographic focus of our sample also reflected the Commission’s previous decisions for electricity distribution businesses (EDBs), gas pipeline businesses (GPBs) and UCLL/UBA, although a wider range of jurisdictions was included in the Commission’s airport comparator sample.²³

Nonetheless, we do agree that comparators from developed countries in the Asia Pacific region could reasonably be included within the sample, as investors are likely to view firms within these countries as reasonable investment substitutes for the FFLAS providers. While there may be differences in terms of industry structure and regulatory arrangements, we note that this is also true of the jurisdictions included in our original sample and applying a broad sample is in keeping with the Part 4 approach. It is also relevant that several countries within that region have deployed high-speed fibre networks. Accordingly, we have expanded our sample to take in relevant comparators from Japan, Singapore and South Korea.

We do not agree with Oxera’s proposal to include comparators from Hong Kong within the sample. This is because the economic and political links with mainland China may result in rapidly changing perceptions of the outlook for growth and risk in this market, particularly in light of the current political turmoil. This will mean that Hong Kong-based comparators are not likely to be viewed as comparable to the New Zealand FFLAS providers. Given these factors and considering that the comparator sample is already large, we see little benefit from including these firms.

We agree with Castalia that Superloop is a relevant comparator. This company was not captured within our original comparator set because the starting point for the sample was the Bloomberg Industry Classification Standard

¹⁹ Oxera (2019a), page 23.

²⁰ Castalia (2019), page 5-6.

²¹ Vodafone (2019b), page 15.

²² Spark (2019a), page 7.

²³ Commerce Commission (2016) and (2015).

(BICS) Level 3 Telecommunication Carriers and Telecommunication Resellers category. Superloop is instead categorised as a Communication Infrastructure Construction Company under BICS Level 3, although it owns and operates network assets. Consequently, we have broadened the starting point for our sample to include the Communication Infrastructure Construction and Cable and Satellite categories.

We do not consider that Vodafone and Spark's proposal to include more comparators financed through PPP arrangements would improve the asset beta estimates. PPP developments may have their own sector-specific characteristics and risk sharing arrangements, which will mean that their asset betas are less likely to be good proxies for those of FFLAS providers.

In relation to Spark's suggestion to consider government owned companies, these companies have not been expressly *excluded* in the construction of the asset beta sample. Therefore, we consider that no further adjustment is required to address this point.

Based on the updates described above, we have added the following companies to our comparator sample.

Table 3.2: Additional comparators to add to our May 2019 report sample

Company	Description	Market Cap US\$b	Main country of operation	Revenue split (2018)
Wholesale only				
Cellnex	Cellnex is a communications infrastructure provider. The company offers co-location services, allowing mobile network operators and broadcasters to install their wireless equipment in over 45,000 towers and other points in France, Italy, Netherlands, Spain, Switzerland, and the UK.	12.1	Spain	<ul style="list-style-type: none"> • 65% communications infrastructure • 26% broadcasting infrastructure • 9% other network services
Uniti Group	Uniti is structured as a Real Estate Investment Trust for tax reasons, but its core business is acquiring communications assets, such as fibre, data centres, consumer broadband, coaxial and upgradeable copper, and leasing them back to anchor customers on either an exclusive or shared-tenant basis. The company also provides cell site backhaul and small cell for wireless operators and ethernet, and wavelengths and dark fibre for telecommunications carriers and enterprises.	1.5	USA	<ul style="list-style-type: none"> • 69% leasing communications assets • 29% cell site backhaul and dark fibre • 1% towers • 1% Competitive Local Exchange Carrier
Integrated communications companies (predominantly fixed-line)				
BCE	BCE (formerly Bell Canada Enterprises) is the largest communications company in Canada. Its main business segment, Bell Wireline, provides internet access, internet protocol television (IPTV), local and long-distance telephone, and satellite television. In addition, Bell Wireline includes BCE's wholesale business. Bell Wireless offers mobile voice and data services. Bell Media provides content through radio, TV, streaming, and outdoor advertising.	41.5	Canada	<ul style="list-style-type: none"> • 89% communications • 11% media
Cable One	Cable One provides broadband data, video and voice services in Western, Midwestern and	7.1	US	<ul style="list-style-type: none"> • 65% communications

Company	Description	Market Cap US\$b	Main country of operation	Revenue split (2018)
	Southern US, mainly in non-metropolitan markets. Since 2019, Cable One has been rebranded as Sparklight.			<ul style="list-style-type: none"> • 34% video and advertising • 1% other
Cogeco	Cogeco is a provider of broadband services, including primarily internet, as well as home phone and TV, to residential customers in Canada and the US. In addition, the company provides colocation, network connectivity, hosting, cloud and managed services to business customers.	3.9	Canada	<ul style="list-style-type: none"> • 88% broadband • 12% business
Liberty Global	Liberty Global provides fixed-line telephony, broadband internet and video services to residential and business customers in the UK, under the brand Virgin Media, and Europe (as upc, Telenet and Vodafone Ziggo). The company also offers mobile services and wholesale access to its networks.	18.4	UK	<ul style="list-style-type: none"> • 73% communications • 24% TV • 3% other
Shaw Communications	Shaw Communications's main driver of revenue is the wireline business, which includes consumer and business voice, data and TV services through hybrid fibre-coaxial cable. The company also offers mobile services.	9.7	Canada	<ul style="list-style-type: none"> • 93% communications (including TV) • 7% other
Superloop	Superloop owns and operates metropolitan fibre networks in Australia, Hong Kong and Singapore, providing voice and internet services to residential and business customers.	0.2	Australia	<ul style="list-style-type: none"> • 70% communications • 30% cloud and managed services, cyber safety
Integrated communications companies (predominantly mobile or highly diversified)				
Euskaltel	Euskaltel provides fibre optic and convergent telephony, broadband, TV and mobile services to residential and business customers in the northern regions of Spain. The company also provides wholesale access to its network.	1.5	Spain	<ul style="list-style-type: none"> • 100% communications (including TV)
KDDI	KDDI's main driver of revenue is the au brand, offering mobile voice and data plans and handsets. Other business segments include fixed line communications and data centre services.	62.8	Japan	<ul style="list-style-type: none"> • 70% communications • 20% equipment • 8% contents • 1% other
LG U+	LG U+ derives the majority of its service revenue from wireless operations. The company also offers mobile handsets and voice, data, and TV through wireline.	4.8	South Korea	<ul style="list-style-type: none"> • 63% communications • 24% equipment • 7% TV • 6% other

Company	Description	Market Cap US\$b	Main country of operation	Revenue split (2018)
Nippon Telegraph & Telephone	Nippon Telegraph & Telephone (NTT) is the incumbent integrated communications company in Japan. NTT uses its fixed network to support regional, long-distance, and international communications and offers mobile communications through its brand NTT docomo. NTT provides both wholesale access and retail services, as well as a range of ICT solutions including data centres, cloud and system integration services.	93.5	Japan	<ul style="list-style-type: none"> • 76% communications • 15% ERP services and ICT • 9% other
Rogers	Rogers' main revenue driver is the provision of wireless communications services to consumers and businesses. The company also offers wireline telephony, internet, TV and other services, including through its fibre network, and is active in television and radio broadcasting.	25.4	Canada	<ul style="list-style-type: none"> • 63% communications • 24% TV and media • 14% equipment
Singapore Telecommunications	Singapore Telecommunications (SingTel) provides wholesale access and retail services through its fixed and mobile networks in Singapore. SingTel is a global company and through its subsidiaries in Asia, Australia, Africa, and the US earns most of its revenue outside of Singapore.	37.2	Singapore	<ul style="list-style-type: none"> • 61% communications • 17% ICT • 12% equipment • 6% digital business • 3% other
SoftBank Group	<p>The SoftBank Group is a large conglomerate centred on the communications industry. SoftBank provides mobile communications and internet services in Japan and in the US under the brand Sprint. SoftBank also provides broadband services using the NTT network. Other activities include investment through the SoftBank Vision Fund and Delta Fund segment, semiconductors, and e-commerce.</p> <p>The communications business also started trading separately as SoftBank Corp in December 2018.</p>	94.8	Japan	<ul style="list-style-type: none"> • 64% communications • 22% investment • 13% internet • 1% other
SK Telecom	SK Telekom provides communication services relying on its own wireless network. In addition, the company is active in the media and advertising industry, e-commerce, security and other sectors.	16.0	South Korea	<ul style="list-style-type: none"> • 69% communications • 19% media • 5% e-commerce and advertising • 8% other
StarHub	StarHub offers communications, entertainment and digital solutions to households and business clients. The company owns fixed network assets, including fibre, as well as wireless infrastructure. It provides both wholesale access and retail services.	1.6	Singapore	<ul style="list-style-type: none"> • 65% communications • 22% equipment • 13% TV

Source: Bloomberg, company annual accounts, CEPA analysis. Note that NetLink Trust, a Singaporean wholesale provider of passive fibre infrastructure could also be included within the sample, however it is currently excluded by the requirement to have at least two years of trading history as at our estimate date of 28 February 2019 (it started trading in July 2017).

We also considered the following companies but decided to exclude them on the basis that a large fraction of their revenues appeared to be derived from activities outside the telecommunications sector, across a range of different businesses that appear likely to have different drivers.

Table 3.3: Other comparators considered

Company	Description	Market Cap US\$b	Main country of operation	Revenue split (2018)
Integrated communications companies (predominantly mobile or highly diversified)				
Charter Communications	Charter Communications offers cable TV, internet, and home phone services through its Spectrum brand. The company recently launched mobile services thanks to a MVNO agreement with Verizon.	95.3	US	<ul style="list-style-type: none"> • 44% TV and advertising • 40% voice and data • 14% business (includes voice and data, video and managed services) • 2% other
KT	KT provides primarily wireless communication services. In addition, the company offers broadband and telephony over wireline and a range of other services and products, including media and content, design products and financial services.	5.8	South Korea	<ul style="list-style-type: none"> • 50% communications • 15% merchandise • 15% finance • 10% media • 10% other

Source: Bloomberg, company accounts, CEPA analysis.

In addition to the above, we also considered Sejong Telecommunications. While it passed our filters, Bloomberg's net debt data is incorrect.²⁴

3.4. OTHER FILTERS

3.4.1. Submitters' views

Oxera's submission proposed several additional filters to those described above:²⁵

- Exclude firms with average bid-ask spreads above 1%. This would act as an additional liquidity filter.
- Exclude companies with leverage above 90% in the last year, which removes one firm (Frontier Communications).
- Exclude Orange Belgium, as its parent company Orange is also included in the sample.

²⁴ We noticed a similar issue with two companies in our previous sample – Hutchison Telecommunications and MNF Group. Bloomberg data indicated both companies had negative net debt, however this did not match their accounts. We have removed these from our sample at this stage.

²⁵ Oxera (2019a), page 24.

3.4.2. Our response

In relation to liquidity, bid-ask spreads have been applied by other regulators as a liquidity check for beta comparator selection.²⁶ In its 2016 Cost of Capital IM decision, the Commission decided not to apply a filter based on bid-ask spreads, noting that:²⁷

- For consistency, the approach to liquidity filters should be applied across the energy and airports samples. Adopting a bid-ask spread filter would require determination of a subjective threshold to apply across both the energy and airports sample.
- Given the small size of the airport comparator sample, the Commission was reluctant to unnecessarily exclude companies and noted that the impact on the results would be relatively immaterial.

While Oxera have proposed a maximum spread of 1%, selecting an appropriate threshold is likely to be subjective.²⁸ Nonetheless, we have considered the impact of applying the 1% maximum bid-ask filter. The comparators that would be removed by this filter are shown in the table below.

