



Competition in the New Zealand Mobile Market

Spark New Zealand

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1. Introduction and Summary

1. As input into the Commerce Commission's 2018 study of mobile telecommunications markets in New Zealand, we have been asked by Spark to assess the current state of competition in the New Zealand mobile market.
2. At paragraph 5 of its issues paper, the Commission states that:¹

This study will help us build an evidence base so that we can track relevant trends and identify whether there are any current or potential barriers to competition delivering benefits for consumers of mobile services in New Zealand.
3. When analysing competition in mobile markets, it is important to recognise the following features:
 - a) Economies of scale and high sunk costs;²
 - b) Economies of density;³
 - c) A lumpy investment cycle due to rapid technological innovation (e.g., 3G, 4G and 5G); and
 - d) The increasing modularity of communications.⁴
4. The frequent cyclical (or repeated) nature of innovation/investment is a particular feature that distinguishes mobile markets from many other markets - in particular, new generations of technology displace the old generation and effectively require an overbuild of the entire network.⁵ In other words, competing in mobile markets requires repeated sunk investments, where the new investment may reduce the value of previous investments.⁶
5. Therefore, competition must be looked at in a dynamic sense. What we are ultimately interested in is whether a market is providing *outcomes* for consumers that are improving over time,

¹ New Zealand Commerce Commission, *Study of mobile telecommunications markets in New Zealand: Issues Paper*, August 2018, par.5

² See, for example, Haucap (2003), who states: “For mobile telephone networks it is characteristic that the cost structure has high fixed and common costs and relatively low variable or incremental/marginal costs. The main part of a mobile telephone operator's costs therefore does not vary with the number of participants, calls or connection minutes, but it is fixed and, furthermore, to a large extent also sunk.”

Justus Haucap (2003) “The Economics of Mobile Telephone Regulation”, University of the Federal Armed Forces Hamburg, Department of Economics Discussion Paper No. 4.

³ E.g. as Oughton and Frias (2018) note:

“Network infrastructure has very high fixed costs of delivery, therefore is greatly affected by scale economies and population density”

Edward J. Oughton and Freias, Zoraida (2018), “The cost, coverage and rollout implications of 5G infrastructure in Britain”, *Telecommunications Policy*, 42, 636-652.

⁴ Specifically, the fact that a communications platform is made up of 4 key complementary services (applications, content, communications and devices), which can increasingly be provided in a disintegrated (i.e. modular) way, Jeff and Bruno Soria (2016), *A new regulatory framework for the digital ecosystem*. Available at: https://www.gsma.com/publicpolicy/wp-content/uploads/2016/09/GSMA2016_Report_NewRegulatoryFrameworkForTheDigitalEcosystem_English.pdf

⁵ Note that we are referring to the radio equipment, as opposed to towers and backhaul.

⁶ For example, 2degrees is currently considering shutting down its 2G network (<https://www.stuff.co.nz/business/96885579>) and Spark built a brand new 3G UMTS/WCDMA network (branded XT) on the basis that its then existing CDMA 3G network was not competitive. The CDMA network was shut down 3 years after the new UMTS/WCDMA network was built (http://www.nzherald.co.nz/business/news/article.cfm?c_id=3&objectid=10823637).

particularly if those outcomes are at least as good as those in comparable (e.g., overseas) markets (keeping in mind the difficulties of cross-market comparisons).

6. The impending transition to 5G illustrates the point that competition must be assessed in a dynamic sense. It is not yet clear what the full business case for 5G will be.⁷ As the GSMA notes:⁸

Over the past 30 years, the mobile industry has demonstrated its ability to transform society through 2G, 3G and 4G. 5G will build on these successes to deliver the networks and platforms to support existing and new services, with new business models and use cases that are unknown today.

7. In a similar vein, eSim technology⁹ may change the way consumers interact with mobile networks. For example, Google's Project Fi is an MVNO that uses eSim enabled phones¹⁰ to intelligently switch between wi-fi and three different 4G networks, depending on which gives the best performance at a point in time.¹¹
8. In other words, competition tomorrow could look quite different from competition today. Indeed, as we explore in this report, competition five years ago looked quite different than it does today.
9. In this context, the purpose of this report is to examine the recent evolution of competition in the mobile market and what it looks like today, rather than speculate about what it might look like tomorrow.
10. The analysis contained in this report shows that:
- a) New Zealand mobile prices are generally lower than the OECD average, and prices are declining in both nominal and real terms;
 - b) Despite claims to the contrary, mobile ARPU does not appear to have been rising in New Zealand;
 - c) New Zealand mobile subscriptions, call minutes and particularly data traffic have increased over time faster than population and GDP growth;
 - d) New Zealand mobile churn rates are high compared to the average of other developed countries;
 - e) New Zealand MNO profitability (as measured by EBITDA) is lower than the average of other developed countries;
 - f) The coverage and quality of New Zealand's mobile networks compares favourably to other countries; and
 - g) Spark has improved mobile service quality despite dramatic increases in traffic over its network.¹² Mobile download and upload speeds in New Zealand are close to the highest in the OECD.

⁷ Though we note that Spark has plans to use 5G for fixed wireless services. See Spark, 5G. *The evolution towards a revolution – briefing paper*, August 2018.

⁸ Page 5 of <https://www.gsmaintelligence.com/research/?file=0efdd9e7b6eb1c4ad9aa5d4c0c971e62&download>

⁹ I.e. phones that have an embedded sim card rather than an external sim card that is inserted.

¹⁰ And certain specific Android phones that are compatible with a special physical sim card.

¹¹ See <https://fi.google.com/about/>.

