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# Price trends and asset beta cross submission

Final

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September 2015



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# 1 Executive Summary

## 1.1 Introduction

1. We have been asked by Chorus Limited (Chorus) to review aspects of submissions made by Network Strategies on the further draft determination released by the Commerce Commission (the Commission) in relation to the pricing of copper lines and the wholesale broadband services. In particular, we have been asked to review and provide our opinion on:
  - a. three issues raised by Network Strategies submission for Spark and Vodafone in regards to price trends:
    - i. The Producer Price Index (PPI) used by NZIER to estimate the long term price trend for the cost of trenching.
    - ii. The time period relied on by NZIER to estimate the price trend for fibre optic cable.
    - iii. TERA's implementation of NZIER's price trends in the cost model.
  - b. issues raised by Network Strategies on behalf of retail service providers on the Commission's asset beta estimate.<sup>1</sup>
2. The report's structure is such that each of the areas we have been asked to review is self-contained within its own chapter. Chapter 1 is authored by Jason Ockerby and chapters 2 by Dr Tom Hird.
3. The authors of this report have read the High Court Code of Conduct for expert witnesses and have complied with its requirements when preparing the relevant sections of this report.

## 1.2 Price trends summary

4. In essence, we agree with a number of the points by Network Strategies. We agree with its analysis that the PPI for Heavy and Civil Engineering is not preferred to the Commission constructing its own PPI series to ensure that the long term price trends more closely aligns with changes in the cost of trenching over time.
5. We also agree that the long-term fibre case series is a relevant series for the Commission to consider in constructing its price trend for fibre cable. Our preferred approach is to use an average over the full length of this series, however we discuss

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<sup>1</sup> Network Strategies, Report for Spark and Vodafone, Report Number 35013. 13 August 2015.

the outcome of taking an average to avoid the period of the dot com bubble, which is preferred by Network Strategies (and NZIER).

### 1.3 Asset beta summary

6. Network Strategies has criticised the fact that the Commission has described its comparison of the 2009 and the 2015 5 year asset beta estimates as ‘adjacent time periods’ and has argued that this is an error because the 2009 asset beta estimate is not strictly adjacent to the 2015 asset beta estimate.
7. In our view, Network Strategies’ position appears to rest on a semantic reading of the Commission’s decision; one that is inconsistent with the economic logic of the Commission’s decision. The Commission has, correctly in our view, expressed concern about the sudden drop in measured asset betas following the global financial crisis – with betas measured using data from calendar years 2009 to 2012 much lower than betas before or since.
8. We note that Oxera’s updated asset beta estimates only extend to 16 March 2015. We have updated these to 31 July 2015. We do not do this because we believe that adding 3½ months of data should make a material difference to the asset beta adopted. However, updating the asset beta estimates does demonstrate that measured asset betas have continued to rise.
9. In our view, our analysis serves to demonstrate the unreasonableness of Network Strategies’ implicit position that the Commission should, in essence, adopt an asset beta estimate that is heavily dependent on data from the 2009 to 2012 period.

## 2 Price trends

10. The analysis in this section provides a response to submissions from Network Strategies on price trends.<sup>2</sup>

### 2.1 Trenching price trend

11. Network Strategies considers the PPI used by NZIER “an imperfect proxy” as the “*heavy and civil engineering construction sector includes infrastructure projects other than telecommunications, including roads, dams, tunnels and electricity networks*”.<sup>3</sup> Based on this PPI, NZIER recommend a price trend for trenching costs of 3.3% per annum. In our August 2015 paper we set out that the appropriate long term price trend for trenching is in the range of 1.99% to 2.77%, with the lower end being our preferred estimate.
12. We agree with Network Strategies that the PPI relied on by NZIER represents an imperfect proxy for the long term trend in the cost of trenching. The Heavy and Civil Engineering Construction sector (ANZIC 310) is made up of two sub-sectors:<sup>4</sup>
- Road and Bridge Construction - this class consists of units mainly engaged in the construction or general repair of roads, bridges, aerodrome runways or parking lots, or in organising or managing these activities (code 3101); and
  - Other Heavy and Civil Engineering Construction - this class consists of units mainly engaged in the construction of railway permanent way, dams, irrigation systems, harbour or river works, water or gas supply systems, oil refineries (except buildings), pipelines or construction projects not elsewhere classified, in the on-site assembly of furnaces or heavy electrical machinery from prefabricated components, or in the general repair of such structures, machinery or equipment, or in organising or managing these activities (code 3109).
13. As alluded to by Network Strategies, the prominence of the road sub-sector in the heavy and civil engineering construction sector may mean that this series is not representative and may be subject to volatility that is unrelated to cost trends for construction in the telecommunications sector. This point has been recognised in the past by NZIER:<sup>5</sup>

<sup>2</sup> Network Strategies, Report for Spark and Vodafone, Report Number 35013. 13 August 2015.