Table 3.4: Comparator sample: Average bid-ask spread greater than 1%

Company	2014-2019	2009-2014	2017-2019
Gamma	2.1%	n/a	2.4%
Go	Bid-ask spread not available. However, total number of trading days is lower than other comparators and there are multiple days where the company did not trade.		
Manx Telecom	1.9%	n/a	1.9%
Shenandoah Telecommunications Company	n/a	1.3%	n/a
Siminn	n/a	n/a	1.1%
Sonaecom	1.7%	n/a	2.0%

Source: Bloomberg, CEPA analysis. We have used bid-ask spreads calculated by Bloomberg: “The average of all bid/ask spreads taken as a percentage of the mid-price...default calculation interval is five days...for a trading day to contribute to the calculation, there should be at least ten value bid/ask spread points on that day”. “n/a” means that either the comparator is already not included in the sample for that time period, or its bid-ask spread was below the 1% threshold.

In relation to the exclusion of comparators with leverage above 90%, in theory at least, the cost of capital would be expected to be invariant to changes in leverage. However, in practice asset betas might vary with leverage due to the effect of non-zero debt betas. While debt betas are likely quite close to zero for companies with an investment grade credit rating, this may not hold for companies with very high leverage. Given that the leverage of Frontier Communications is significantly above that of the other comparators (77% on average over 2014-2019 and 94% over 2017-2019), we are comfortable with excluding this company from the comparator set.

We agree with Oxera’s proposal to remove Orange Belgium from the comparator sample, as its parent company is already included. For similar reasons, we have also excluded Telefonica Deutschland.

Applying the additional filters described above (bid-ask spread greater 1%, leverage above 90%, removal of Orange Belgium and Telefonica Deutschland) does not have a material impact on the asset beta ranges.

²⁶ See for example NERA (2016) for Ofcom.

²⁷ Commerce Commission (2016), paragraphs 285.2 and 467.

²⁸ Although Oxera states that this filter is consistent with its 2014 report for the Commission on the UCLL/UBA asset beta, that report notes that while “there are several possible measures of liquidity ... [f]or the purposes of simplicity, only those companies with non-zero trading volumes on at least 80% of all trading days were included in the sample”. Oxera (2014), page 25.

4. RELATIVE RISK ASSESSMENT

In following discussion, we focus on risk assessment for an efficient FFLAS provider operating under the PQ regime. Section 5 sets out our considerations on whether it is appropriate to set a different asset beta for a FFLAS provider under the ID regime.

4.1. OUR APPROACH

Within the broad comparator set, we identified two clear sub-groups that could be expected to face a distinctly different degree of systematic risk: wholesale-only communication service providers and vertically integrated service providers. The different systematic risk characteristics of these two groups provide a basis for evaluating the degree of systematic risk faced by the FFLAS providers, and where we might reasonably expect their asset beta to sit in relation to these comparators. Naturally, there will still be differences in the systematic risk of the companies included within the two groups. However, while we considered alternative options for identifying more granular comparator sub-groups, in practice these were not found to be robust.

To form a view on whether the asset beta for an efficient FFLAS provider was likely to fall below, within or above the range of estimates established by these two comparator groups, we conducted a relative risk assessment. This considered a range of risk factors, including demand, growth opportunities, operating leverage, asset stranding, company size and long-lived investments. Our assessment focussed on the extent to which these factors influence *systematic risk*, as opposed to non-systematic or diversifiable risk.

4.2. DEMAND

Our analysis of the submissions has identified three concerns raised by submitters in relation to our income elasticity of demand relative risk assessment:

- A lack of comparability between the FFLAS providers and the wholesale group;
- Chorus may not be able to achieve the revenue cap; and
- Income elasticity of demand is higher for FFLAS than for copper.

We consider each issue below.

4.2.1. Submitters' views

Comparability to the wholesale group

Some submissions raised concerns that we had overstated the similarities between the fibre service providers and the wholesale service provider sample group. For example, Black Crane Capital stated that:

“CEPA does mention certain common characteristics of the wholesale service provider peer group that means their demand systemic risk is low (e.g. long-term contracts between supplier and customer and high switching costs for customers) but which Chorus and the LFCs lack, these differences are not given sufficient weight when CEPA concludes Chorus for instance having a similar level of demand systemic risk to that of the wholesale service provider peer group. In fact, longer-term contracts and higher switching costs for customers for the wholesale service provider peer group are key drivers in their lower exposure to fluctuations in forces that drive underlying customer demand relative to the integrated service provider peer group. The lack of such drivers for Chorus and the LFCs mean they much more closely resemble the latter rather than the former group.”²⁹

²⁹ Black Crane Capital (2019), page 3.

[...]

CEPA does not consider [...] that individual end consumer demand decisions have an immediate direct impact on the demand for Chorus and LFC services in a way akin to that for the integrated service provider peer group and unlike that for the wholesale service provider peer group due to greater technical similarities with the former group. [...] greater sensitivity to end consumer demand should also put Chorus and the LFCs very close to the integrated service provider peer group when considering demand systemic risk”³⁰

Oxera stated that:

“there is insufficient evidence to conclude that tower companies (and satellite operators) described by CEPA as ‘wholesale’ companies are better comparators for fibre than integrated companies.”³¹

Chorus may not be able to achieve the revenue cap

Several submitters were concerned that the Chorus may not be able to earn up to the revenue cap, which means that it is not an offsetting factor in relation to systematic demand risk.

Table 4.1: Submitters’ views on the effect of a revenue cap on systematic risk

Submission	Statement
Black Crane Capital	“We would also push back on the idea that the demand systemic risk faced by Chorus is lower due to the presence of a revenue cap, given a) the revenue cap may not always be operative and b) stranding risk” ³²
Investors Mutual	“1. The quality definition and pricing of anchor products may prevent Chorus from achieving its full revenue cap allowance; 2. Competition arising from technological advancements in HFC, fixed wireless or mobile networks may prevent Chorus from achieving its full revenue cap allowance; and 3. The requirement to use nationally averaged pricing exposes Chorus to the risk of competitors cherry picking customers from profitable areas. This could increase fibre prices for remaining users, until ultimately Chorus is unable to achieve its full revenue cap allowance. The users most likely to suffer from higher prices would be those in regional areas, where network competition will be less economic.” ³³
L1 Capital	“Crucially a revenue cap, while capping operating leverage and revenue growth for Chorus does not significantly add to the security of its revenues for the following reasons [...] Revenue cap does not protect against large demand destruction [...] Smoothing of anchor products means returns under revenue cap may not be achievable for multiple periods [...] Potential to deregulate fibre assets further undermines effectiveness of revenue cap” ³⁴

³⁰ Black Crane Capital (2019), page 3.

³¹ Oxera (2019a), page 24.

³² Black Crane Capital (2019), page 3.

³³ Investors Mutual (2019), page 2.

³⁴ L1 Capital (2019), pages 12-13.

Submission	Statement
Oxera	<p>“CEPA’s central argument, that ‘wholesale’ providers are likely to be ‘closer in nature’ to the Chorus fibre network because their long-term contracts provide revenue certainty similar to the revenue cap regime of Chorus, fails to consider that the revenue cap regime provides a revenue ceiling, not a floor. The revenue cap will not protect against demand risk arising from demand/volume fluctuations that prevent Chorus from generating the forecast revenues.”³⁵</p> <p>Oxera also considered that the wash-up mechanism may not provide revenue stability, noting that:</p> <p>“a wash-up mechanism may be ineffective at insulating the regulated company from risk if the reason for the shortfall in the first period was caused by low demand for fibre products as a result of competition. In this case, the ability to charge a higher price in subsequent periods will not help to recover the losses, since higher prices may just accelerate migration to competitive networks.”³⁶</p>
Paradice Investment Management	<p>“it is entirely wrong to assume that the revenue cap imposed on Chorus will be fully achieved and account must be given to other restrictions that exist for Chorus, such as the need to provide anchor products.”³⁷</p>
Ubique Asset Management	<p>“CNU’s [Chorus’] revenue cap is not a guarantee of a return as CNU does not have long term access service contracts with retail service providers and is further limited by anchor product and unbundling requirements under the new framework.”³⁸</p>
Vodafone	<p>Vodafone expressed a different view, noting that under the wash-up mechanism:</p> <p>“If a price-regulated LFC cannot fully recover revenues in one period, the under-recovery will be recorded in a wash-up account which can be drawn down in the future when end-users are more willing to pay”³⁹</p>

Income elasticity of demand for FFLAS is higher than for copper

Oxera argue that:

“Demand for fibre services is likely to be more responsive than demand for copper services to changes in the economy, due to the higher cost and greater value added (high-speed) services provided by the fibre network relative to the legacy copper network.”⁴⁰

Further, Oxera state that:

“This is consistent with the views of regulators in various jurisdictions, which have allowed a higher WACC for fibre networks relative to copper networks due to the higher variability of demand for fibre. As mentioned above, CEPA disagrees with the regulatory precedent of a higher WACC for fibre on the basis that the riskier demand for fibre is based on ‘intuition’ and not conclusive evidence. We note that,

³⁵ Oxera (2019a), page 25.

³⁶ Oxera (2019b), page 21.

³⁷ Paradice Investment Management (2019), page 2.

³⁸ Ubique Asset Management (2019), page 4.

³⁹ Vodafone (2019b), page 6.

⁴⁰ Oxera (2019a), page 13.

*in the absence of listed pure-play fibre operators whose data cannot be used to quantify the systematic risk differences between fibre and copper, as the next best alternative it is important to take into consideration sound economic arguments that indicate greater demand risk for fibre relative to copper and adjust the asset beta for fibre accordingly.*⁴¹

4.2.2. Our response

We still consider that an asset beta value between the wholesale providers group and the integrated group is appropriate

Our May 2019 report acknowledged that the wholesale group are not perfect comparators for the FFLAS providers from a systematic demand risk perspective, which is why we proposed an asset beta value *between* the wholesale and integrated groups. We consider that our reasoning for this proposal still holds.

While Black Crane Capital are correct that FFLAS providers are more exposed to end-user demand compared to the wholesale comparator group, we consider that the degree of exposure is greater for the integrated service provider group. As we noted, “[it] is common for the integrated companies to offer additional services, including sales of equipment, streaming and business ICT services.”⁴² We consider that the systematic demand risk associated with these types of retail services is greater than for the simpler wholesale products offered by the FFLAS providers. Ofcom expressed a similar view on the nature of wholesale and retail services in its 2014 fixed access market review:

*“[W]e expect that, a priori, the systematic risk of Openreach’s copper access business is unlikely to be higher than that of other UK telecoms operators. This is because the latter purchase most of the wholesale inputs they require to supply retail voice and broadband services from Openreach and are also involved in retail activities that are more likely to be subject to higher systematic risk.”*⁴³

The ability to offer differentiated, value-added services to end-users means that the earnings potential of the integrated service providers is more exposed to positive and negative macroeconomic shocks. In contrast, the earnings potential of a FFLAS provider operating under the PQ regime is determined by the revenue cap (i.e., revenues are linked to its efficient capital and operating costs, rather than value-add to end-users). FFLAS providers operating under an ID regime are also limited in the additional premium features they could offer. We consider that these factors limit both upside and downside variability around expected returns. In this respect (not all respects), we consider that the FFLAS providers are closer in nature to the wholesale service provider group.

We do not consider that there is material systematic risk relating to Chorus’ inability to achieve its revenue cap

Submissions have set out several scenarios in which Chorus would be unable to earn revenues up to the revenue cap, even with the wash-up mechanism in place. These scenarios relate to:

- A flawed application of the regulatory regime – for example, Chorus is not able to charge up to the cap due to the implementation of anchor product pricing or requirements to price on a uniform basis across New Zealand.
- Competition – for example, demand for the fibre services is lower than expected because of the availability of lower cost substitutes.

We agree that a revenue cap does not guarantee that Chorus will earn revenues up to the cap in any given period. However, the scenarios that submissions have highlighted are unrelated to systematic risk. For example,

⁴¹ Oxera (2019a), page 14.

⁴² CEPA (2019), page 22.