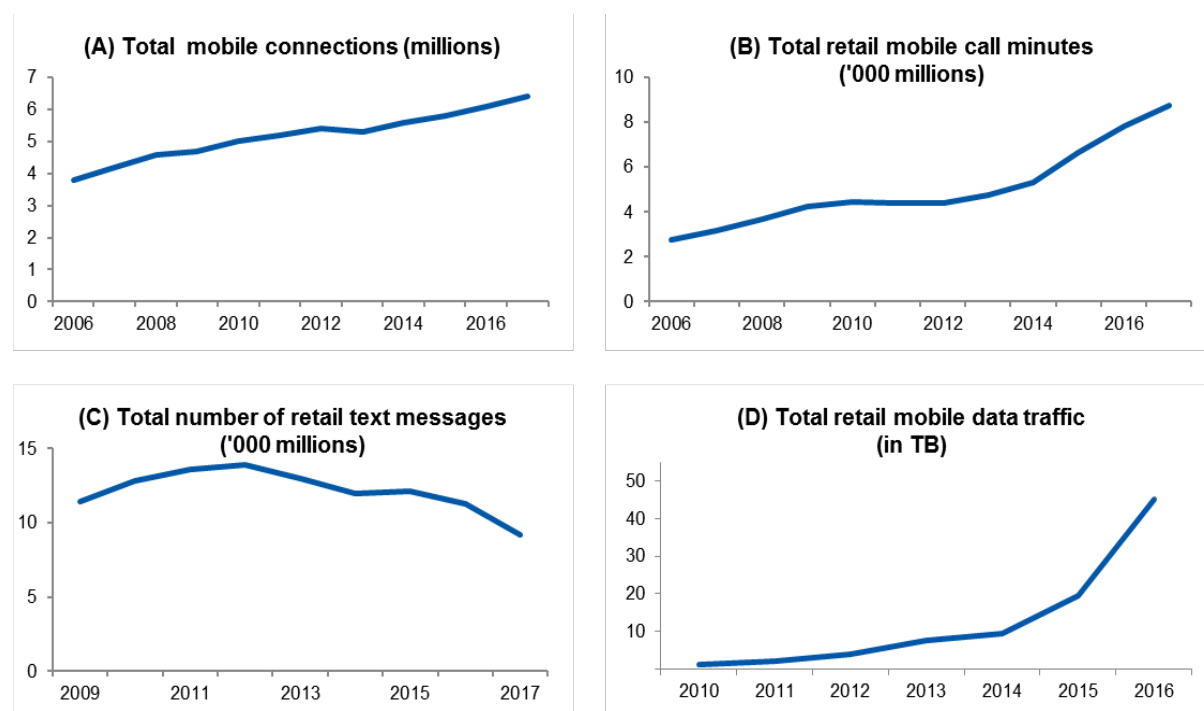
¹² We do not have specific quality data for Vodafone or 2degrees.

11. Accordingly, we think it is appropriate to conclude that the New Zealand mobile market is currently performing well, suggesting that there are no *current* barriers to competition delivering benefits to consumers. Regarding *potential* barriers to competition in the future, as already mentioned, it is not clear what competition will look like in the future. The impending arrival of 5G, e-SIMs, network slicing and the increasing modularity of communication services could drastically change the role of the current MNOs, or it might not.
12. Regardless, given the current health of the market, the Commission should exercise caution and not pre-emptively intervene on the basis of speculation about a certain future market structure. The risk being that regulation, rather than market forces, ends up determining the shape of competition in the future.
13. Furthermore, in a dynamic market it is particularly important to examine a broad range of indicators of market health and to examine these indicators over time. As the focal point of competition can change over time, snapshots of prices or other metrics in a single year can paint a misleading picture of the competitive dynamics. This is particularly important when making international comparisons, as different markets may evolve at different rates and in different ways, depending on the preferences of local consumers.
14. The remainder of this report is structured as follows:
 - a) Section 2 examines how consumers have been using and purchasing mobile services over time;
 - b) Section 3 examines the evolving market structure in New Zealand;
 - c) Section 4 examines price outcomes; and
 - d) Section 5 examines non-price competition and bundling.

2. Usage trends

15. Figure 1 graphs mobile connections, call minutes, text messages and data traffic over the period 2006 to 2017. This demonstrates that total connections, call minutes and data traffic have been growing over time (faster than population growth and GDP growth),¹³ while the total number of text messages peaked in 2012 and has been on a steady decline since.

Figure 1
Total NZ mobile volumes (2006 – 2017)



Source: NZ Commerce Commission, Annual NZ Telecommunications Industry Questionnaire

16. Increasing volumes is consistent with relative prices decreasing, which is a sign of competition. Increasing volumes could also be due to an external shock to preferences, or a combination of the two.
17. The reduction in texts likely reflects a combination of technological substitutes (IP based instant messaging services such as Facebook Messenger, What's App and Snapchat)¹⁴ and the falling cost of the data required to communicate in this way (see section 4 below).
18. The growth in data volumes has been particularly explosive, and far exceeds that explained by subscriber growth alone. According to the Commission's data, between 2010 and 2017:
- Data volumes have increased by over 4000% (to 2016);

¹³ New Zealand population growth was 15% from 2006 to 2017 From: www.stats.govt.nz/topics/population

New Zealand GDP growth was 27% from Q2 2006 to Q2 2017. From:

http://archive.stats.govt.nz/datavisualisation/gdp.html?_ga=2.107990466.1382136458.1538366787-55673975.1536874044

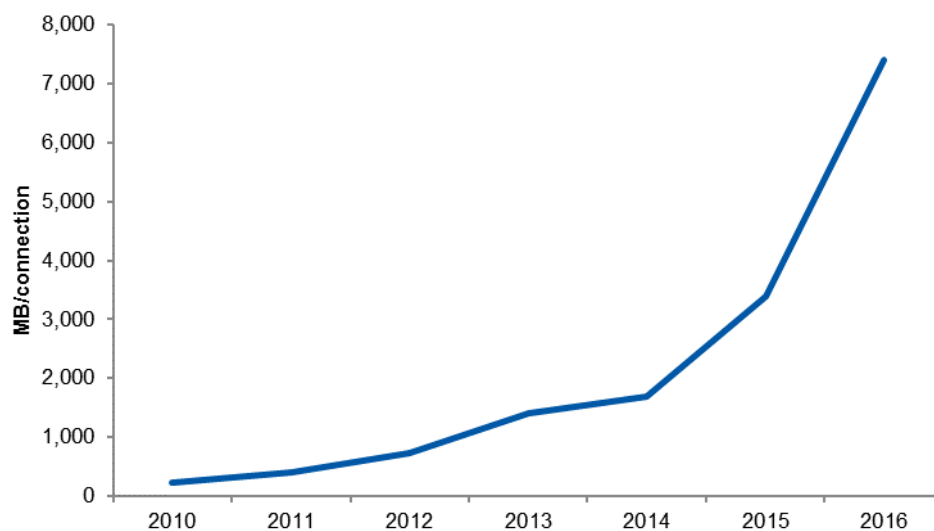
¹⁴ See: Dewar, Calum and Giles, Mark, *Rebalancing the Value from Voice and SMS to Data*, GSMA Intelligence, August 2014.

From: www.gsmainelligence.com/research/?file=2014-08-29-rebalancing-the-value-from-voice-and-sms-to-data.pdf&download

- b) Call volumes have increased 100%;
- c) Connections have increased 30%; and
- d) SMS volumes have fallen -28%.

19. As is clear from these numbers, the growth in data usage is largely driven by individual consumers using more data, rather than simply a growth in subscribers. This is confirmed by Figure 2 below, which shows data usage per connection over time. This demonstrates that there was an exponential increase in data per connection between 2014 and 2016.