<sup>3</sup> Network Strategies, p. 64

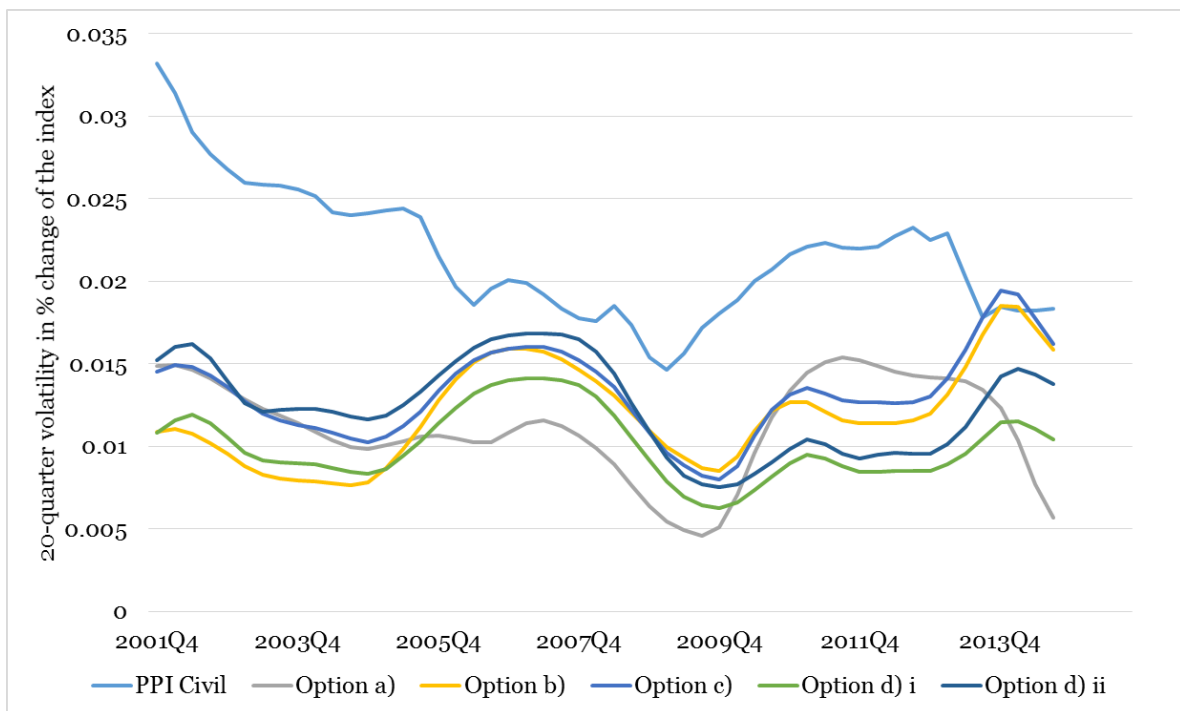
<sup>4</sup> <http://www.stats.govt.nz/~media/Statistics/surveys-and-methods/methods/class-stnd/industrial-classification/anzsic06-divison-e.pdf>

<sup>5</sup> NZIER, *Construction industry study Implications for cost escalation in road building, maintenance and operation*, NZIER final report to the Ministry of Transport, November 2013, page 14,

*the ability of official statistics to accurately isolate civil construction data from data relevant to the rest of industry, and the recent revision to statistics data provide a good example of this problem. This civil sector is also dependent on inputs from mining (quarry aggregate) and the transport and storage sectors. So the choice of ‘sector’ definition will influence measurement results.*

14. In addition to this PPI series being less representative of the long-term trend in the cost of trenching, the PPI series proposed by NZIER is significantly more volatile than the alternatives presented in our July 2015 report. We have suggested that the Commission construct its own PPI series to ensure that the long term price trends more closely aligns with changes in the cost of trenching over time. In our July 2015 report, we considered five bespoke indices based on a weighted average of capital good price index series (CGPI series) and labour cost index series (LCI series).
15. The figure below shows the 20-quarter volatility in the annual percentage change in each index. It shows significantly greater volatility in the PPI for Civil Construction.

**Figure 1: Volatility in price indices**



16. Heavy and civil engineering firms specialise in large infrastructure projects beyond telecommunications networks such as roads, dams, tunnels, and electricity networks.

<http://www.transport.govt.nz/assets/Uploads/Research/Documents/NZIER-report-2013-construction-industry-performance.pdf>



The volatility in the heavy and civil engineering PPI may reflect lumpy demand by government agencies for major road and other projects over time. In our view, such volatility is undesirable if it were translated into regulated prices for telecommunications services.

17. In contrast, the construction of a composite index is done by calculating weighted average of forecasts of general and specific indices to reflect the cost structures of the relevant network. A composite approach is likely to result in price trends that are more representative of the hypothetical network operator's costs than if a broader, less representative index were used.

### 2.1.1 Improvements in technology

18. Network Strategies notes that the long term trend estimated by NZIER *“will take little account of recent technological developments in the telecommunications sector which seek to reduce construction costs”*<sup>6</sup>. Such developments include hydrotrenching and microtrenching. Network Strategies acknowledges that microtrenching is not a solution for all New Zealand conditions, but should be considered where appropriate.
19. Statistics New Zealand review industry and commodity PPI series periodically to ensure that both the structure and weights used are up to date and reflective of the industry in question. Its price indices aim to be constant in terms of quality, that is, they aim to *“measure the extent to which the cost of an identical basket of goods and services changes over time, unaffected by changes in quality, quantity, or terms of sale”*<sup>7</sup>.
20. We agree with Network Strategies that forward-looking costs may be understated if technological developments over time are not taken into account in the long term price trend. This would occur when preferred/higher quality trenching techniques are adopted in the model in the future, but the trend in trenching costs is based on existing trenching techniques. Given that NZIER's PPI is very broad, it is unlikely to give significant weight to developments specific to trenching.
21. Generally, as Statistics New Zealand aim to keep the quality and quantity constant, new technologies that either improve quality or reduce the quantity required are not going to be directly reflected in their PPI series. This means that, to the extent that actual trenching costs might fall due to technological developments (meaning new trenching techniques are modelled), this may not be reflected in the long term price

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7 [http://www.stats.govt.nz/browse\\_for\\_stats/economic\\_indicators/prices\\_indexes/ppi-concepts-sources-methods-2015/methodology.aspx](http://www.stats.govt.nz/browse_for_stats/economic_indicators/prices_indexes/ppi-concepts-sources-methods-2015/methodology.aspx)

trends estimated by NZIER, meaning that the costs in the future would be overstated (and hence current costs would be understated).