⁴³ Ofcom (2014), page 206.

submissions have not provided evidence that a failure to set appropriate anchor prices is likely to be related to macroeconomic conditions. Similarly, as discussed further below, we do not consider that the risks associated with asset stranding due to competition are systematic in nature. Therefore, to the extent that the revenue cap and wash-up mechanism might not mitigate these particular business risks, this does not contribute to higher systematic risk for Chorus.

The view that the PQ regulatory arrangements will have a stabilising effect is echoed in the commentary of ratings agencies. For example, in August 2019 Moody's expressed the view that:

*"Once the new [building block model] is implemented we expect Chorus will display a utility-like revenue profile, with most of the company's revenue subject to regulation. The new framework will feature a revenue cap, which will be calculated based on the company's allowable costs and returns to be determined by the NZCC. This provides good revenue stability over the regulatory period."*⁴⁴

Moody's also note that "[p]rice and revenue shocks are unlikely under the new framework", particularly in comparison to the past regulatory framework for copper networks. Further, although noting that the details of the proposed wash-up mechanism are still to be determined, it "provides a degree of buffer against demand fluctuations and has the effect of smoothing Chorus' revenue over the longer term".

We do not agree that income elasticity of demand for FFLAS is clearly higher than for copper

As we set out in our report:

*"in Ofcom's recent Wholesale Local Access (WLA) review, Ofcom expressed the view that while demand for fibre access services was likely to stabilise with increasing uptake, systematic risk for fibre access was still likely to be higher than for copper access. However, consumer research conducted by Ofcom also indicated that "there is less propensity for consumers to downgrade than to upgrade in terms of the headline speed of their fixed line broadband package". This suggests that once fibre services are adopted, demand could be relatively 'sticky'. Dutch regulator ACM cited similar evidence in its review of the relevant product market for wholesale high-quality access services in the Netherlands, indicating that business end-users rarely switched from fibre to copper-based services."*⁴⁵

Oxera support the last point, noting that "fibre customers are unlikely to switch from fibre to copper".⁴⁶

We have reviewed the current pricing of fibre and copper plans for the five largest providers in New Zealand.⁴⁷ Current pricing in the market does not indicate that fibre plans are systematically more expensive than copper-based ADSL or VDSL plans (Appendix A provides the sample of plans we reviewed). This raises a question as to whether fibre is likely to be treated as a luxury product, as Oxera propose.

Overall, we are not convinced by the argument that, in New Zealand, fibre will face materially greater income elasticity of demand compared to copper, particularly once customers have transitioned to the fibre network.

⁴⁴ Moody's (2019), page 3.

⁴⁵ CEPA (2019), page 24.

⁴⁶ Oxera (2019a), page 20.

⁴⁷ Commerce Commission (2018).

4.3. GROWTH OPPORTUNITIES

4.3.1. Submitters' views

L1 Capital consider that the demand growth prospects of the mobile tower companies are stronger than for Chorus due to:

*"[the] higher ability to monetise increasing data usage. The revenue model is linked to higher mobile data usage which is growing faster than demand for Chorus fibre services. The rollout of 5G services will require densification of tower networks and an acceleration of demand for mobile data which will further accelerate revenue growth relative to Chorus."*⁴⁸

Further, *"[t]he absence of any revenue or pricing caps allows the towers to take advantage of high growth in demand for mobile internet data"*.⁴⁹

L1 Capital consider that demand growth for the satellite operators is similar to Chorus, although it notes that the satellites have *"higher ability to monetise increasing data usage (revenue model explicitly linked to higher data usage)"*.⁵⁰

WIK Consult raised a concern with how we assessed the LFCs' relative risk for growth opportunities. We address this in Section 5.3.

4.3.2. Our response

L1 Capital's commentary is broadly in line with our May 2019 report, which notes that the value of future growth opportunities for Chorus and the LFCs could be lower than for the other companies in our comparator set (including the tower companies), although we noted that the investment plans of the comparator set appear to be diverse. Similarly, we observed that the presence of Chorus' revenue cap would tend to dampen the value of opportunities for revenue growth that are not based on additions to the RAB.

4.4. OPERATING LEVERAGE

4.4.1. Submitters' views

Submissions that commented on operating leverage were of the view that it points to a higher asset beta for the FFLAS providers. Oxera state that:

*"A fibre network that is expected to incur additional capital expenditure in the future, as connections are laid out and take-up of fibre increases, is likely to have a higher operating leverage than a mature legacy copper network, with a relatively low proportion of fixed costs."*⁵¹

Further:

⁴⁸ L1 Capital (2019), page 6.

⁴⁹ L1 Capital (2019), page 8.

⁵⁰ L1 Capital (2019), page 9

⁵¹ Oxera (2019a), page 16.

“In the steady state, with high fibre penetration rates, the majority of the CAPEX will have been completed, and the operational leverage of fibre will be lower in the steady state than in the construction and early growth phase, leading to a lower asset beta in the steady state.”⁵²

L1 Capital make a range of observations in relation to operating leverage:

“Satellite and tower companies have higher operating leverage than Chorus: Chorus margins are constrained by revenue caps, anchor prices and high costs due to service quality standards under the fibre legislation. Satellite and wireless companies are unconstrained on revenues and have a lower cost of deploying the service to the incremental user, thus generating higher gross margins and a higher incremental return on capital.”⁵³

In support of this, L1 Capital cite a presentation from American Towers which states that:

“Adding additional tenants, equipment and upgrades yields additional revenue, while costs remain flat. The tower model demonstrates significant operating leverage as tenancy increases”⁵⁴

L1 Capital also consider that for the tower companies, “[w]ithout a revenue cap [adding] incremental users and towers lead to significant operating leverage with a much lower historical average capital intensity than Chorus”.⁵⁵ L1 Capital reference an estimate of average capital intensity (i.e., capex to sales ratio) for Chorus and the tower companies over 2014 to 2018. For example, L1 Capital report an average capital intensity of 67.4% for Chorus, compared to between 10.3% - 25.8% for the tower companies and 21.5% - 27.7% for the satellites.

Elsewhere in their submission, L1 Capital also observe *“that Chorus also has ... high levels of operating leverage relative to the set of comparable suggested by CEPA”*.⁵⁶

4.4.2. Our response

As noted in our report, operating leverage represents the ratio of fixed costs to variable costs – the higher the proportion of fixed costs, the higher the operating leverage. Typically, if a company operating in a competitive market has a higher proportion of variable costs to fixed costs, then it will be able to increase (decrease) its variable costs in line with changes in conditions to a greater extent than a company with higher operating leverage. As a result, volatility in profits (and thus the asset beta) would be relatively lower.

In relation to Oxera’s observations, we agree that during the roll-out phase and while demand (and therefore connections) is growing, a new fibre network would likely incur proportionately more capital expenditure relative to a hypothetical mature copper network. However, we do not see this as being relevant to an assessment of the operating leverage of the FFLAS providers relative to the comparator sample because:

- We are considering an asset beta that will apply from the start of the new regulatory period in 2022, when – as Oxera note – the UFB roll-out is expected to be largely complete and uptake substantially higher than it is today.
- The comparator set does not reflect the characteristics of a standalone mature copper network. Rather, it reflects a mix of companies, many of whom are themselves undertaking (or planning to undertake) substantial capital investments. Oxera has not presented evidence demonstrating that the FFLAS providers

⁵² Oxera (2019a), page 20. Note, Oxera’s report defines ‘steady state’ as from the start of the first regulatory period in 2022 onwards.

⁵³ L1 Capital (2019), page 13.

⁵⁴ AMT, American Tower Corporation: An Overview, page 6-7.

⁵⁵ L1 Capital (2019), page 6.

⁵⁶ L1 Capital (2019), page 21.

are likely to have a higher degree of operating leverage relative to the comparator set from the start of the first regulatory period.

We find that L1 Capital's commentary in relation to operating leverage is inconsistent:

- On the one hand, it considers that the tower companies and satellite operators have *higher* operating leverage relative to Chorus. As we note above, this would tend to point to a higher asset beta for those companies, other factors held equal.
- On the other hand, it also presents evidence suggesting that over 2014-2018, Chorus has had higher capital intensity relative to the tower companies or satellites. We have not reviewed these figures but consider this unsurprising given Chorus' investment in the UFB network over this period. However, this does not provide any indication of how operating leverage for these companies will compare from 2022 onwards.
- L1 Capital consider that Chorus' margins are constrained by its revenue cap, anchor pricing and service quality standards. However, it has not explained why these factors are relevant to an assessment of operating leverage, which refers to the contribution of fixed costs to total costs.

Overall, we do not consider that the submissions provide useful evidence in relation to the relative operating leverage of the FFLAS providers and comparator sample. We maintain our original view, which is that:

- There is limited evidence to support an empirical comparison of operating leverage between the companies.
- Based on a qualitative assessment, we are not persuaded that operational leverage is likely to be materially different across the FFLAS providers and the comparator set.
- For Chorus, the revenue cap links earnings to its efficient capital and operating costs, suggesting that even if Chorus' operating leverage were higher than the comparator sample, the effect of this on earnings volatility would be reduced.

4.5. ASSET STRANDING

A number of submissions commented on asset stranding risk. However, our analysis is that the majority focus on issues relevant to the Commission's approach to Type II asymmetric risks. We have identified three submissions that set out concerns about the comparability of the asset stranding risk of Chorus/ LFCs against the wholesale or integrated comparator groups.

4.5.1. Submitters' views

Black Crane Capital state that:

"We believe that Chorus and the LFCs face a risk of asset stranding that is greater either [sic] than either that of the wholesale service provider peer group or the integrated service provider peer group. The wholesale service provider peer group are protected partly due to their significantly longer contractual terms with their customers and higher switching costs for customers (as mentioned above), and also partly because from a technological standpoint there is less substitution risk. In contrast, the integrated service provider peer group are somewhat technology agnostic as they have the option to access their customer base through a variety of technologies and generally are not dependent on one particular access route".⁵⁷

Similarly, L1 Capital state that:

⁵⁷ Black Crane Capital (2019), page 3.

“Asset stranding risk significantly higher for Chorus than satellite and tower companies. Wireless towers are critical to mobile networks and the provision of mobile data. Zoning and licensing restrictions on new tower construction together with strong network effects strongly entrench existing operators. Satellite companies do face stranding risks from newer satellites, but the majority of their asset value lies in orbital launch slots and their large holding of spectrum. Chorus, on the other hand is exposed to risk from mobile substitution and new emerging technologies, exacerbated by the need to have geographically averaged pricing.”⁵⁸

Oxera consider that competition increases asset stranding risk. Oxera also consider that competition is partly linked to systematic risk, noting that:

“A variety of measures for competition and market power have been used, with theoretical studies concluding that there is a negative relationship between the level of monopoly power and beta. [...]

The relationship runs in reverse, such that, as competition increases, the systematic risk of the competing firms increases. However, we note that not all of the demand risk due to competition is likely to be systematic in nature, as some is diversifiable.”⁵⁹

4.5.2. Our response

The asset beta is only intended to reflect differences in systematic risk, as differences in business risk can be addressed through diversification. As stated in our report, we considered that stranding risk that relates to competition or technological developments is not systematic in nature:

“Not all fluctuations in demand will be linked to economic cycles, including some of the factors noted by Chorus and the LFCs. In particular, we do not consider stranding risk related to competition from alternative services to be systematic in nature. For example, the extent and speed of fibre up-take could be influenced primarily by the fibre providers’ ability to connect new customers in a timely manner and perceptions regarding the quality of service offered over the fibre network, which are not influenced by the economic cycle. Further, an investor with a diversified portfolio would be able to mitigate the risk of switching by investing across a range of alternative providers. For similar reasons, we would also not consider obsolescence due to technological developments to constitute a systematic source of stranding risk.”⁶⁰

Despite this general view, we noted that there could be a systematic element of stranding risk. For example, in its 2016 assessment of the asset beta for GPBs, the Commission considered that stranding risk was at least partly systematic. This was because with relatively low penetration in New Zealand, gas networks depend on increasing connections to remain viable, which may be linked to the economic cycle. On this basis, the Commission applied an uplift to the asset beta to reflect greater maturity of demand for gas in the comparator set relative to New Zealand GPBs. We noted that the case for a similar uplift in the case of the FFLAS providers was likely to be weaker, given that uptake of FFLAS is currently well above expectations (and anticipated to be higher at the start of the first regulatory period). Overall, we considered that the systematic stranding risk exposure of the comparators would either be similar to the FFLAS providers, or to the extent that it is lower, offset by other relative risk factors.