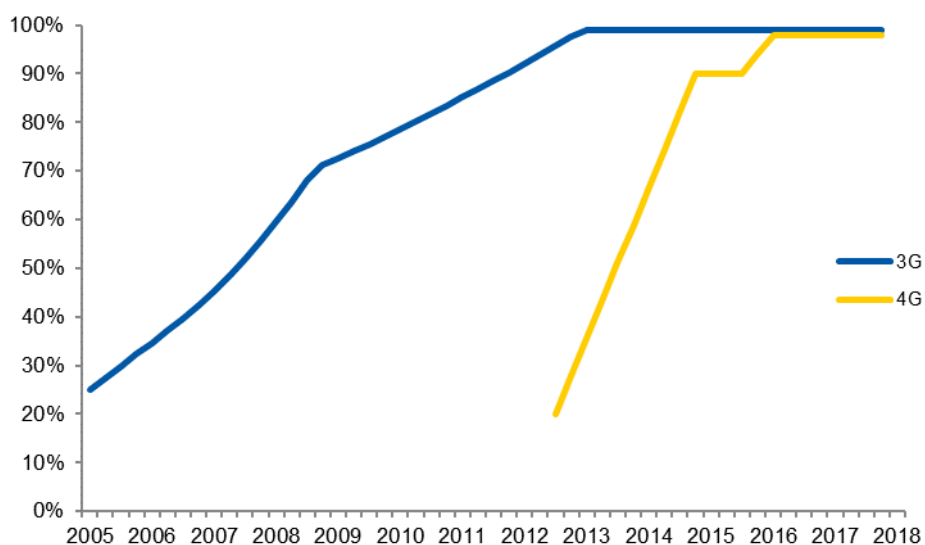
Figure 2
NZ data usage per connection (MB) per year



Source: NZ Commerce Commission, Annual NZ Telecommunications Industry Questionnaire

20. This period of growth roughly coincides with the roll out of 4G technology in New Zealand. Figure 3 below shows 3G and 4G coverage in New Zealand between 2005 and 2018.

Figure 3
NZ 3G and 4G population coverage (2005 - 2018)



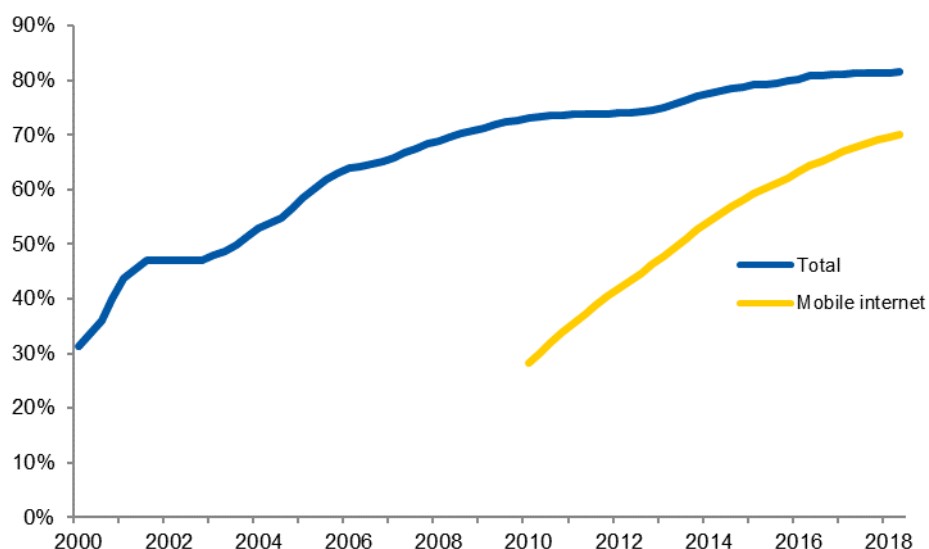
Source: GSMA Intelligence

21. We discuss in more detail in Sections 4 and 5 the offers by MNOs that may have contributed to this surge (in particular, lower data prices and zero rating/free data bundles for social media websites/apps).
22. More generally, mobile computing and increased use of social media and video streaming are likely to be large drivers behind this trend.¹⁵
23. Penetration data also suggests that there is room for more data growth, as shown by Figure 4 below. While total mobile penetration has flat-lined at around 80% since the beginning of 2015, mobile internet penetration (i.e., the proportion of the population who use mobile internet) has continued to grow and currently sits at approximately 71%.

¹⁵ Ericsson, *Ericsson mobility report*, June 2018

From: www.ericsson.com/assets/local/mobility-report/documents/2018/ericsson-mobility-report-june-2018.pdf

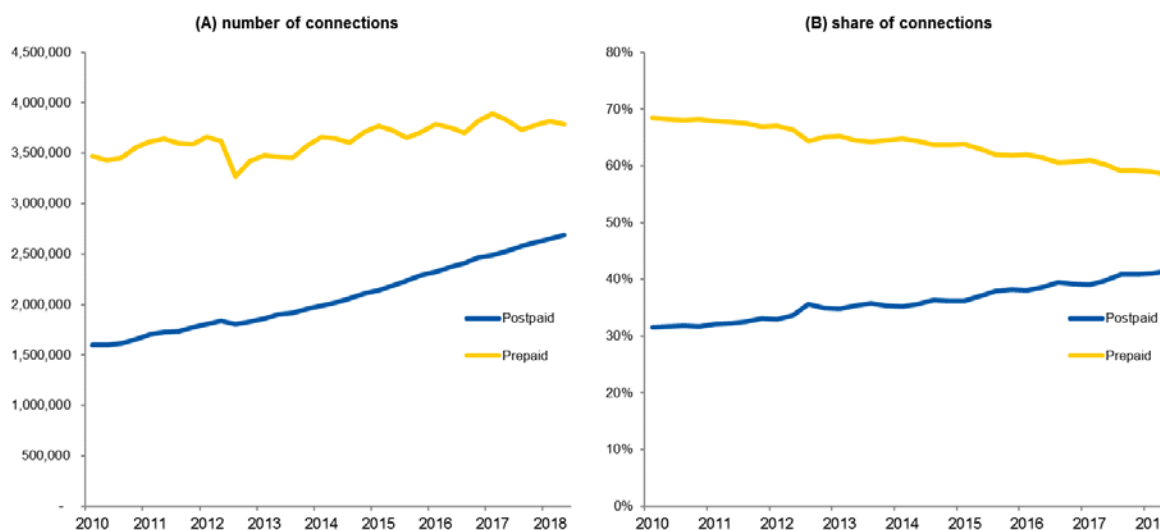
Figure 4
NZ Mobile penetration (unique subscribers): 2000 - 2018



Source: GSMA intelligence

24. There has also been a compositional shift in the way consumers purchase mobile plans, with the share of subscribers purchasing post-paid plans steadily increasing over time, from 32% in Q1 2010 to 41% in Q2 2018.