## 2.2 Fibre cable price trend

22. Network Strategies suggest a price trend for fibre optic cable of -3.0%, based on US data for the period 2003 to 2014. This compares with NZIER's estimate of -1.3%.
23. Network Strategies agree with NZIER that data from the 1990s to the early 2000s reflects unsustainable trends which would not continue in the future, and that this period should be omitted. However, Network Strategies argue that NZIER has used only data from 2006 to 2014, rather than from 2003 to 2014, and that "*no reason was given for omitting the data from 2003 to 2005*"<sup>8</sup>.
24. NZIER has relied on the shorter of the two fibre optic cable series from the US Bureau of Labour Statistics (BLS) (based in December 2003)<sup>9</sup>, and estimated a price trend using quarterly data from Q2 2004 to Q1 2014. The first annual average percentage change observation is for Q1 2006, calculated as the average annual value from Q2 2005 to Q1 2006 divided by the average annual value from Q2 2004 to Q1 2005.
25. In contrast, Network Strategies has relied on the longer of the two fibre optic cable series from the US BLS (based in December 1988)<sup>10</sup> and presumably used data from 2002 (to determine the annual percentage change from 2002 to 2003) to 2014 to calculate a price trend of -3.0%.
26. In our view, the Commission has two reasonable options to balance the concerns of the various economists:
  - i. use the longer dated fibre optic cable series to estimate a long term price trend, and use data from at least the start of 2003. Using data from the start of 2003 is consistent with NZIER's own advice that "*data prior to 2003 is severely affected by the dot com bubble*" (emphasis added). We estimate a long term price trend for fibre optic cable based on data from the start of 2003 to the end of 2014 of -2.1%, based on the longer BLS PPI series; or
  - ii. rely on as long a history of fibre optic cable data as possible to estimate a long term price trend, and therefore use data from 1988 to 2014. We estimate a long term price trend for fibre optic cable based on data from 1988 to 2014 of -2.0%, based on the longer BLS PPI series.

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<sup>8</sup> Network Strategies, p. 66

<sup>9</sup> Series ID: PCU3359213359210

<sup>10</sup> Series ID: WPU10260333

27. The first option would adopt the more established (longer-term) fibre cable series published by the BLS that was identified by Network Strategies and use the data for the period both Network Strategies and NZIER agree is appropriate, i.e., post 2003. The second option would adopt the long-term fibre cable series identified by Network Strategies but over the full length of the series, as recommended by CEG. In our view, estimating the price trend over the full length of the series is most appropriate. This is for two reasons. First, taking an average over such a long series will at least capture one full economic cycle (including both economic upturns and downturns) which, as discussed in our earlier report, should be included in the price trend assumption of a tilted annuity. Second, it will avoid arbitrary decisions to exclude relevant periods and the potential for error in identifying the start and end of such periods (as reflected in Network Strategies and NZIER's choices regarding starting the series post the dot com bubble).

### 2.3 Implementation of price trends

28. Network Strategies note that TERA have not used the price trends developed by NZIER, and that “*no explanation has been provided by TERA as to why it chose to deviate from the Commission's decisions regarding price trends*”<sup>11</sup>.
29. The Commission explains in its further draft determination that the long term price trend for each asset category is based on a combination of the raw indices (i.e., the raw indices estimated by NZIER and the composition of that asset category). The Commission explains:<sup>12</sup>

*The long-term price trend is then determined for each asset category based on a combination of the raw indices and the composition of that asset category. For example, fibre optic cost consists of 70% of fibre cable cost and 30% labour costs. Given this, the price trend for fibre optic is equal to 30% multiplied by the trend for the labour cost index, plus 70% multiplied by the trend for the fibre optic cable index.*

30. This means that, for fibre optic cables, 70% weight is given to TERA's fibre optic cable estimate (-1.3%), and 30% weight is given to TERA's labour estimate (2%), resulting in an overall price trend for fibre optic cable of -0.3%.
31. With regard to NZIER's labour forecast, which plays a role in the overall fibre forecast, we note it is based on the projected trend for the consumer price index (CPI). NZIER predicts a trend growth of labour cost index (LCI) of 0.97 times growth in the CPI, but that:

<sup>11</sup> Network Strategies, p. 66

<sup>12</sup> Commerce Commission (2015), Further draft determination, para 379.2.2.

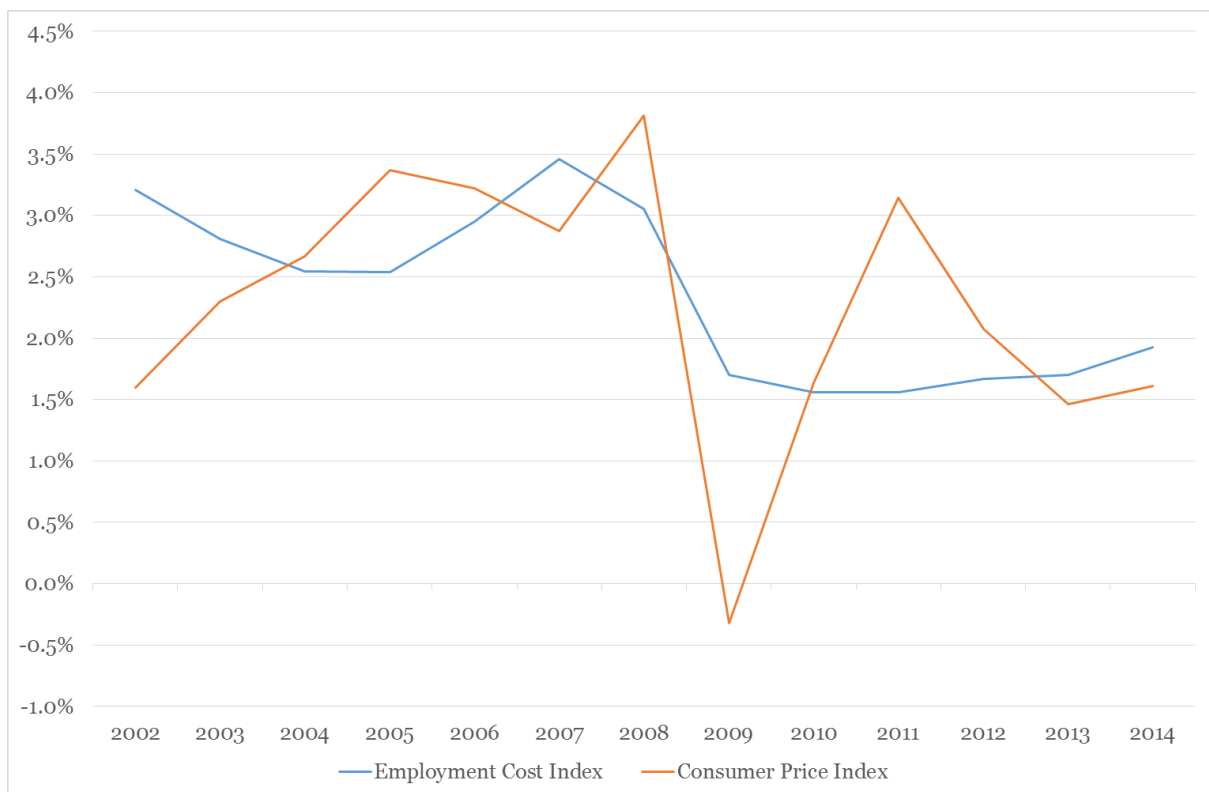
*This does not warrant a projected trend materially different from the CPI. That being so we prefer to err on the side of being conservative and recommend a trend growth rate equal to expected trend growth in CPI.*