We note that two submitters suggested that to the extent stranding risk is systematic, it was sufficiently captured in our sample. Vodafone noted that:

⁵⁸ L1 Capital (2019), page 13.

⁵⁹ Oxera (2019a), page 15.

⁶⁰ CEPA (2019), page 30.

“Asset stranding will be at least partially a systematic risk. Competitors to the LFCs will likely offer services at a lower cost, so in the event of a systematic downturn end-users may turn to these alternative networks more.

Systematic risk is already compensated for in the asset beta. Many of the comparator firms proposed by CEPA face very similar, or even greater risks than the LFCs. For example BT have been required to open up their ducts and poles for competitors to build alternative networks to compete alongside them. Telecom Italia is also facing wide-spread competition, with Open Fibre building an alternative fibre network across most of Italy. Both of these examples are a far deeper form of infrastructure competition than faced by Chorus on unbundling or FWA.”⁶¹

Trustpower agreed with Vodafone’s position:

“We agree with the point made by Vodafone that the WACC may already adequately account for asset stranding risk.

As highlighted by Vodafone, a number of comparator firms utilised in the CEPA analysis face similar, or greater asset stranding risks than Chorus and the LFCs. Vodafone points out that regulatory frameworks that require access at a facilities-level to promote fibre network competition heighten this risk in some of the comparator countries. We agree and add the observation that the widespread deployment of cable networks in a number of European countries and the US would further raise the asset stranding risk faced by many of the comparator firms.”⁶²

In relation to Oxera’s observations on the link between competition and systematic risk, we note that:

- The findings it cites indicate that a firm with more monopoly power might have a lower asset beta than one with less. However, it does not follow from this that the FFLAS providers would have a higher beta than the firms in our comparator sample.
- The academic literature is not unanimous on the nature of the link between competition and systematic risk. For example, some studies have indicated that competition might *reduce* asset betas.⁶³ Further, the findings will be strongly influenced by the particular assumptions made, which may or may not be applicable to FFLAS providers in New Zealand.

4.6. COMPANY SIZE

Submitters did not raise any general issues with our company size relative risk assessment. However, Castalia considered that a small company adjustment was appropriate for the LFCs. We respond to this in Section 5.6.

⁶¹ Vodafone (2019), page 10.

⁶² Trustpower (2019), page 3.

⁶³ Babenko et al (2018), Bustamante and Donangelo (2014).

4.7. LONG-LIVED INVESTMENTS

4.7.1. Submitters' views

Several submissions commented on our view that the long-lived nature of fibre investments does not mean that the FFLAS providers will have greater systematic risk relative to the comparator sample.⁶⁴ Oxera propose that:

“Long-lived projects are likely to be exposed to greater systematic risk than shorter projects due to the increased uncertainty in long-term cash flows extending far into the future. ... As the value of the investment is affected by expectations regarding the future macroeconomic conditions, the longer-duration projects are subject to greater uncertainty stemming from changes in the real economy and the political and regulatory landscape than shorter-duration projects. This results in a higher asset beta for long-lived projects. The fibre network will have long-term cash flows relative to the legacy copper network due to the longer remaining economic lives of fibre assets. Therefore, the asset beta of fibre would be higher than that of copper.”⁶⁵

Oxera go on to note that:

“CEPA implies that copper networks can be upgraded to increase their useful lives ... We note that this is not a completely accurate comparison. Copper networks may have the right to continue operating the copper network, but over time, as fibre penetration increases, the copper network is destined to become obsolete. The associated ducts, rights of way and operating knowledge may derive value from being redeployed to support the fibre network, but not by continuing to be available for a stand-alone copper network. The useful lives of the copper assets and the associated cash flows cannot be increased by simply upgrading the network, as fibre customers are unlikely to switch from fibre to copper, making the investment unprofitable. At present, fibre assets are expected to have longer useful lives than the existing copper assets and therefore merit a higher asset beta.”⁶⁶

On the other hand, WIK Consult note that:

“We also agree with CEPA's view that the long-lived nature of new fibre networks does not contribute to a higher asset beta relative to other firms in the sample and between Chorus and the LFCs.”⁶⁷

L1 Capital consider that mobile tower companies “own long life assets with a significant portion of their estimated value expected in outer years” and have a “similar period to recover investment” to Chorus.⁶⁸

4.7.2. Our response

We are still of the view that the long-lived nature of new fibre assets, relative to a legacy copper network, is not a determinative factor contributing to a higher asset beta for FFLAS providers relative to the other firms in our comparator sample.

The scenario constructed by Oxera relies on the notion of a standalone legacy copper network, whose expected value is based on earnings that will cease at some future point in time, with the earnings of a new fibre network extending beyond this. However, this is a rather artificial comparison, which is not relevant to assessing the relative risk of the FFLAS providers and the comparator group.

⁶⁴ We do not comment on submitter views in relation to the appropriate asset beta pre-implementation of the new regulatory framework, as the focus of our report is on the asset beta that will apply from the first regulatory period onwards.

⁶⁵ Oxera (2019a), page 18.

⁶⁶ Oxera (2019a), page 19.

⁶⁷ WIK Consult (2019), page 8.

⁶⁸ L1 Capital (2019), page 7.

This is because our comparator group consists of *companies*, rather than standalone projects or physical assets with a finite useful life. Naturally, the expected returns of these companies will be linked to the particular assets that they own today and the returns that can be generated from these over their remaining useful life. However, expected returns will also be linked to other factors, including operating knowledge, planned new investments, and options to make future investments. Our May 2019 report provided some practical examples of these factors. For these reasons, we do not find it plausible that investors would assess the expected returns of the comparator group over a shorter period of time than for the FFLAS providers.

5. SECTOR-WIDE OR COMPANY SPECIFIC ASSET BETAS

5.1. OUR APPROACH

In our report we considered a range of factors that could lead to a different asset beta for Chorus and/ or the LFCs. This analysis was largely qualitative but relied on established theoretical and practical considerations. We concluded that, relative to Chorus (or more generally a FFLAS provider under revenue cap regulation):

“[t]here may be reasons to think that the LFCs – who are not regulated under a revenue cap – could face a higher degree of systematic risk relative to the wholesale-only comparators, relating to their shorter-term contracting arrangements and correspondingly higher exposure to fluctuations in end-user demand.”⁶⁹

In considering whether it would be appropriate to set a company-specific asset beta, we also noted that:

- We had not identified a robust basis to estimate a different asset beta for the LFCs.
- In the context of the ID regime, the asset beta will be used to monitor the profitability of the LFCs, rather than to set a cap on revenues or prices. In this context, a sector-wide approach may be preferable to a company-specific approach, as the latter would require a subjective adjustment on the basis of limited evidence.

Submissions include a mix of views as to whether there should be a sector-wide or company-specific asset beta (i.e., the same asset beta covering both the PQ and ID regimes or separate asset betas for the regimes). Oxera, engaged by Chorus, considered that LFCs had similar relative risk exposure to Chorus, while WIK Consult and Castalia, both engaged by Enable Networks and Ultrafast Fibre, considered that there were reasons for the LFCs to have a different (higher) asset beta.

5.2. DEMAND

5.2.1. Submitters' views

WIK Consult do not address the observations on demand risk that we set out in our report. However, it raises a concern that we failed to address demand risk from competition.⁷⁰

Similarly, Castalia raised a concern that we did not take account of the business risk the LFCs face from copper.⁷¹

5.2.2. Our response

As we discuss in more detail in Section 5.8, we consider that demand risks related to competition and business model are sources of *business risk* – not systematic risk – for the FFLAS providers. Neither submission demonstrates why the demand risk associated with competition or differences in the LFC/ Chorus business models is systematic in nature. As we discuss in Section 2.1, competition in and of itself is not a systematic risk. As we explained in our report, the key issue is whether the income elasticity of demand results in changes in the quantity demand of fibre services in the event of a market wide shock.

It is also important to note that our report presents our view on an appropriate asset beta for an efficient FFLAS provider, not Chorus specifically as a combined copper and fibre access provider. This is reflected in our use of a

⁶⁹ CEPA (2019), page 5.

⁷⁰ WIK Consult (2019), page 6.

⁷¹ Castalia (2019), pages 3-4.

comparator set that represents a reasonable proxy for the systematic risk faced by a FFLAS provider, rather than Chorus' asset beta.

5.3. GROWTH OPPORTUNITIES

5.3.1. Submitters' views

In relation to the assessment of relative risk associated with systematic growth opportunities, WIK Consult state that:

*"CEPA expects greater growth opportunities for Chorus relative to the LFCs, given that its fibre footprint includes larger urban centres that are projected to have a greater share of NZ's future population growth. We agree with this analysis which would imply a greater risk for the LFCs."*⁷²

5.3.2. Our response

WIK Consult appear to have misunderstood the theory related to symmetric growth opportunities and our statement in relation to this. Greater exposure to growth opportunities increases the asset beta rather than decreasing it. For example, if a company has higher exposure to growth opportunities than the market as a whole, a positive macroeconomic shock will lead to greater growth for that company relative to the market, implying an asset beta greater than 1. As we stated in our report:

*"Auckland and Wellington are projected to account for over 50% of population growth to 2043, which could suggest that demand for services on Chorus' fibre network could face greater exposure to fluctuations in net migration and/or premises construction over the economic cycle, relative to the LFCs."*⁷³

We had concluded that Chorus' growth opportunities would likely be dampened by the revenue cap, leading to an overall similar level of systematic risk to the LFCs. In suggesting that Chorus' exposure to growth opportunities is greater, WIK Consult, perhaps inadvertently, present arguments that would support a higher asset beta for Chorus.⁷⁴

5.4. OPERATING LEVERAGE

5.4.1. Submitters' views

WIK Consult state that:

"CEPA ignores the fact that Chorus could much more make use of existing infrastructure to be reused for deploying the UFB fibre network than the LFCs. This opportunity generates a (significantly) better position of Chorus relative to the LFCs with regard to its operating leverage. As a result, Chorus and the LFCs do not, as CEPA concludes, have here a similar systematic risk exposure. It is rather the case that with regard to operating leverage the LFCs face a relative higher systematic risk."

⁷² WIK Consult (2019), page 7.

⁷³ CEPA (2019), page 24.

⁷⁴ WIK Consult (2019), page 7.

5.4.2. Our response

In our opinion WIK Consult has not presented an argument related to operating leverage systematic risk.⁷⁵ The ability to shift costs between business units is a business risk. It is not clear why this is relevant to the asset beta of an efficient FFLAS provider, noting that we are not estimating an asset beta for Chorus specifically. WIK Consult has not addressed how operating leverage systematic risk for the LFCs compares to the comparator sample.

5.5. ASSET STRANDING

5.5.1. Submitters' views

Both Castalia and WIK Consult consider that competition from the copper network increases the systematic risk of asset stranding for the LFCs.⁷⁶

5.5.2. Our response

As discussed in Section 4.2 above, we do not consider competition to be a material source of stranding risk. To the extent that asset stranding risk is partly systematic, we consider our comparator group appropriately captures this stranding risk.

In response to the systematic risk associated with stranding of the fibre network being substantially different for the LFCs relative to Chorus due to the copper network, we note that Chorus' systematic risk would be similar as the value of its fibre network would be stranded in a similar way to the LFCs.