Figure 5
NZ Prepaid vs Postpaid share of connections



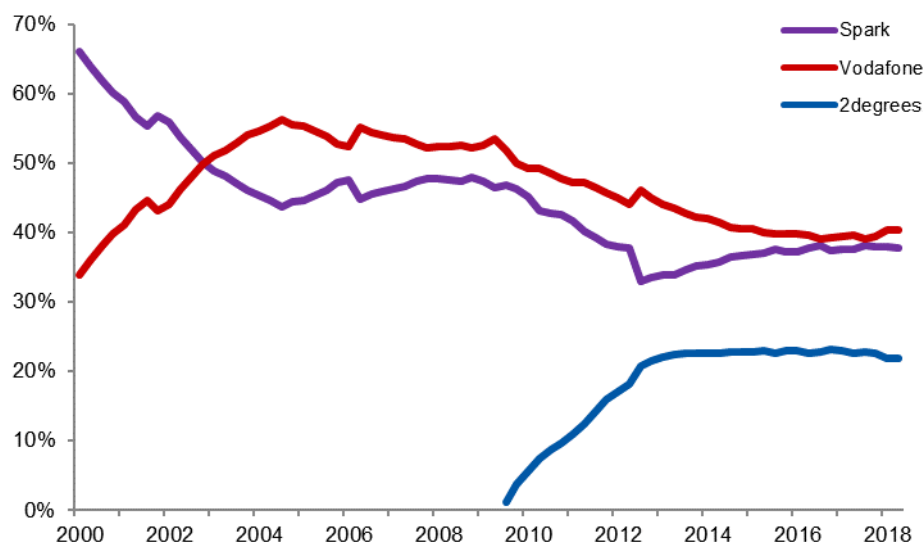
Source: NERA analysis of IDC data

25. While both prepaid and postpaid connections appear to be growing, the number of postpaid connections has been growing faster. This has also coincided with prepaid offerings becoming more “plan like”. For example, more than [%] **SPKCI** of Spark’s pre-paid customers now purchase a “value pack”, which is a bundle of data, texts and voice minutes and bares a close resemblance to Spark’s post-paid plans. See Appendix A for examples of Spark’s pre and post-paid plans.

3. Market structure

26. Prior to 2009, the New Zealand mobile market consisted of two MNOs: Telecom (now Spark) and Vodafone. 2degrees entered in 2009. Figure 6 plots the (MNO) market share measured by subscribers over time.

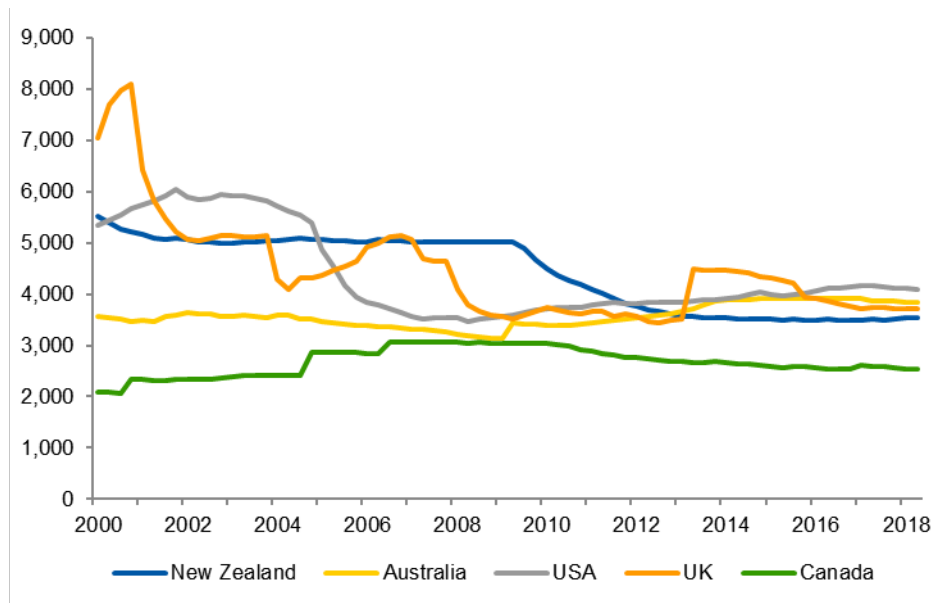
Figure 6: NZ Mobile market share (connections)



Source: GSMA intelligence

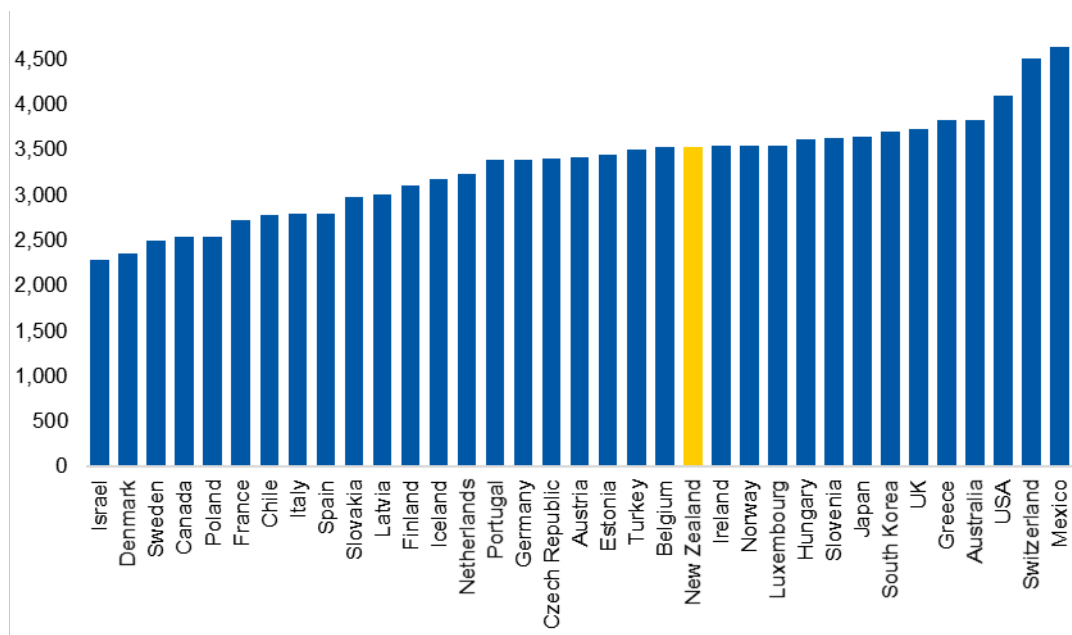
27. These figures demonstrate two broad step changes in the aggregate structure of the New Zealand mobile market:
- The expansion by Vodafone in the early 2000s such that it overtook (by connections) Spark in late 2002; and
 - The aggressive entry of 2degrees in 2009, going from 0% to ~20% market share in under 4 years.
28. Figure 7 shows a times series of the (MNO) Herfindahl-Hirschman Index (HHI), which is a measure of market concentration, against the USA, UK, Canada and Australia, and Figure 8 compares New Zealand HHI to other OECD countries in the most recent quarter.