32. The Commission explains:<sup>13</sup>

*We agree with NZIER to set the price trend at 2% because we would not expect that LCI grows more slowly than the CPI.*

33. In our view, LCI can reasonably grow more slowly than CPI. A comparison of LCI and CPI over time (based in December 1992) shows that this is in fact what has happened in history in New Zealand (as evidenced by NZIER’s analysis). This is also consistent with what has happened in other countries, such as the United States.

**Figure 2: US inflation and wages index**



34. For this reason, NZIER should use its own estimate for LCI of 1.9% in preference to an estimate based on the trend growth in CPI.

<sup>13</sup> Commerce Commission (2014), *Further draft determination UCLL*, p. 287 para 1498

## 3 Asset beta

35. The analysis in this section provides a response to submissions from Network Strategies on asset beta.<sup>14</sup>

### 3.1 The Commerce Commission decision

36. The Commerce Commission, in its further draft decision, increased its estimate of asset beta from 0.40 to 0.45. Its reasoning for doing so included the following passage:<sup>15</sup>

*There remain quite significant differences between the estimates for the five years to 2009 and the five years to 2015 (and the five years to 2014 reported in our previous draft decision). In particular, estimates drawn from the five years to 2015 are consistently lower than those in the preceding five-year period.<sup>86</sup> Given the absence of a simple explanation for these differences between adjacent time periods, if we were to simply adopt the most recent estimate, we might be using an asset beta that was too low.*

*Instead, we have also placed weight on estimates from the period to 2009 (in addition to those for the period to 2015). Doing so, we determined an asset beta of 0.45. This falls near the mid-point of the estimates reported in Table 3.*

<sup>86</sup> This is in contrast to the corresponding analysis for the beta of the electricity lines services during development of the IMs. In that context, of older time periods and higher frequency sampling (particularly weekly data) strongly supported the appropriateness of our initial estimate.

37. This reasoning was consistent with the reasoning we presented in our submission on the original draft decision<sup>16</sup> and cross submissions.<sup>17</sup> Specifically, we presented robust evidence that the global financial crisis and the subsequent European sovereign debt crisis were depressing measured asset betas for telecommunications companies over the period from mid-2008 to the end of 2012.

<sup>14</sup> Network Strategies, Report for Spark and Vodafone, Report Number 35013. 13 August 2015.

<sup>15</sup> Commerce Commission, Cost of capital for the UCLL and UBA pricing reviews, Further draft decision, 2 July 2015, p.40.

<sup>16</sup> CEG, WACC parameters in the UCLL and UBA draft decision, February 2015.

<sup>17</sup> CEG, Issues from submissions UCLL and UBA, March 2015. We note that while the Commission's reasoning for having regard to betas estimated using data largely prior to calendar year 2009 is consistent with our own, the Commission adopts a beta that is lower than the beta that we regard as the best estimate.

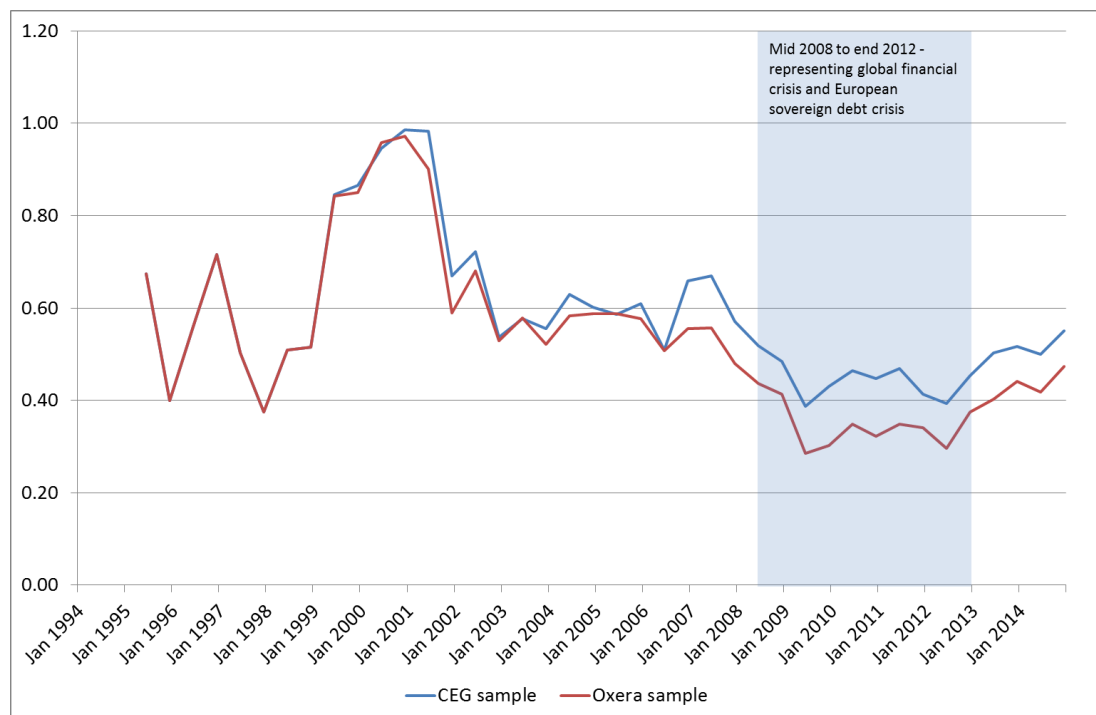
38. Network Strategies in its submission on the original draft decision argued that the Commission should focus on the most recent 5 year period because estimates of asset beta taken from the five year period ending April 2009:

*...are likely to have been distorted by the global financial crisis, and as such there is a case that this period should not be considered at all by the Commission.<sup>18</sup>*

39. We responded as follows in our March 2015 cross-submission:

*It is correct that the global financial crisis, and the subsequent European sovereign debt crisis, materially affected measured asset beta for fixed line telecommunication businesses (and other non-financial corporations). However, as made clear, in our February report, the effect was to depress betas. Moreover, the relevant time period was from mid-2008 onwards until late 2012. This was illustrated in Figure 1 of our February 2015 report which is reproduced below.*

**Figure 5\*: Time series of six month asset beta estimates**



Source: Bloomberg data, CEG analysis. \*Reproduced from CEG March cross submission.