5.6. COMPANY SIZE

5.6.1. Submitters' views

Castalia consider that "*firm size clearly does have an impact on risk profile and expected investment returns.*"⁷⁷

In line with our assessment, WIK Consult agree with the academic literature and most national regulatory authorities in concluding that company size does not generate a higher systematic risk.⁷⁸

5.6.2. Our response

Castalia note that practitioners often adjust the cost of equity for small firms upwards when using the CAPM.⁷⁹ However, it does not provide a definition of a 'small' firm or regulatory precedent for such an adjustment.

In relation to the Castalia's observations on the Fama-French model, we note that regulatory authorities do not often apply this framework. For example, the Australian Energy Regulator (AER), in its 2013 rate of return guidelines, considered whether it should use the Fama-French three factor model as part of its approach to setting the rate of

⁷⁵ While not relevant to our argument because we are discussing the asset beta for an efficient FFLAS, we note that WIK Consult's logic is also fallible here. If a positive or negative macroeconomic shock were to occur it would affect both Chorus' fibre and copper networks (depending on income elasticity of demand). Thereby, negating any of WIK Consult's perceived benefits.

⁷⁶ Castalia (2019), page 4 and WIK Consult (2019), page 7.

⁷⁷ Castalia (2019), page 5.

⁷⁸ WIK Consult (2019), page 7.

⁷⁹ Castalia (2019), page 5.

return for regulated energy networks. It concluded that it should not use this model and reaffirmed this decision in 2018.⁸⁰

In our report, we set out a range of evidence we considered on a small company adjustment to the asset beta. We do not consider that Castalia has presented new evidence that changes our conclusion set out in our report.

5.7. OTHER RISK FACTORS

The submissions do not appear to have raised any other systematic risk factors that need to be considered:

- Castalia mention political risk and force majeure risks, but state that the risks are the same for Chorus and the LFCs.⁸¹
- Castalia consider that we “*erroneously*” note that regulatory risk is not important.⁸² However, Castalia fails to relate its view on regulatory risk to systematic risk.

5.8. COMPETITION

As noted above, both Castalia and WIK Consult considered that we had not appropriately taken copper competition for the LFCs into account for our relative risk assessment.

5.8.1. Submitters’ views

WIK Consult state that it is “*surprised that the business model of the fibre companies as such and the competitive position in the market are not factors which CEPA take into consideration.*”⁸³ WIK Consult go on to state that:

“While both Chorus and the LFCs face similar line-of-business restrictions and are wholesale-only operators and build similar fibre networks under similar constraints and obligations, there is one major difference in the business model: While the LFCs are pure-play fibre network providers, Chorus runs in parallel to its UFB fibre network a nationwide copper network. This difference in the business model generates major differences in the risk profile relative to each other.”⁸⁴

[...]

“given the higher risk that the LFCs are facing relative to that of Chorus, an uplift of the value of the asset beta for the LFCs of up to 10 percentage points relative to that of Chorus would be reasonable.”⁸⁵

5.8.2. Our response

As we have noted above:

⁸⁰ AER (2013), Table A.1 pages 8-9, and AER (2018), Table 6 page 83.

⁸¹ Castalia (2019), pages 4-5.

⁸² Castalia (2019), page 4.

⁸³ WIK Consult (2019), page 6.

⁸⁴ WIK Consult (2019), page 9 ¶33.

⁸⁵ WIK Consult (2019), page 2.

- We are estimating a beta for an efficient FFLAS provider, not a combined copper and fibre services provider. Regardless, the return on Chorus' fibre assets would change if customers migrated to/ from its copper network in relation to systematic changes.
- Competition is not in and of itself a systematic risk. We consider that the key issue is income elasticity of demand and whether this differs across fibre and copper. We have addressed this in Section 4.2 above.

As WIK Consult itself correctly identifies, this is business or company specific risk rather than systematic risk:

*"[The LFCs'] **business risk** is predominantly driven by demand and take-up."⁸⁶ [Emphasis added]*

*"The implication is that Chorus' **company risk** is less affected by fibre demand and fibre take-up." [Emphasis added]*

Castalia also identifies the risks as being business risks:

"we examine the key underlying business risks, it is clear that LFCs face a number of risks that are incremental to those faced by Chorus".

In relation to the uplift that might apply, we note that WIK Consult did not provide empirical evidence to justify its position of a 10% uplift to the asset beta established for Chorus.⁸⁷

5.9. SUMMARY

Considering the factors outlined above, we do not consider that the issues raised in submissions alter the view set out in our May 2019 report. While we consider that the systematic risk exposure of the LFCs could be above that of Chorus because they will not, at least initially, operate under a revenue cap with a wash-up mechanism, we have not identified a robust basis to quantify the impact.

Castalia note that:

"given a credible threat of future price regulation, the WACC that the Commission might apply to LFCs in future regulation is an important factor investors will take into account in forecasting future LFC revenues. If the Commission maintains its emerging view, investors may infer that the Commission may apply the same, or materially the same, WACC to LFCs as to Chorus under any future possible direct price regulation. Such an expectation would lead to inefficiently low valuations and a higher cost of capital for LFCs now, even though LFCs will not at this stage, and may never, be subject to price regulation. This would create an inefficient and unfair outcome for LFCs."⁸⁸

As noted in our report, we consider that stability of revenues under the revenue cap is the key difference between Chorus and the LFCs in relation to the asset beta.

We are still of the view that it is reasonable for the Commission to adopt a sector-wide rather than company-specific approach, given the need for subjective ad hoc adjustments in the latter case. As noted in our report, we consider that a reasonable range for the asset beta lies between the wholesale and integrated comparator groups. While a point estimate is required to apply the PQ regime, in the context of the ID regime we note that the Commission would be able to consider the asset beta range in monitoring the profitability of the LFCs.

⁸⁶ WIK Consult (2019), page 9.

⁸⁷ We assume that WIK Consult's "10 percentage points" refers to 10 percent, given that the asset beta is not a percentage.

⁸⁸ Castalia (2019), page 7-8.

6. ESTABLISHING AN ASSET BETA RANGE

In this section, we consider more general comments received in relation to the overall asset beta range.

6.1. OUR APPROACH

Based on the relative risk assessment, our May 2019 report concluded that an asset beta that falls between the wholesale-only and vertically-integrated comparator groups represents a reasonable estimate for the FFLAS providers. Consistent with the Commission's approach under the Part 4 Cost of Capital IM, in establishing a range we:

- Placed most weight on the two most recent five-year periods (2009-14 and 2014-19), while also having regard to evidence from the most recent two-year period (2017-19).
- Placed most weight on the 4-weekly and weekly estimates, while also having regard to evidence from the daily estimates.

6.2. SUBMITTERS' VIEWS

Comments received in the submissions covered the following points:

- The weight placed on the wholesale-only and integrated groups.
- The weight placed on asset beta estimates in terms of their time horizon and frequency.
- The appropriate range of the asset beta.

Appropriate weighting of the comparator groups

Oxera consider that:

"In the absence of sufficient evidence to justify the higher weight that is implicitly placed on the 'wholesale' providers by splitting the sample, it is more appropriate to weight the comparators equally by estimating the asset beta based on the total sample."⁸⁹

For its combined wholesale and integrated sample, Oxera propose that:

"Given that a proportion of these comparator companies consist of lower-risk businesses (i.e. copper), the asset beta for a stand-alone FFLAS is likely to lie above the 0.52 midpoint of the asset beta range estimated from the comparator sample."⁹⁰

⁸⁹ Oxera (2019), page 23-24.

⁹⁰ Oxera (2019), page 26.

Castalia consider that:

- The Chorus asset beta *“provides an excellent absolute lower bound for a Chorus FFLAS beta estimate.”* and *“[i]n turn, a robust Chorus FFLAS beta estimate would be a good lower bound estimate for the LFC asset beta”*.⁹¹
- As a likely upper bound, it *“expect[s] that LFC asset betas would be higher than a typical natural monopoly asset beta, but would still not exceed 1”*.⁹²
- Consider that it is inappropriate to give the wholesale group (of which it consider only Chorus to be relevant) an effective weighting of 50%.⁹³

Appropriate weighting of the asset beta estimates

In establishing their proposed range for the asset beta, Oxera state that:

*“As telecoms is a fast-paced industry with frequent technological advancements (and given that the comparator sample is smaller over the 2009–14 period), we have assigned more weight to the asset betas estimated over the recent 5-year and 2-year periods by taking an average of all the asset betas estimated over the three periods (2009–14, 2014–19, 2017–19).”*⁹⁴

Castalia *“recommend averaging the two-year and five-year beta observations (where both are available) to arrive at a point estimate for the asset beta of each comparator firm.”*⁹⁵ In relation to frequency, Castalia consider that *“weekly observation frequency is appropriate as a matter of principle”* and given that in some cases comparators do not trade over several days *“do not see the need to put any weight on longer observation intervals, like CEPA did with four-weekly observations”*.⁹⁶

Appropriate range

The ranges proposed in submissions (where a specific range was mentioned) are summarised in the table below.

Table 6.1: Submissions on appropriate asset beta range

Submission	Views on appropriate range
Telstra Super	<ul style="list-style-type: none"> • Note that market analyst expectations appear to have been for an asset beta of more than 0.5. • Reference the 2010 Crown Fibre Holdings (CFH) assessment of 0.50 to 0.65, noting that CFH cited similar contemporaneous ranges derived for NBN Co and Openreach. • Consider that a range of 0.51 – 0.63 (consistent with excluding comparators with less than 50% revenues from fixed line services from CEPA’s sample) would be a more appropriate range and consistent with the CFH range.
Ubique Asset Management, Investors Mutual,	<ul style="list-style-type: none"> • Also reference the CFH range.

⁹¹ Page 3.

⁹² Page 5.

⁹³ Page 6.

⁹⁴ Oxera (2019), page 25.

⁹⁵ Castalia (2019), page 3.

⁹⁶ Page 3.

Submission	Views on appropriate range
Black Crane Capital	<ul style="list-style-type: none"> Also consider that a range of 0.51 – 0.63 (consistent with excluding comparators with less than 50% revenues from fixed line services from CEPA's sample) would be a more appropriate.
L1 Capital	<ul style="list-style-type: none"> Consider that the integrated telcos should be used to calculate the FFLAS asset beta.
Oxera	<ul style="list-style-type: none"> Establish a range of 0.46 – 0.57 and a mid-point of 0.52, based on their revised sample and approach to averaging across the beta estimates.

6.3. OUR RESPONSE

Having considered the submissions:

- We are still comfortable with dividing the wholesale and integrated service providers groups and selecting an asset beta range between the two. We consider that the two groups have distinctly different characteristics that can help inform an appropriate range for the FFLAS providers. These distinctions would be obscured by combining the two groups, simply because there are fewer wholesale only providers.
- As discussed in Section 4, the issues raised in submissions have not changed our view on the systematic risk exposure of the FFLAS providers relative to the two comparator groups. Therefore, we still consider that an asset beta range between the wholesale and integrated groups is appropriate.
- We note that given the rapid evolution of the telecommunications sector, there may be an argument for placing more weight on the most recent two-year period, alongside the two most recent five-year periods. However, we have taken the two-year beta evidence into account when considering the five-year ranges. We also note that placing equal weight on the two-year and daily betas would imply a similar range of 0.43 – 0.51.

7. UPDATED ASSET BETA ESTIMATES

7.1. REVISED COMPARATOR SET

As described in Section 3, we have made several updates to the comparator set in response to submissions and further analysis. These changes are summarised in the tables below.