Figure 7: NZ Mobile market Herfindahl-Hirschman Index time series– HHI (connections)



Source: GSMA Intelligence

**Figure 8
Herfindahl-Hirschman Index OECD country comparison – Q2 2018**



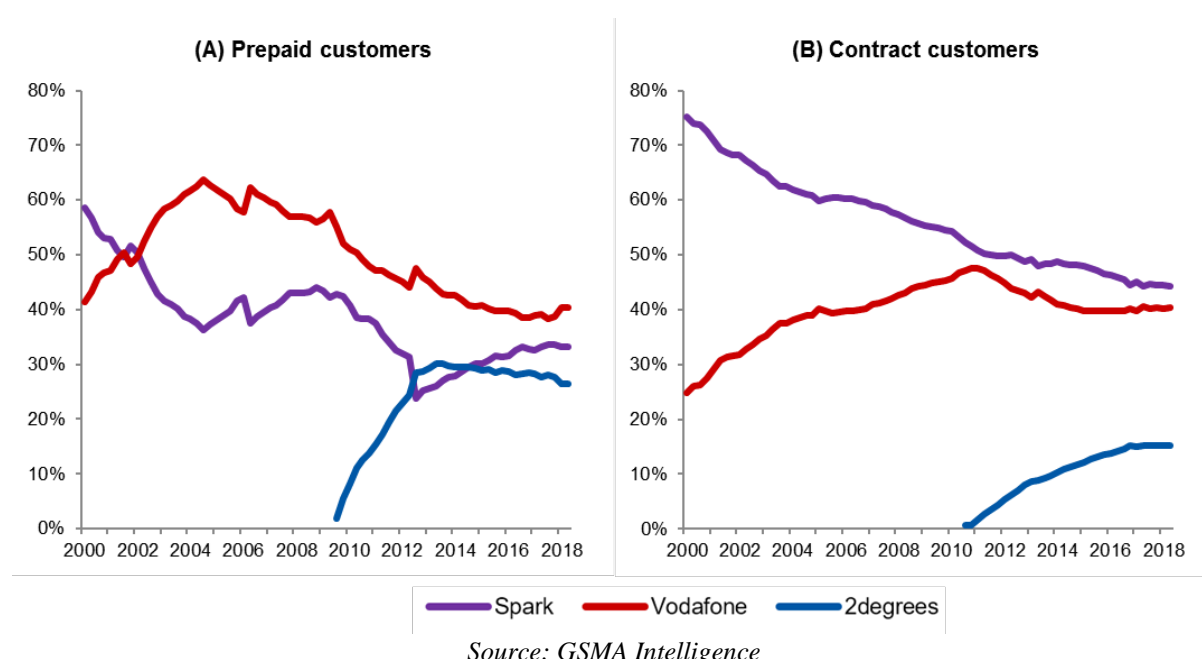
Source: GSMA Intelligence

29. Interestingly, the New Zealand mobile market was previously more concentrated than the Australian and American markets, but the entry of 2degrees and an increase in concentration in Australia and the United States has reversed that pattern.
30. New Zealand has just above the median HHI for other OECD countries. The figures for HHI calculated by revenue presented by Analysys Mason paint a slightly different picture, with New Zealand being the most concentrated market in their benchmark sample. As we discuss later in

the context of Analysys Mason's ARPU trends analysis (see Figure 14 below), the underlying revenue data for Vodafone may contain some anomalies. That is not to say New Zealand is not more concentrated when measured by revenue terms. Rather, the upward trend in HHI Analysys Mason observes may simply reflect a data anomaly. It is also inconsistent with 2degrees expanding their share of the post-paid, as we now demonstrate.

31. The step changes in competition described in paragraph 27 above also had differential impacts on the prepaid and postpaid segments of the market. Figure 9 below shows market shares for prepaid and postpaid customers over time.

Figure 9: NZ Prepaid and Postpaid customer market shares over time (connections)



32. Figure 9 shows that in the prepaid segment:

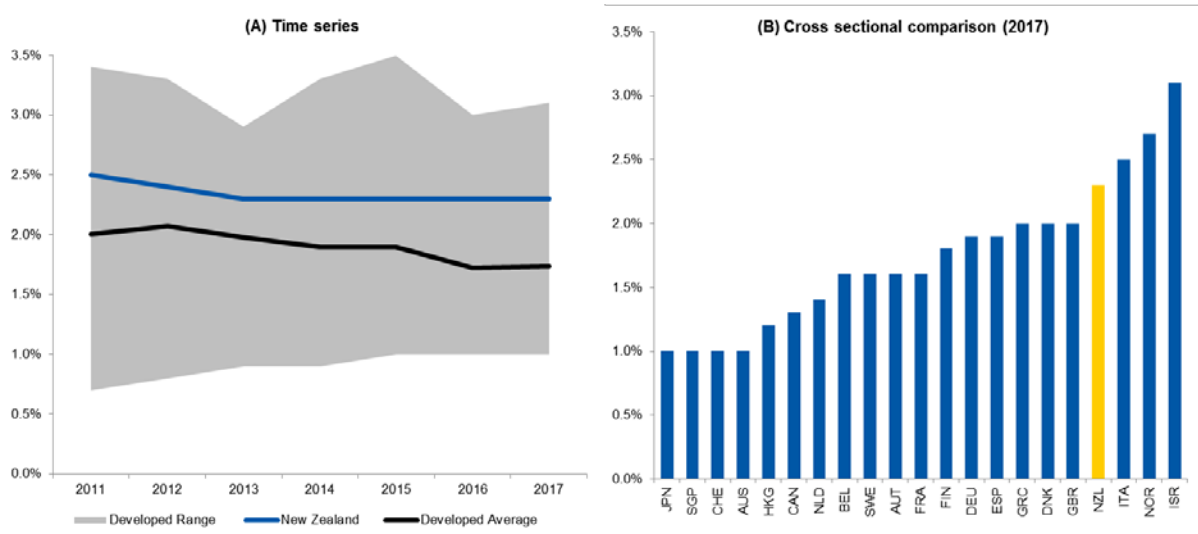
- Vodafone overtook Spark to become the main prepaid player in 2002 and from around 2004 each firm's market share was relatively stable until 2degrees entered; and
- When 2degrees entered it appeared to be taking market share equally from both Spark and Vodafone, other than in late 2012 when Spark suffered a material drop. Since this point in time Spark has slowly been recovering market share while Vodafone has continued a slow decline and 2degrees has remained relatively stable/slightly decreasing.