*It is simply inconsistent with the facts for Network Strategies to argue that the asset betas measured to April 2009 were artificially raised by the global*

<sup>18</sup> Network Strategies, Report for Spark and Vodafone, Report Number 35013. 13 August 2015, p. 68.

*financial crisis. The evidence clearly illustrates that the onset of the global financial crisis was associated with an abrupt fall in asset betas which has been reversed in the most recent data.*

*Moreover, the theoretical channel through which this depression of asset betas operated is well understood. During the global financial crisis and the subsequent European sovereign debt crisis equity betas for firms operating in the financial sector were raised – as one would expect during financial crisis. The mathematical consequence of this is that equity betas for all other firms were depressed (noting that the average beta must be equal to 1.0 by definition). The inverse relationship between telecommunication and finance sector betas during this period was clearly illustrated in Figure 2 of our February 2015 report – also reproduced below.*

**Figure 7\*: European finance vs telecommunications betas**



Source: Bloomberg data, CEG analysis. \*Reproduced from CEG March cross submission

*Network Strategies assertion is not based on any factual analysis and is inconsistent with the facts as surveyed above and reported on in more detail in section 2.1 of our February 2015 report.*

40. The same sentiments were expressed in our February submission on the original draft decision.
41. Put very simply, our position was that there was not a sound basis to assume that the precipitous decline in telecommunications asset betas from mid-2008 to 2012 was

representative of forward looking asset betas. Indeed, there was good theoretical and empirical reasons for believing that this decline would be temporary. Such a belief was supported by the empirical observation of a steep rise in 6 month asset beta estimates post 2012. In this context, our advice to the Commerce Commission was to give weight to periods prior to the precipitous decline in telecommunications asset betas in mid-2008. We advised the Commission that, when this is done, an asset beta of 0.50 was appropriate.

42. The Commission has not agreed in full with our advice; had it done so it would have given more weight to historical average asset beta estimates than it has. However, the Commission's decision to give weight to both the 5 year asset beta ending 10 April 2009 and the 5 year asset beta ending 16 March 2015 is more consistent with our advice as is its reasoning for this decision. In particular, the focus on a 5 year asset beta estimated to 10 April 2009 is consistent with a desire to give weight to the period prior to the precipitous decline in short term (6 month) asset betas following the global financial crisis. Similarly, the Commission's decision to have regard to the trailing average of 5 year asset betas over the last 10 years is also consistent with avoiding giving undue weight to temporarily low measured asset betas post global financial crisis.

### 3.2 Network strategies submission

43. Network Strategies has criticised the fact that the Commission has described its comparison of the 2009 and the 2015 5 year asset beta estimates as 'adjacent time periods' and has argued that this is an error because the 2009 asset beta estimate is not strictly adjacent to the 2015 asset beta estimate. This is because the 2009 asset beta is estimated using 5 years of data ending 10 April 2009 while the 2015 asset beta is estimated using 5 years of data beginning on 17 March 2010. Thus, there is a gap of around 11 months between the end of one estimation period and the beginning of the next.
44. On this basis Network strategies argues that comparing the 'correct' adjacent time periods would involve a comparison of 5 year asset betas ending on 10 April 2010 and 16 March 2015. (Although even these are not strictly 'adjacent' in the sense that Network Strategies is interpreting the concept - with a gap of about 1 month between the end of one estimation period and the beginning of the next).
45. When this is done Network Strategies argues that the five year asset beta for the earlier period drops from 0.50 (the 2009 estimate) to 0.43 (the 2010 estimate).



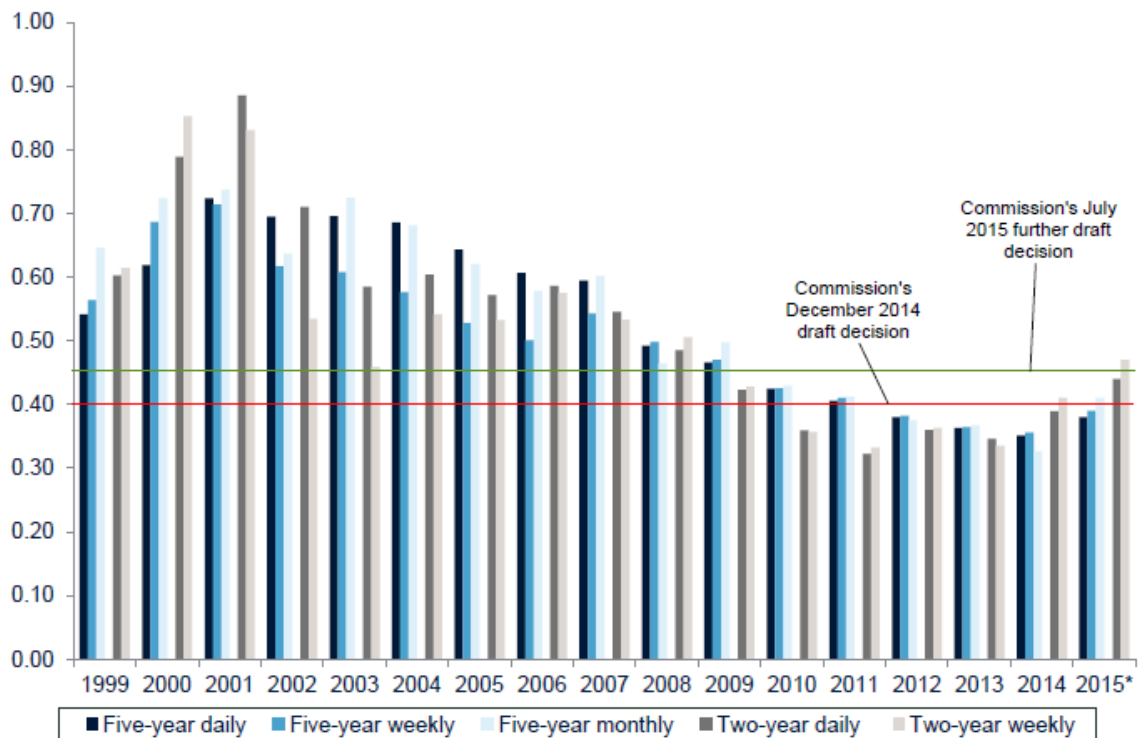
Network Strategies argues that, when this is averaged with a 0.40<sup>19</sup> asset beta for the five years to 2015, the ‘correct’ asset beta is 0.41.<sup>20</sup>