Table 7.1: New comparators

Group	Comparator	Ticker	Reason for inclusion
Wholesale	Uniti	UNIT US Equity	Expanded starting point (Bloomberg classification set).
	Cellnex Telecom	CLNX SM Equity	
Integrated	BCE	BCE CN Equity	Expanded starting point (Singapore, Japan, and South Korea).
	Cable One	CABO US Equity	
	Cogeco	CCA CN Equity	
	Euskaltel	EKT SM Equity	
	Liberty Global	LBTYA US Equity	
	Rogers	RCI/B CN Equity	
	Shaw Communications	SJR/B CN Equity	
	Superloop	SLC AU Equity	
	SingTel	ST SP Equity	
	StarHub	STH SP Equity	
	SK Telecom	017670 KS Equity	
	LG U+	032640 KS Equity	
	NTT	9432 JP Equity	
	KDDI	9433 JP Equity	
	Softbank Group	9984 JP Equity	

Table 7.2: Comparators removed from original sample

Group	Comparator	Ticker	Reason for exclusion
Integrated	Cincinnati Bell	CBB US Equity	Large proportion of revenues from non-telecommunication sector activities.
	KCOM	KCOM LN Equity	
	QSC	QSC GR Equity	
	AT&T	T US Equity	
Integrated	Telefonica Deutschland	OD2 GR Equity	Parent company now included in the sample.
	Orange Belgium	OBEL BB Equity	
	Sprint	S US Equity	
Integrated	TDC	TDC LI Equity	Complete data not available over full period, and fails liquidity filter.
	Masmovil Ibercom	MAS SM Equity	

Group	Comparator	Ticker	Reason for exclusion
	Trilogy International Partners	TRL CN Equity	Complete data not available over the full period (previously included in the two-year beta only).
	Frontier Communications	FTR US Equity	Anomalously high gearing
	Hutchison Telecommunications	HTA AU Equity	Incorrect net debt data in Bloomberg.
	MNF Group	MNF AU Equity	

Our full revised comparator set is summarised in the table below.

Table 7.3: Full comparator set

Wholesale comparators (10)		
Chorus		
Uniti		
American Tower Corporation (tower company)		
Crown Castle (tower company)		
Cellnex Telecom (tower company)		
INWIT (tower company)		
Rai Way (tower company)		
SBAC (tower company)		
Eutelsat (satellite operator)		
SES (satellite operator)		
Integrated comparators (53)		
BT Group	Sonaecom	Vodafone
CenturyLink	Spark	Zayo Group Holdings
Cogent Communications Holdings	Sunrise	SK Telecom
Consolidated Communications Holdings	Swisscom	LG U+
DNA Oyj	TalkTalk	NTT
Deutsche Telekom	Telefonica	KDDI
Elisa Oyj	Tele2	Softbank Group
Gamma	Telecom Italia	BCE
Go	Telekom Austria	Cable One
Hellenic Telecommunications Organisation	Telephone and Data Systems	Cogeco
Iliad	Telia Company	Euskaltel
Koninklijke KPN	Telenor	Liberty Global
Manx Telecom	Telstra	Rogers
Orange	T-Mobile US	Shaw Communications
Proximus	TPG Telecom	Superloop

Integrated comparators (53)		
Retelit	US Cellular Corporation	SingTel
Shenandoah Telecommunications Company	Verizon Communications	StarHub
Siminn	Vocus	

7.2. REVISED ASSET BETA ESTIMATES

Based on this revised sample, our asset beta estimates are shown in the table below, compared to our May 2019 report. Estimates for the full comparator set are provided in Appendix B.

Table 7.4: Updated asset beta estimates

Comparator group	May 2019 report			Updated comparator set		
	4-Weekly beta	Weekly beta	Daily beta	4-Weekly beta	Weekly beta	Daily beta
5-year asset beta (2014-2019)						
Wholesale	0.38	0.41	0.41	0.38	0.41	0.41
Integrated	0.46	0.52	0.52	0.47	0.52	0.54
5-year asset beta (2009-2014)						
Wholesale	0.38	0.45	0.47	0.38	0.45	0.48
Integrated	0.55	0.51	0.52	0.51	0.48	0.51
2-year asset beta (2017-2019)						
Wholesale	n/a	0.37	0.36	n/a	0.40	0.38
Integrated	n/a	0.44	0.46	n/a	0.47	0.49

Source: Bloomberg, CEPA analysis. Estimates are calculated between the following date ranges: 1 March 2014 – 28 February 2019, 1 March 2009 – 28 February 2014, 1 March 2017 – 28 February 2019. We have not reported 4-weekly beta estimates for the 2017-2019 period, due to a low number of observations and high standard errors.

For the **wholesale-only service providers**, the four-weekly and weekly estimates from the two most recent five-year periods (2014-2019 and 2009-2014) indicate a range for the asset beta of 0.38 – 0.45 (midpoint of 0.41). At 0.40, the weekly asset beta estimate for the most recent two-year period (2017-2019) is within the five-year range. The two-year and five-year daily asset beta estimates support a slightly wider range of 0.38 – 0.48.

The asset betas for the **vertically integrated comparators** are higher than for the wholesale-only service providers, consistent with our relative risk assessment. For the integrated companies, the estimated range indicated by four-weekly and weekly data over the two most recent five-year periods is 0.47 – 0.52 (midpoint of 0.49). The five-year daily estimates and results from the most recent two-year period are also broadly consistent with this range.

Combining the estimates from the two samples suggests a range of 0.41 – 0.49 (midpoint of 0.45). The lower value of this range is set by the wholesale-only comparators and the upper value is set by the integrated comparators, based on the average asset beta for the two most recent five-year periods. Basing this range on the five-year beta estimates is consistent with the Commission's 2016 Part 4 IM decision for EDBs, GPBs and airports, which placed greater weight on the weekly and four-weekly estimates from the two most recent five-year periods.

8. CREDIT RATING AND LEVERAGE

8.1. SUBMITTERS' VIEWS

Submissions that commented on this issue generally considered that a credit rating of BBB/BBB+ was too high for the FFLAS providers. Telstra Super notes that:

“the Cambridge paper says a finding of BBB/BBB+ is possible on its broad comparator group. Chorus operates with a BBB credit rating and we consider this provides sufficient margin above the minimum BBB- rating identified by the Commerce Commission.”⁹⁷

Black Crane Capital consider that our approach to estimating the appropriate credit rating and leverage is inconsistent. Specifically, it observes that:

“When doing the benchmarking exercise CEPA calculated the appropriate leverage range based off taking average figures, whereas for the credit ratings benchmarking CEPA ignored the average ratings and instead took the most common rating (thus ending up with an answer one or two notches higher than the average). Furthermore, CEPA states that taking this (higher than average) rating is consistent with the NZCC’s approach of ensuring a buffer above the investment grade rating. While this may be true, they should then also be adjusting the appropriate leverage ratio down to ensure this buffer is also reflected there as well.”⁹⁸

Paradise Investment Management similarly consider that *“the recommended BBB+ credit rating proposed in the EV Paper (Section 490) is too high as it is a full 2 notches above the top average rating for both wholesale and integrated service providers”*.⁹⁹

Oxera state that:

“a target credit rating of BBB and a target gearing of 30%, consistent with the comparator sample, seem to be appropriate. This is also in line with the recent regulatory precedent—for instance, Ofcom assumes a BBB credit rating for BT in the UK.”¹⁰⁰

8.2. OUR RESPONSE

In order to address the leverage anomaly associated with the simplified Brennan-Lally CAPM, the Commission’s approach to estimating notional leverage has been to adopt the average leverage of the comparator sample. Past decisions have then adopted a notional credit rating that is consistent with this notional gearing.

Based on the original comparator sample set out in our report, we found that:

- For the wholesale comparators, average leverage was 35% over 2014-19 and 31% over 2009-14.
- For the integrated comparators, average leverage was 29% over 2014-19 and 30% over 2009-14.
- The most common (current) credit rating was BBB- for the wholesale comparators and BBB+ for the integrated companies.
- For both comparator groups, the average (current) credit rating was BBB-/BB+.

⁹⁷ Telstra Super (2019), page 3.

⁹⁸ Black Crane Capital (2019), page 4.

⁹⁹ Page 2.

¹⁰⁰ Page 6.

It is important to note that:

- The average leverage for each group includes companies that do not have a credit rating. Therefore, we cannot conclude that the average credit rating of the sample is consistent with the average leverage.
- The average leverage includes companies with credit ratings below investment grade. Therefore, applying the average leverage of the comparator sample could potentially be inconsistent with the view that an efficient fibre services provider would seek to maintain an investment grade rating.

Given these observations, we undertook a cross-check to assess what credit rating would be consistent with the average leverage of the full comparator set and confirm that this was an investment grade rating. To do this, we mapped the 2014-2019 average leverage of each rated comparator to their credit rating. This provided an average leverage value for all comparators at each credit rating level. This analysis indicated that:

- The most common rating *and* the average rating for all comparators with an investment grade rating was BBB/BBB+. This suggests that BBB/BBB+ represents a reasonable credit rating for the FFLAs providers, given the comparator set.
- Over 2009-2014, average leverage was 32% for comparators rated BBB+ and 38% for comparators rated BBB. This suggests that a rating of BBB/BBB+ is also broadly consistent with the full comparator group average leverage of 29% - 35%.

8.3. UPDATED ESTIMATES

Leverage estimates for our revised comparator sample are shown in the table below.

Table 8.1: Average leverage of the comparator sample

Comparator groups	May 2019 report	Updated comparator set
2014-2019		
Wholesale	35%	35%
Integrated	29%	28%
2009-2014		
Wholesale	31%	31%
Integrated	30%	32%
2017-2019		
Wholesale	26%	29%
Integrated	30%	29%

Source: Bloomberg, CEPA analysis

Applying the Commission's Part 4 IM approach to our comparator sample, i.e., focusing on the two most recent five-year periods, suggests that the appropriate notional leverage is between 28% - 35%. The point estimate would depend on the weight placed on the evidence from wholesale-only and integrated service providers in determining the asset beta estimate.

For the updated comparator sample, the average credit rating for the wholesale group is BBB-/BB+, and BBB-/BBB for the integrated group. As noted above, because not all companies in the sample are rated, we cannot infer that the average credit rating is consistent with the average leverage.

To assess the appropriate credit rating, we have undertaken the same cross check described above. Our analysis of comparators with an investment grade rating indicates an average rating of BBB/BBB- for the wholesale group and BBB+/A- for the integrated group. This is in line with our May 2019 report conclusion that a rating of BBB/BBB+ appears reasonable for the FFLAS providers based on the comparator set.

Considering comparators with a credit rating (see table below) indicates that comparators rated BBB+ had average leverage of 34% over 2014-2019, and 31% for BBB rated comparators. This is broadly consistent with the range established by the full wholesale and integrated samples (28% - 35%).

Table 8.2: Leverage and credit rating comparison

Average Gearing (2014-2019)		Sector								
		Chorus	Tower Companies	Satellite Operators	Wholesale- only Providers	Integrated Providers	Telecoms - Wholesale + Integrated	Gas / Electricity	Airports	Average
Credit Rating	AA-					26%	26%	21%		24%
	A+					13%	13%	28%	26%	23%
	A					20%	20%	40%		28%
	A-					14%	14%	41%	23%	36%
	BBB+					34%	34%	43%		40%
	BBB	55%			55%	28%	31%	42%		37%
	BBB-		27%	34%	30%	27%	30%	35%		33%
	Average	55%	27%	34%	35%	26%	27%	40%	25%	

Source: Bloomberg, CEPA analysis

Appendix A STANDALONE FIBRE AND COPPER PLAN PRICES

In the table below, we set out the copper and fibre plans that are available from the five largest internet service providers.