33. In contrast, in the postpaid segment:

- Spark still has the largest market share, although it has been steadily declining since 2000;
- Vodafone was steadily gaining market share from a lower base until 2degrees entered, after which point Vodafone has been losing share at a similar rate to Spark; and
- 2degrees has been consistently gaining share from both Spark and Vodafone. This has occurred more slowly than its rapid growth in prepay, although the same plateau has not occurred.

34. Churn rates in New Zealand as measured by the Merrill Lynch Global Wireless Matrix are higher than the average of developed countries in the dataset, as shown in Figure 10 below.

Figure 10
NZ churn rates vs developed countries in Merrill Lynch Global Wireless Matrix



Source: NERA analysis of Merrill Lynch Global Wireless Matrix 2018.

Note: Does not include 2degrees data as it did not disclose sufficient information to Merrill Lynch.

The developed categorisation is determined by Merrill Lynch.

35. This suggests that relative to other developed countries, switching costs in New Zealand are low.

4. Prices and profits

36. While we have not seen any MNO entry since 2degrees, the figures above show the market structure has been quite dynamic, suggesting vigorous competition. Having considered structural indicators in section 3, we now look at outcomes.
37. One aspect of outcomes is prices, which we consider in this section. The other is quality, which we consider in Section 5. A metric closely related to both is profitability – providing higher quality generally results in more costs being occurred. It is important the Commission considers a range of indicators of competitive outcomes, as focusing on one outcome (e.g. price) at the expense of another (e.g.) quality could mask whether competition is truly delivering benefits for consumers.
38. Benchmarking by Teligen, as contained in the Commission’s monitoring reports, demonstrates that prices in New Zealand for the monitored baskets are generally materially lower than the OECD average. The Commission notes that prices for higher volume baskets are relatively expensive, particularly when compared to Australia. Table 1 below recreates Table 5 from the issues paper using the more recent (August 2018) Teligen data and including higher usage OECD baskets that are omitted from the Commission’s table. We also include the non-OECD unlimited data basket, given unlimited plans are now being introduced into the New Zealand market.

Table 1: NZ prices are generally materially below OECD averages

Mobile phone services basket	NZ rank in OECD	August 2018 price (NZD PPP)			NZ % var from	
		NZ	Aust	OECD average	Aust	OECD average
30 calls + 100MB GST included	11/36	15.47	22.39	22.93	-31%	-33%
100 calls + 500MB GST included	7/36	17.92	22.39	33.29	-20%	-46%
100 calls + 2GB GST included	16/36	27.70	22.45	40.86	23%	-32%
300 calls + 1GB GST included	17/36	35.00	22.45	42.23	56%	-17%
900 calls + 2GB GST included	16/36	35.00	22.45	51.22	56%	-32%
300 calls + 5GB GST included	16/36	45.00	33.59	56.7	34%	-21%
Unlimited calls + 5GB	12/31	45.00	33.59	64.03	34%	-30%
900 calls + 10GB GST included	16/36	49.83	43.29	81.37	15%	-39%
unlimited calls + 20GB	10/31	49.83	52.91	109.00	-6%	-54%
unlimited voice, SMS, data*	5/11	79.00	205.11	100.97	-61%	-22%

Source: NERA analysis, Teligen Q3 2018 benchmarking data.

* Note that this is not an official basket tracked by the OECD, but we have included it given unlimited plans are beginning to be introduced into the market.

39. Two things are apparent from this table:
- New Zealand is cheaper than the OECD average for every usage basket; and
 - For the highest and the lowest usage baskets, New Zealand is cheaper than Australia.
40. Therefore, the Commission’s statement that “retail prices for mobile bundles with higher calling and data allowances appear to be relatively high in New Zealand” is actually a statement about relativity with Australia, despite being phrased generically. A more accurate statement would be that New Zealand’s prices are relatively low compared to the OECD for all usage patterns, and for data inclusions of between 1 and 10 GB, Australia is even lower.

41. Furthermore, as the Commission notes,¹⁶ prices have been falling faster in New Zealand than in Australia and the OECD average. The (relatively) most expensive bundles have had the largest relative price decrease.¹⁷
42. Given the continued downward trend, it would appear to be pre-emptive to conclude there is a competition problem based on the current cross-sectional comparison showing NZ is cheaper on average than the OECD but more expensive than Australia for certain segments of the market. As we return to later, price is also only one aspect of outcomes.
43. Furthermore, there are a number of caveats that must be borne in mind when conducting benchmarking:
 - a) Consumers may purchase baskets that may exceed their actual consumption (e.g., a consumer that consumes 2GB of data may have a 3GB plan);
 - b) Plans may have certain sites zero rated or provided as a “free” add-on pack. For example, Sparks’ free “Socialiser” bonus provides 1 GB of free data per month for Spotify and social media applications, which is not picked up by Teligen’s benchmarking (i.e. a “2GB” data allowance is in practice a 3GB data allowance). Similarly, Vodafone currently has a “free social data for 1 year” offer;¹⁸
 - c) Certain benchmarked usage patterns may not actually match with the demand of New Zealand consumers.
44. One way of dealing with this is to look at what consumers are paying for what they actually use. While it is difficult to ‘unpick the bundle’ of data, minutes and texts that consumers purchase, the explosion in data use suggests that the data aspect is a large driver of consumer decisions, as does the fact that most post-paid plans now include unlimited minutes and texts.¹⁹
45. Therefore, as a simple proxy for the “price” consumers are paying for data, we can calculate \$ per GB consumed (i.e., revenue divided by total data usage). This suggests that the price of data is dropping markedly over time.