### 3.3 CEG response

46. In our view, Network Strategies’ position appears to rest on a semantic reading of the Commission’s decision; one that is inconsistent with the economic logic of the Commission’s decision. The Commission has, correctly in our view, expressed concern about the sudden drop in measured asset betas following the global financial crisis. It has noted that five year asset betas from after this period are depressed relative to asset betas measured from before that period and asset betas measured after that period (using only data after 2012). In particular, the Commission reproduces the following chart from Oxera’s report and states:<sup>21</sup>

*Figure 4, below, is reproduced from Oxera’s report and shows an increase in the average asset beta (in all frequencies) in the last year.*

**Figure 4: Average asset beta values for the refined comparator set (1999-2015)**



<sup>19</sup> The average of monthly (0.41) and weekly (0.39) asset betas.

<sup>20</sup> Network Strategies appears to average the two periods to arrive at a 0.415 beta and then round down. No reason is provided for rounding down rather than up.

<sup>21</sup> Commerce Commission, Further draft decision, pp. 41-42.

47. This figure shows the most recent 2 year daily/weekly asset betas being 0.44/0.47 (i.e., on average, above the Commission's revised asset beta of 0.45). It also shows that 5 year asset betas from 2009 (and earlier) were also above 0.45. The only asset beta estimates that are below 0.45 are those that include data from calendar years 2009 to 2012.<sup>22</sup> This is the period when 6 month asset betas were at their historical minimum – as demonstrated in Figure 5 from CEG's March cross submission (reproduced above).
48. If there is reason to doubt that the period from calendar years 2009 to 2012 is reflective of perceived market conditions going forward then the Commission has very good reason to focus on 5 year asset beta estimates from before this period (noting that the Oxera "2009" 5 year asset beta estimate only includes one quarter of data from 2009). There is, of course, reason for such doubt given that this period encompasses the worst of the period of the global financial crisis and the European sovereign debt crisis. Therefore, the Commission's regard to the 2009 5 year asset beta is appropriate.
49. By contrast, Network Strategies approach is devoid of any contextual economic analysis regarding the pattern of asset beta estimates over time and the potential causes of this pattern. Its position is based on semantic interpretation of 'adjacent' periods rather than grappling with the implications of the time series pattern for asset beta. Indeed, by arguing that the Commission should average across 2010 and 2015 5 year asset betas, Network Strategies is proposing to use two asset beta periods that are heavily affected by data from calendar years 2009 to 2012.
50. Doing so obscures the very significant differences between asset betas estimated using data predominantly pre 2009 and post 2012 – differences that the Commission was correctly concerned about and which it appropriately had regard to.
51. In this context, we note that the short term asset betas that we estimated previously have continued to rise over time – further strengthening the view that the period 2009 to 2012 gave rise to data that cannot reasonably be assumed to be reflective of perceived future market conditions.
52. Indeed, the most recent 2 year asset beta estimate for the Oxera sample is 0.45 and the most recent 6 month asset beta is 0.50 (both ending 31 July 2015). Network Strategies' submission on the revised draft decision expresses the view that the most appropriate asset beta is the most recent asset beta estimate.<sup>23</sup>

*In any event Network Strategies continues to believe that, given the dynamic nature of the telecommunications industry, the most recent time-*

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<sup>22</sup> Noting that, for example, the 2014 2 year betas are measured from April 2012 to April 2014.

<sup>23</sup> Network Strategies, Report for Spark and Vodafone, Report Number 35013. 13 August 2015, p. 80.

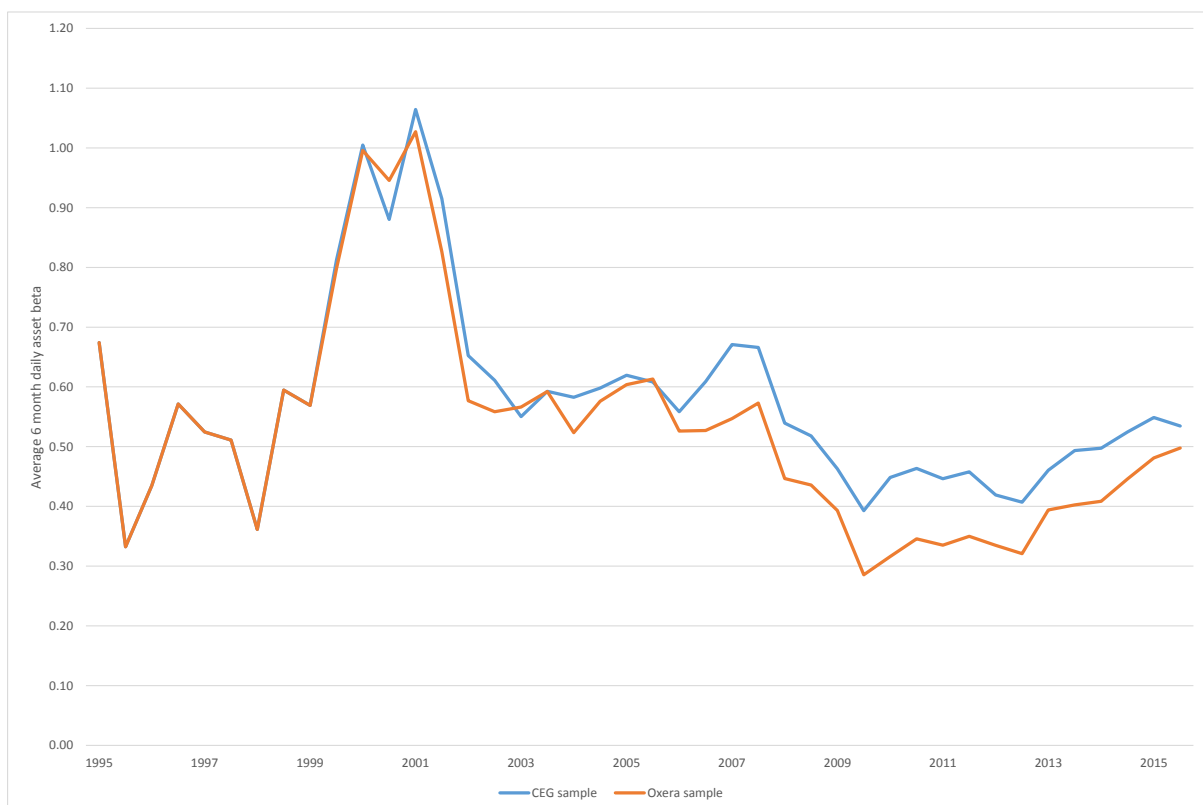
*period is more relevant as an indicator of the risks facing the business which we would expect to affect the asset beta of an operator*