Table Appx A.1: Copper and fibre standalone plans, as of 21 August 2019

Type	Retailer	Plan	Data (GB)	Monthly price (\$)
Fibre	Trustpower	Unlimited Fibre Fastest No Power	Unlimited	149
Fibre	Vocus	Fibre 900/500	Unlimited	137
Fibre	Trustpower	Unlimited Fibre Faster No Power	Unlimited	129
Fibre	Vocus	Fibre 200/200	Unlimited	126
Fibre Max	Vodafone	Smart Connect	Unlimited	123
Fibre	Spark	Unplan Fibre Max	Unlimited	120
Fibre 200/ HFC Max	Vodafone	Smart Connect	Unlimited	113
Fibre	Spark	Unplan Fibre 200	Unlimited	110
Fibre	2degrees	Ultimate Unlimited	Unlimited	110
Fibre	Spark	Unplan Fibre Max	120	110
ADSL	Trustpower	Unlimited ADSL Plan	Unlimited	109
VDSL	Trustpower	Unlimited VDSL Plan	Unlimited	109
Fibre	Trustpower	Unlimited Fibre No Power	Unlimited	109
ADSL	Vocus	ADSL Pro	Unlimited	103
VDSL	Vocus	VDSL Pro	Unlimited	103
Fibre	Vocus	Fibre 100/100	Unlimited	103
ADSL	Spark	Naked ADSL Unlimited	Unlimited	100
VDSL	Spark	Naked VDSL Unlimited	Unlimited	100
Fibre	Spark	Unplan Fibre 200	120	100
Fibre	Spark	Unplan Fibre Max	60	100
ADSL	Trustpower	100GB ADSL Plan	100	99
VDSL	Trustpower	100GB VDSL Plan	100	99
Fibre	Trustpower	100GB Fibre Plan	100	99
Wireless	Spark	Naked Rural Wireless Broadband	120	96
ADSL/ VDSL/ Fibre 100/ HFC 200	Vodafone	Smart Connect	Unlimited	93
Fibre	Spark	Unplan Fibre 200	60	90
Fibre	Spark	Unplan Fibre 100	Unlimited	89
Wireless	Spark	Unplan Wireless	Unlimited	85
Fibre	Spark	Unplan Fibre Basic	Unlimited	85
ADSL/ VDSL/ Fibre	2degrees	Unlimited	Unlimited	85
Wireless	Spark	Naked Home Wireless Broadband	120	85
VDSL/ Fibre/ HFC	Vodafone	Everyday Home	240	83

Type	Retailer	Plan	Data (GB)	Monthly price (\$)
Fibre	Spark	Unplan Fibre 100	120	79
Wireless	Spark	Unplan Wireless	120	75
Fibre	Spark	Unplan Fibre Basic	120	75
ADSL/ VDSL/ Fibre	2degrees	80GB	80	75
Fibre	Spark	Unplan Fibre 100	60	69
Wireless	Spark	Unplan Wireless	60	65
Fibre	Spark	Unplan Fibre Basic	60	65
Wireless	Vodafone	Basic Home	60	50

Source: 2degrees, Glimp, Spark, Vocus, Vodafone

Appendix B UPDATED ESTIMATES

Table_Appx B.1: Five-year asset beta (2014-2019) ¹⁰¹

Company	4-weekly results	Standard error	Weekly results	Standard error	Daily results	Standard error
American Tower Corporation	0.41	0.13	0.45	0.06	0.49	0.03
Crown Castle	0.25	0.12	0.38	0.06	0.40	0.02
Cellnex Telecom						
INWIT						
Rai Way						
SBAC	0.40	0.13	0.52	0.06	0.51	0.03
Tower Companies - Average	0.36	0.13	0.45	0.06	0.47	0.03
Eutelsat	0.35	0.14	0.33	0.06	0.33	0.03
SES	0.35	0.17	0.36	0.07	0.38	0.03
Satellite Operators - Average	0.35	0.15	0.34	0.07	0.35	0.03
Chorus	0.50	0.15	0.42	0.08	0.37	0.04
Uniti						
Wholesale - Average	0.38	0.14	0.41	0.07	0.41	0.03
BT Group	0.37	0.17	0.52	0.08	0.65	0.03
CenturyLink	0.40	0.14	0.46	0.06	0.41	0.03
Cogent Communications Holdings	0.77	0.20	0.77	0.10	0.70	0.04
Consolidated Communications Holdings	0.38	0.13	0.44	0.06	0.40	0.03
DNA Oyj						
Deutsche Telekom	0.50	0.07	0.49	0.03	0.45	0.01
Elisa Oyj	0.41	0.14	0.59	0.06	0.66	0.03
Gamma						
Go	0.64	0.23	0.58	0.11	0.73	0.07
Hellenic Telecommunications Organisation	0.58	0.06	0.65	0.04	0.70	0.02
Iliad	0.38	0.21	0.57	0.10	0.64	0.04
Koninklijke KPN	0.45	0.10	0.50	0.05	0.56	0.02
Manx Telecom	0.28	0.12	0.20	0.06	0.19	0.03
Orange	0.44	0.09	0.51	0.04	0.56	0.02
Proximus	0.46	0.14	0.58	0.06	0.62	0.03
Retelit	1.05	0.22	0.88	0.10	0.63	0.04
Shenandoah Telecommunications	0.44	0.31	0.68	0.13	0.77	0.06
Siminn						

¹⁰¹ Blank values indicate that the stock was not traded over the full period. Standard errors (SE) for the averages are pooled SE.

Company	4-weekly results	Standard error	Weekly results	Standard error	Daily results	Standard error
Sonaecom	0.54	0.17	0.49	0.09	0.37	0.05
Spark	0.73	0.20	0.93	0.12	1.07	0.06
Sunrise						
Swisscom	0.44	0.10	0.45	0.04	0.50	0.02
TalkTalk	0.48	0.25	0.52	0.11	0.49	0.05
Telefonica	0.51	0.06	0.51	0.02	0.52	0.01
Tele2	0.55	0.15	0.61	0.07	0.68	0.03
Telecom Italia	0.39	0.05	0.35	0.03	0.36	0.01
Telekom Austria	0.32	0.08	0.24	0.04	0.24	0.02
Telephone and Data Systems	0.68	0.19	0.75	0.09	0.66	0.04
Telia Company	0.40	0.10	0.49	0.05	0.57	0.02
Telenor	0.49	0.12	0.62	0.05	0.64	0.02
Telstra	0.56	0.15	0.49	0.07	0.53	0.03
T-Mobile US	0.36	0.14	0.53	0.07	0.56	0.03
TPG Telecom	0.58	0.36	0.65	0.15	0.72	0.06
US Cellular Corporation	0.63	0.24	0.72	0.11	0.63	0.05
Verizon Communications	0.27	0.12	0.33	0.05	0.38	0.02
Vocus	0.32	0.38	0.67	0.17	0.71	0.07
Vodafone	0.59	0.12	0.62	0.05	0.64	0.02
Zayo Group Holdings						
SK Telecom	0.27	0.17	0.33	0.09	0.26	0.05
LG U+	0.05	0.19	0.20	0.09	0.20	0.05
NTT	0.45	0.10	0.48	0.05	0.55	0.02
KDDI	0.58	0.12	0.67	0.06	0.78	0.03
Softbank Group	0.55	0.09	0.52	0.04	0.51	0.02
BCE	0.29	0.09	0.32	0.04	0.35	0.02
Cable One						
Cogeco	0.29	0.11	0.24	0.05	0.27	0.03
Euskaltel						
Liberty Global	0.53	0.10	0.49	0.05	0.47	0.02
Rogers	0.24	0.10	0.26	0.05	0.28	0.02
Shaw Communications	0.38	0.11	0.34	0.06	0.42	0.03
Superloop						
SingTel	0.67	0.09	0.69	0.05	0.76	0.03
StarHub	0.46	0.17	0.46	0.08	0.52	0.04
Integrated - Average	0.47	0.17	0.52	0.08	0.54	0.04

Table Appx B.2: Five-year asset beta (2009-2014)

Company	4-weekly results	Standard error	Weekly results	Standard error	Daily results	Standard error
American Tower Corporation	0.41	0.11	0.56	0.05	0.67	0.02
Crown Castle	0.57	0.10	0.61	0.05	0.68	0.02
Cellnex Telecom						
INWIT						
Rai Way						
SBAC	0.48	0.09	0.54	0.05	0.58	0.02
Tower Companies - Average	0.49	0.10	0.57	0.05	0.64	0.02
Eutelsat	0.25	0.08	0.30	0.04	0.26	0.02
SES	0.18	0.06	0.21	0.03	0.21	0.01
Satellite Operators - Average	0.22	0.07	0.26	0.03	0.24	0.02
Chorus						
Uniti						
Wholesale – Average	0.38	0.09	0.45	0.04	0.48	0.02
BT Group	0.52	0.10	0.55	0.05	0.59	0.02
CenturyLink	0.39	0.08	0.37	0.04	0.38	0.02
Cogent Communications Holdings	0.89	0.21	1.05	0.11	1.06	0.04
Consolidated Communications Holdings	0.41	0.07	0.28	0.03	0.33	0.01
DNA Oyj						
Deutsche Telekom	0.24	0.06	0.26	0.03	0.29	0.01
Elisa Oyj	0.37	0.08	0.38	0.04	0.39	0.02
Gamma						
Go	0.81	0.21	0.27	0.10	0.31	0.09
Hellenic Telecommunications Organisation	0.42	0.06	0.40	0.03	0.36	0.01
Iliad	0.39	0.11	0.37	0.05	0.34	0.02
Koninklijke KPN	0.20	0.11	0.25	0.05	0.24	0.02
Manx Telecom						
Orange	0.34	0.06	0.35	0.03	0.37	0.01
Proximus	0.42	0.10	0.41	0.05	0.41	0.02
Retelit						
Shenandoah Telecommunications	0.86	0.23	0.93	0.10	1.34	0.05
Siminn						
Sonaecom	0.69	0.12	0.65	0.06	0.61	0.03
Spark	0.77	0.17	1.05	0.09	1.29	0.05
Sunrise						
Swisscom	0.32	0.07	0.33	0.03	0.32	0.02

Company	4-weekly results	Standard error	Weekly results	Standard error	Daily results	Standard error
TalkTalk						
Telefonica	0.45	0.04	0.46	0.02	0.48	0.01
Tele2	0.63	0.15	0.58	0.07	0.63	0.03
Telecom Italia	0.24	0.04	0.27	0.02	0.28	0.01
Telekom Austria	0.26	0.07	0.31	0.03	0.34	0.02
Telephone and Data Systems	0.92	0.16	0.92	0.07	0.91	0.03
Telia Company	0.42	0.08	0.50	0.04	0.55	0.02
Telenor	0.75	0.09	0.63	0.04	0.67	0.02
Telstra	0.22	0.11	0.29	0.05	0.32	0.02
T-Mobile US	0.58	0.22	0.66	0.09	0.70	0.04
TPG Telecom	2.27	0.42	1.10	0.17	0.68	0.07
US Cellular Corporation	0.82	0.17	0.88	0.08	0.88	0.03
Verizon Communications	0.37	0.09	0.28	0.03	0.40	0.02
Vocus						
Vodafone	0.40	0.09	0.36	0.04	0.47	0.02
Zayo Group Holdings						
SK Telecom						
LG U+						
NTT	0.31	0.06	0.36	0.03	0.38	0.02
KDDI	0.53	0.10	0.50	0.05	0.52	0.03
Softbank Group	0.58	0.11	0.61	0.06	0.62	0.03
BCE	0.16	0.08	0.15	0.04	0.22	0.02
Cable One						
Cogeco	0.15	0.13	0.15	0.05	0.18	0.02
Euskaltel						
Liberty Global	0.51	0.07	0.42	0.03	0.40	0.01
Rogers	0.28	0.11	0.29	0.05	0.34	0.02
Shaw Communications	0.23	0.09	0.32	0.04	0.39	0.02
Superloop						
SingTel	0.50	0.08	0.55	0.05	0.65	0.03
StarHub	0.34	0.09	0.28	0.05	0.31	0.03
Integrated - Average	0.51	0.13	0.48	0.06	0.51	0.03

Table Appx B.3: Two-year asset beta (2017-2019)