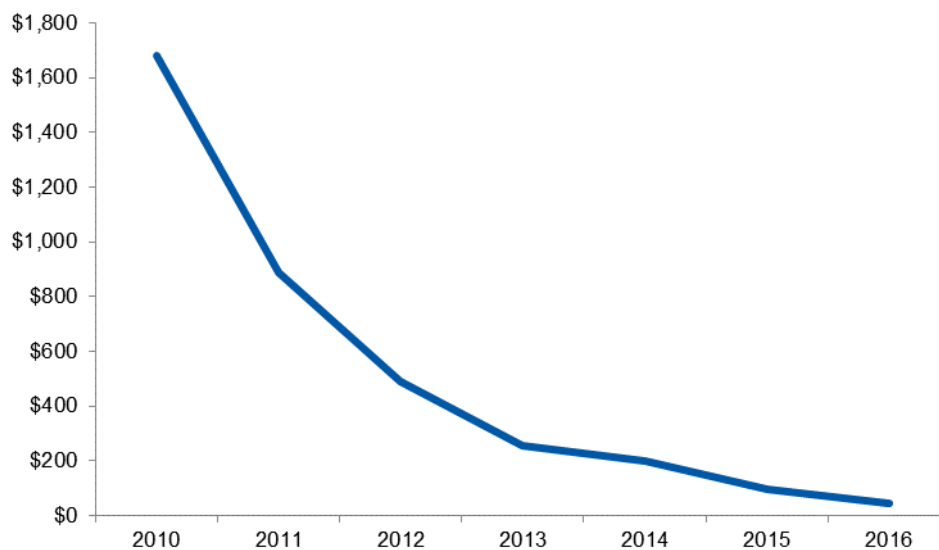
¹⁶ New Zealand Commerce Commission, *Study of mobile telecommunications markets in New Zealand: Issues Paper*, August 2018, par.97

¹⁷ See, e.g. Figure 8 of New Zealand Commerce Commission, *Study of mobile telecommunications markets in New Zealand: Issues Paper*, August 2018

¹⁸ <https://www.vodafone.co.nz/pay-monthly/>, accessed 15/10/2018.

¹⁹ For example, out of Spark’s seven postpaid mobile plans, only the cheapest open term plan includes capped minutes. The 300 included minutes also roll-over if they are not used. Similarly, of Vodafone’s postpaid plans, only the cheapest plan includes capped minutes. See <https://www.vodafone.co.nz/pay-monthly/> and <https://www.spark.co.nz/shop/mobile-plans/paymonthly.html> (accessed 05/10/18).

Figure 11
Revenue per GB consumed (\$ per GB)



Source: NERA analysis of IDC data and NZ Commerce Commission 2017 Annual Telecommunications Monitoring Report data

46. It is also worth considering the Commission’s concern about high usage plans against the backdrop of actual usage. As the Commission demonstrates in Figure 11 of the issues paper, average data usage per connection in 2017 was ~1.2Gb per month,²⁰ far below the highest usage plans tracked by Teligen.
47. It might be argued that this usage profile reflects relatively high prices for high data plans. However, there are several pieces of evidence that suggest the relatively high prices for high data plans actually reflect a lack of demand for high (mobile) data and a lack of focus (until recently) on high data by MNOs, and that both of these features are changing:
- Data usage has been growing exponentially;
 - Prices for the high usage plans have been falling; and
 - Pricing plans for very high usage have only recently been introduced.
48. Regarding the first point, average monthly data use per user has been increasingly exponentially - between 2013 and 2017 it increased by over 600%, suggesting that demand is increasing.²¹
49. On the second point, we have already discussed the evidence the Commission has presented showing that prices are falling and they have fallen relatively faster for high usage plans.
50. On the third point, Figure 12 and Figure 13 show IDC data on retail price plans offered in the New Zealand market since 2015. This presents the retail price point for different standardised data allowances. It therefore differs from the Teligen benchmarking, which calculates the cost to “fill a basket”.
51. Figure 12 shows prices for low and medium usage plans (500mb, 1GB, 2.5GB and 5GB) have decreased significantly between 2015 and 2018. Figure 13 shows the highest usage plans (20GB

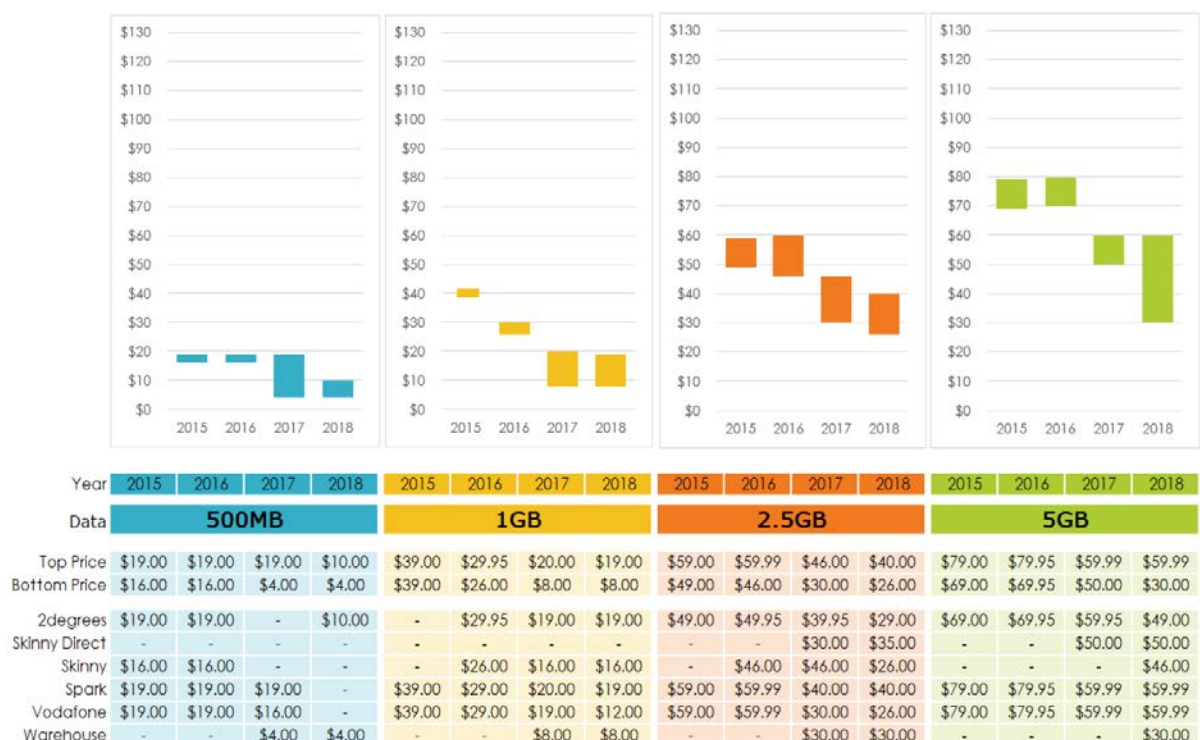
²⁰ Note that this does not necessarily indicate the data plan needed for the average data-using customer as it includes all users whether they use any data or not. The average volume use for non-zero data-use customers will likely be higher.