53. If the most recent time period is to be preferred then it is unclear why the most recent 2 year asset beta is not to be preferred to the 5 year asset beta – noting that a 5 year asset beta is, on average, more than twice as “old” as a 2 year asset betas. Network Strategies has not recorded that 2 year asset betas are above 0.45 nor has it supplied a cogent argument for why a 5 year asset beta is superior to a 2 year asset beta (or indeed a 6 month asset beta for that matter).
54. However, there is a cogent argument for why a 5 year asset beta may be preferred to a shorter term asset beta and this is that asset beta measurement is ‘noisy’. However, this argument in favour of estimating asset beta over 5 years instead of two is the same argument for measuring asset beta over a longer period than 5 years – consistent with our advice in our earlier reports.
55. As explained in our February and March reports, and as exemplified by the CEG and Oxera charts reproduced above, asset beta estimates for an industry are noisy. Different types of shocks hit the economy (and stock market) in different periods. In some of those periods measured asset beta for an industry will be high and, in others, measured asset beta will be low. However, investors will not typically assume that the future shocks that hit the economy/stock market will be the same as the shocks that hit the economy/stock market in the recent past (be that the last 6 months or the last 5 years). Investors may quite reasonably assume that the future will be more like the long run average.
56. This is especially true when the recent past includes highly unusual shocks (such as the global financial crisis and the sovereign debt crisis). In this context, investors will rationally be reticent to base their forward-looking risk perceptions on asset betas measured over this short and unusual period. That is, a rational investor will not presume that just because telecommunications companies had low asset betas in that period they will have low asset betas in the future.
57. Such an assumption would be even more unsound in the current context where the pattern of asset betas is such that:
  - Asset betas measured before 2009-12 are above 0.45; and
  - Asset betas measured after 2009-12 are above 0.45.
58. This is precisely the pattern seen in the two figures presented above (one a CEG estimate of asset betas and one an Oxera estimate). It is an empirical fact, consistent with both the CEG and Oxera empirical estimates, that Network Strategies’ support for a 0.40 asset beta is not based on giving most weight to the most recent data. Rather, the 0.40 asset beta estimate is entirely based on including data from 2009 to 2012. Using data from before or after that period supports an asset beta of at least 0.45 (in our view the best estimate of 0.50 as explained in our previous submissions).

### 3.4 Updated asset beta estimates

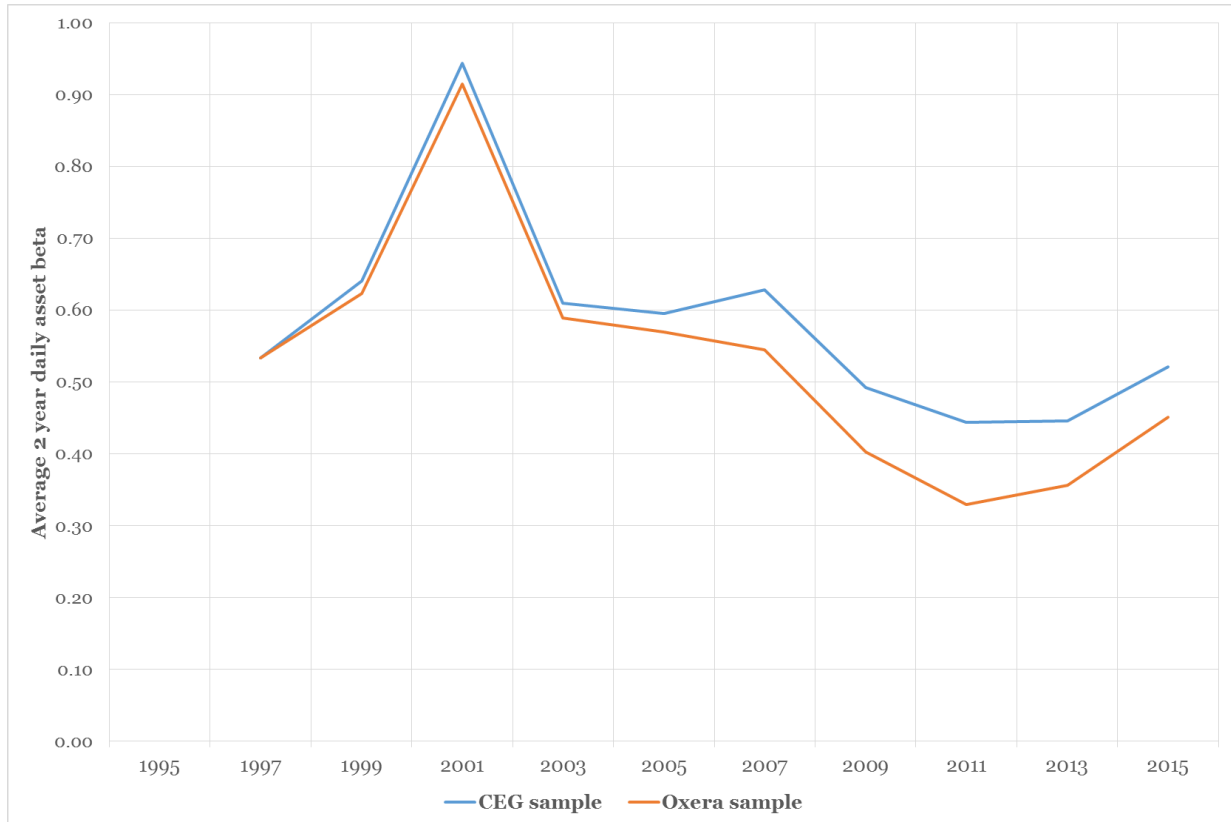
59. Oxera’s updated asset beta estimates only extend to 16 March 2015. We have updated these to 31 July 2015. We do this not because we believe that adding 3½ months of data should make a material difference to the asset beta adopted. However, updating the asset beta estimates does demonstrate that measured asset betas have continued to rise.
60. For the Oxera sample, 2 and 1 year daily asset betas are 0.45 or higher while 6 and 3 month asset betas are above 0.50 or higher. This further highlights the unusual nature of the low asset betas measured when incorporating data from 2009 to 2012.