Company	4-weekly results	Standard error	Weekly results	Standard error	Daily results	Standard error
American Tower Corporation	0.09	0.21	0.26	0.09	0.31	0.04
Crown Castle	0.25	0.21	0.32	0.09	0.30	0.04
Cellnex Telecom	0.61	0.18	0.55	0.10	0.46	0.04
INWIT	0.69	0.26	0.57	0.14	0.49	0.07
Rai Way	0.72	0.28	0.65	0.17	0.57	0.08
SBAC	0.19	0.22	0.34	0.09	0.32	0.04
Tower Companies - Average	0.43	0.23	0.45	0.12	0.41	0.06
Eutelsat	0.35	0.30	0.24	0.14	0.28	0.07
SES	0.24	0.40	0.24	0.19	0.28	0.09
Satellite Operators - Average	0.30	0.35	0.24	0.17	0.28	0.08
Chorus	0.49	0.23	0.29	0.11	0.35	0.05
Uniti	0.47	0.34	0.52	0.16	0.44	0.07
Wholesale - Average	0.41	0.27	0.40	0.13	0.38	0.06
BT Group	0.25	0.31	0.27	0.14	0.45	0.06
CenturyLink	0.30	0.22	0.38	0.09	0.38	0.04
Cogent Communications Holdings	0.60	0.29	0.71	0.14	0.67	0.07
Consolidated Communications Holdings	0.26	0.20	0.41	0.09	0.36	0.04
DNA Oyj	0.53	0.37	0.45	0.18	0.59	0.08
Deutsche Telekom	0.24	0.14	0.31	0.06	0.30	0.03
Elisa Oyj	0.14	0.24	0.39	0.13	0.56	0.06
Gamma	0.16	0.49	0.50	0.27	0.35	0.12
Go	0.77	0.33	0.54	0.16	0.68	0.11
Hellenic Telecommunications Organisation	0.74	0.12	0.78	0.08	0.71	0.04
Iliad	0.10	0.39	0.50	0.20	0.60	0.09
Koninklijke KPN	0.44	0.21	0.49	0.10	0.54	0.05
Manx Telecom	0.41	0.26	0.37	0.13	0.19	0.05
Orange	0.24	0.14	0.35	0.06	0.39	0.03
Proximus	0.16	0.25	0.33	0.11	0.55	0.06
Retelit	1.36	0.39	1.28	0.20	0.94	0.09
Shenandoah Telecommunications	0.00	0.41	0.51	0.18	0.63	0.07
Siminn	0.51	0.18	0.59	0.08	0.57	0.04
Sonaecom	0.05	0.26	0.25	0.16	0.15	0.12
Spark	0.48	0.29	0.69	0.15	0.83	0.08
Sunrise	0.17	0.24	0.34	0.11	0.43	0.05
Swisscom	0.34	0.16	0.41	0.08	0.54	0.03

Company	4-weekly results	Standard error	Weekly results	Standard error	Daily results	Standard error
TalkTalk	0.37	0.45	0.27	0.22	0.37	0.10
Telefonica	0.38	0.12	0.48	0.04	0.47	0.02
Tele2	0.47	0.25	0.53	0.13	0.65	0.06
Telecom Italia	0.30	0.11	0.39	0.06	0.32	0.02
Telekom Austria	0.40	0.16	0.30	0.08	0.28	0.04
Telephone and Data Systems	0.18	0.33	0.55	0.15	0.54	0.07
Telia Company	0.23	0.16	0.38	0.09	0.45	0.04
Telenor	0.23	0.23	0.41	0.11	0.54	0.05
Telstra	0.42	0.33	0.39	0.16	0.44	0.07
T-Mobile US	0.41	0.19	0.51	0.09	0.56	0.04
TPG Telecom	0.92	0.71	0.76	0.28	0.69	0.13
US Cellular Corporation	-0.01	0.45	0.45	0.20	0.54	0.09
Verizon Communications	0.22	0.22	0.24	0.08	0.31	0.04
Vocus	0.54	0.70	0.73	0.33	0.85	0.13
Vodafone	0.58	0.22	0.60	0.10	0.64	0.04
Zayo Group Holdings	0.65	0.26	0.52	0.12	0.45	0.06
SK Telecom	0.15	0.24	0.26	0.13	0.17	0.07
LG U+	0.03	0.33	0.25	0.16	0.17	0.08
NTT	0.52	0.16	0.44	0.09	0.51	0.05
KDDI	0.47	0.22	0.43	0.11	0.62	0.05
Softbank Group	0.67	0.17	0.54	0.08	0.53	0.04
BCE	0.32	0.14	0.45	0.07	0.40	0.04
Cable One	0.56	0.25	0.65	0.11	0.56	0.05
Cogeco	0.36	0.21	0.32	0.11	0.31	0.06
Euskaltel	0.48	0.18	0.30	0.08	0.26	0.04
Liberty Global	0.49	0.16	0.36	0.08	0.35	0.04
Rogers	0.32	0.16	0.37	0.09	0.32	0.04
Shaw Communications	0.51	0.19	0.47	0.12	0.48	0.06
Superloop	1.15	0.54	0.88	0.27	0.59	0.14
SingTel	0.50	0.16	0.54	0.09	0.51	0.04
StarHub	0.67	0.37	0.50	0.16	0.49	0.08
Integrated - Average	0.41	0.30	0.47	0.14	0.49	0.07

Table Appx B.4: Reference indices

Company	Local market indices
Chorus	NZSE Index
Uniti	SPX Index
American Tower Corporation	SPX Index
Crown Castle	SPX Index
Cellnex Telecom	IBEX Index
INWIT	FTSEMIB Index
Rai Way	FTSEMIB Index
SBAC	SPX Index
Eutelsat	CAC Index
SES	CAC Index
BT Group	UKX Index
CenturyLink	SPX Index
Cogent Communications Holdings	SPX Index
Consolidated Communications Holdings	SPX Index
DNA Oyj	HEXP Index
Deutsche Telekom	DAX Index
Elisa Oyj	HEXP Index
Gamma	UKX Index
Go	MALTEX Index
Hellenic Telecommunications Organisation	FTASE Index
Iliad	CAC Index
Koninklijke KPN	AEX Index
Manx Telecom	UKX Index
Orange	CAC Index
Proximus	BEL20 Index
Retelit	FTSEMIB Index
Shenandoah Telecommunications	SPX Index
Siminn	OMX18ISK Index
Sonaecom	PSI20 Index
Spark	NZSE Index
Sunrise	SMI Index
Swisscom	SMI Index
TalkTalk	UKX Index
Telefonica	IBEX Index
Tele2	OMX Index
Telecom Italia	FTSEMIB Index

Company	Local market indices
Telekom Austria	ATX Index
Telephone and Data Systems	SPX Index
Telia Company	OMX Index
Telenor	OBX Index
Telstra	AS51 Index
T-Mobile US	SPX Index
TPG Telecom	AS51 Index
US Cellular Corporation	SPX Index
Verizon Communications	SPX Index
Vocus	AS51 Index
Vodafone	UKX Index
Zayo Group Holdings	SPX Index
SK Telecom	KOSPI Index
LG U+	KOSPI Index
NTT	TPX Index
KDDI	TPX Index
Softbank Group	TPX Index
BCE	SPTSX Index
Cable One	SPX Index
Cogeco	SPTSX Index
Euskaltel	IBEX Index
Liberty Global	SPX Index
Rogers	SPTSX Index
Shaw Communications	SPTSX Index
Superloop	AS51 Index
SingTel	STI Index
StarHub	STI Index

Table Appx B.5: Average leverage – 2014-2019, 2009-2014 and 2017-2019

Company	2014 - 2019	2009 - 2014	2017 - 2019
Chorus	55%		50%
Uniti			56%
American Tower Corporation	26%	20%	24%
Crown Castle	27%	35%	25%
Cellnex Telecom			32%
INWIT			1%
Rai Way			1%
SBAC	35%	38%	34%
Tower Companies - Average	30%	31%	19%
Eutelsat	39%	31%	39%
SES	29%	34%	33%
Satellite Operators - Average	34%	32%	36%
Wholesale - Average	35%	31%	29%
BT Group	23%	41%	31%
CenturyLink	58%	43%	64%
Cogent Communications Holdings	18%	17%	18%
Consolidated Communications Holdings	60%	63%	67%
DNA Oyj			14%
Deutsche Telekom	42%	51%	43%
Elisa Oyj	17%	24%	16%
Gamma			0%
Go	14%	28%	14%
Hellenic Telecommunications Organisation	16%	54%	12%
Iliad	14%	13%	21%
Koninklijke KPN	36%	48%	29%
Manx Telecom	22%		22%
Orange	41%	49%	38%
Proximus	17%	17%	19%
Retelit	0%		0%
Shenandoah Telecommunications	24%	22%	30%
Siminn			25%
Sonaecom	0%	28%	0%
Spark	12%	24%	14%
Sunrise			26%
Swisscom	24%	31%	25%
TalkTalk	27%		35%

Company	2014 - 2019	2009 - 2014	2017 - 2019
Telefonica	51%	45%	54%
Tele2	19%	14%	20%
Telecom Italia	64%	67%	66%
Telekom Austria	41%	47%	35%
Telephone and Data Systems	31%	21%	33%
Telia Company	28%	22%	29%
Telenor	19%	15%	17%
Telstra	22%	23%	29%
T-Mobile US	39%	44%	35%
TPG Telecom	11%	10%	17%
US Cellular Corporation	21%	12%	24%
Verizon Communications	34%	32%	35%
Vocus	20%		36%
Vodafone	35%	30%	36%
Zayo Group Holdings			40%
SK Telecom	21%		21%
LG U+	41%		32%
NTT	26%	37%	24%
KDDI	11%	24%	11%
Softbank Group	54%	38%	57%
BCE	30%	32%	31%
Cable One			17%
Cogeco	47%	39%	46%
Euskaltel			51%
Liberty Global	58%	67%	60%
Rogers	37%	31%	33%
Shaw Communications	27%	31%	24%
Superloop			6%
SingTel	13%	11%	15%
StarHub	10%	9%	15%
Integrated - Average	28%	32%	29%

Table Appx B.6: Long-term S&P credit ratings (current) - Comparator group¹⁰²

Company	S&P Credit Rating
Chorus	BBB
Uniti	
American Tower Corporation	BBB-
Crown Castle	BBB-
Cellnex Telecom	
INWIT	
Rai Way	
SBAC	BB
Eutelsat	BBB-
SES	BBB-
BT Group	BBB
CenturyLink	BB
Cogent Communications Holdings	B+
Consolidated Communications Holdings	B
DNA Oyj	
Deutsche Telekom	BBB+
Elisa Oyj	BBB+
Gamma	
Go	
Hellenic Telecommunications Organisation	BB+
Iliad	
Koninklijke KPN	BBB
Manx Telecom	
Orange	BBB+
Proximus	A
Retelit	
Shenandoah Telecommunications	
Siminn	
Sonaecom	
Spark	A-
Sunrise	
Swisscom	A
TalkTalk	BB-
Telefonica	BBB

¹⁰² Blank values indicate that no rating was available.

Company	S&P Credit Rating
Tele2	BBB
Telecom Italia	BB+
Telekom Austria	BBB+
Telephone and Data Systems	BB
Telia Company	BBB+
Telenor	A
Telstra	A-
T-Mobile US	BB+
TPG Telecom	
US Cellular Corporation	BB
Verizon Communications	BBB+
Vocus	
Vodafone	BBB
Zayo Group Holdings	
SK Telecom	A-
LG U+	NR
NTT	AA-
KDDI	NR
Softbank Group	BB+
BCE	BBB+
Cable One	
Cogeco	BB+
Euskaltel	
Liberty Global	BB-
Rogers	BBB+
Shaw Communications	BBB-
Superloop	
SingTel	A+
StarHub	

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