**Figure 3: 6 month daily asset betas (ending 31 July and 31 January)**



Source: Bloomberg, CEG analysis

**Figure 4: 2 year daily asset betas (ending 31 July 2015 and every 2 years prior)**



Source: Bloomberg, CEG analysis

61. In our view, this serves to demonstrate the unreasonableness of Network Strategies' implicit position that the Commission should, in essence, adopt a asset beta estimate that is strongly influenced by the inclusion of this data. Similarly, it serves to support the reasonableness of the Commission comparing the asset betas associated with data from the 5 years to:
- March 2015 (which includes 3 quarters of 2010 and all of 2001 and 2012); with
  - April 2009 (which only includes one quarter of 2009).
62. The fact that, as noted by the Commission, these are so different (0.50 vs 0.40 on Oxera's estimates) does create a concern that the Commission is quite correct to give weight to. We consider that the Commission's approach still gives too much weight to the 2009 to 2013 period. For the reasons set out above, we consider that telecommunications asset betas estimated over this this period are not a reasonable representation of forward-looking investor perceptions of asset beta and the Commission, by giving 50% weight to the five years from March 2010, gives too much weight to this period. However, Network Strategies' submission that the Commission should give even more weight to this period is, in our view, unreasonable. Certainly, Network Strategies' position that the Commission made an error in having regard to

the five year asset beta ending in April 2009 is wrong. Network Strategies' approach, by obscuring the impact of the 2009 to 2012 period, would actually strengthen precisely the bias that is reduced by the Commission giving weight to the 5 year asset betas estimated to April 2009.

63. The most recent asset betas for each firm in the Oxera and CEG samples are reported in the table below. Note that Portugal Telecom is excluded from the estimates consistent with Oxera's view that the most recent asset beta estimates are anomalously high.<sup>24</sup> As already described, the most recent average asset betas are 0.45 or more.

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<sup>24</sup> However, we note that no scrutiny appears to have been undertaken of unusually low asset betas – such as those for Windstream and Telekom Austria which we estimate at 0.17 and 0.15 for the most recent 2 year assets betas. The selective examination and exclusion of high but low beta estimates raises the possibility of the remaining average being biased downwards. Nonetheless, we have followed Oxera's approach and excluded Telecom Portugal.

**Table 1: Daily asset betas measured to 31 July 2015**

Comparator	Sample (1=Oxera and CEG, 0=CEG only)	Two years	One year	Six months	Three months
CNU NZ Equity	1	0.31	0.42	0.49	0.60
TWTC US Equity	0	0.79	0.76		
CCOI US Equity	0	0.78	0.63	0.57	0.34
LMOS US Equity	0	0.53	0.43	0.33	0.14
ILD FP Equity	1	0.70	0.76	0.86	0.92
COLT LN Equity	0	0.71	0.69	0.58	0.63
TEL NZ Equity	0	1.17	1.42	1.48	0.97
TLS AU Equity	1	0.63	0.67	0.73	0.73
T US Equity	1	0.47	0.48	0.52	0.44
VZ US Equity	1	0.47	0.46	0.50	0.49
CTL US Equity	1	0.36	0.40	0.36	0.46
WIN US Equity	1	0.15	0.11	0.18	0.03
FTR US Equity	1	0.41	0.50	0.65	0.64
CBB US Equity	1	0.29	0.34	0.39	0.36
FRP US Equity	1	0.35	0.42	0.39	0.38
HCOM US Equity	1	0.40	0.29	0.31	0.37
BCE CN Equity	0	0.37	0.36	0.64	0.67
T CN Equity	0	0.44	0.40	0.48	0.51
BA CN Equity	0	0.39	0.23	0.72	0.72
DTE GR Equity	1	0.53	0.57	0.34	0.37
TEF SM Equity	0	0.48	0.49	0.75	0.77
ORA FP Equity	1	0.60	0.68	0.65	0.72
TIT IM Equity	1	0.31	0.30	0.44	0.52
BT/A LN Equity	1	0.69	0.70	0.38	0.50
TEL NO Equity	0	0.72	0.66	0.64	0.65
TLSN SS Equity	0	0.58	0.57		
SCMN VX Equity	1	0.34	0.31	0.18	0.18
KPN NA Equity	1	0.52	0.57	0.70	0.73
BELG BB Equity	1	0.55	0.63	0.24	0.41
TKA AV Equity	1	0.17	0.13		
HTO GA Equity	1	0.74	0.68	0.48	0.54
TDC DC Equity	1	0.27	0.28	0.49	0.60
PTC PL Equity	0				
ELI1V FH Equity	1	0.55	0.63	0.57	0.34
<b>CEG sample</b>		0.52	0.56	0.53	0.53
<b>Oxera sample</b>		0.45	0.47	0.50	0.52

Source: Bloomberg data, CEG analysis