²¹ NZ Commerce Commission 2017 Annual Telecommunications Monitoring Report data

and unlimited data) have only existed for the last two years, which is consistent with price plans (and hence competition) occurring as demand develops. The prices for the 8GB plan are particularly illustrative in this context. In 2015 only 2degrees offered an 8GB plan. Since then, Vodafone entered the segment with a relatively expensive offer in 2016, which it more than halved in 2017 following the entry of Spark and its Skinny Direct sub-brand into the segment and a price cut by 2degrees. Further cuts occurred in 2018, with 2degrees dropping its price again and Skinny (as opposed to Skinny Direct²²) entering the segment with a market leading price.

- 52. This data demonstrates why it is important to analyse price *trends* across segments in a dynamic market like mobile - snapshots of prices in one year can paint a misleading picture of the competitive dynamics.

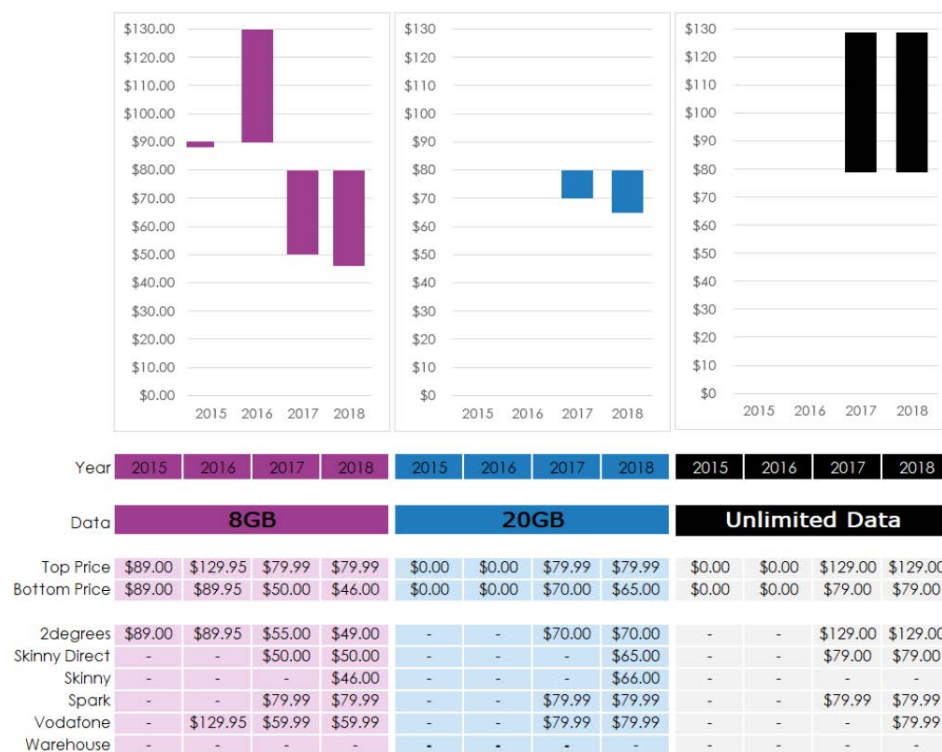
Figure 12
Mobile Plan Price Ranges by Data Allowance 500MB to 5GB



Source: IDC (2018), "Telco Wars: A New Hope", October 2018

²² Where Skinny Direct is the "online only" sub-brand of Skinny. See <https://www.skinnydirect.co.nz/about/>. (Accessed 16/10/18)

Figure 13
Mobile Plan Price Ranges by Data allowance 8GB, 20GB, Unlimited Data

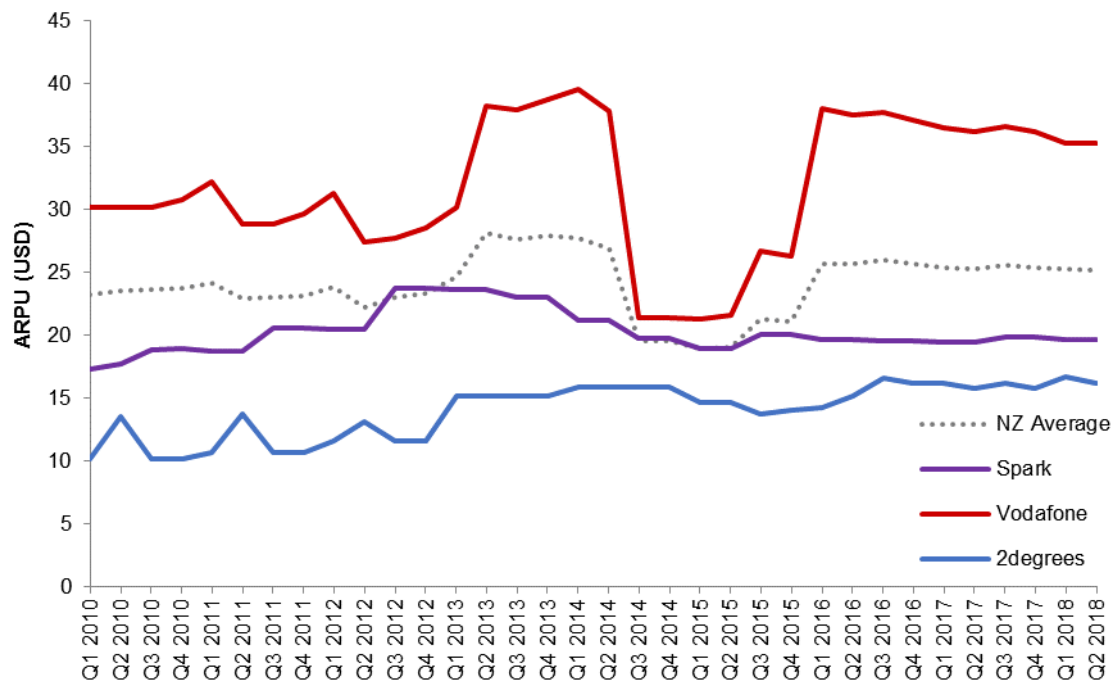


Source: IDC (2018), “Telco Wars: A New Hope”, October 2018

53. Another way of looking at “price” is to compare average revenue per user (ARPU) across markets. While it is a proxy for price, we need to be cautious when observing ARPU, because it is affected by the composition of the customer base and what packages and add-ons customers actually buy. For example, if customers purchase more add-ons, then ARPU will go up, even if prices are held constant. Similarly, if competition occurs by offering free add-ons (e.g. Netflix) rather than cutting price, ARPU might remain stable, but competition would be evidenced by margins falling (we return to margins shortly). Nevertheless, ARPU does have some informative value.
54. Analysys Mason have presented analysis suggesting that ARPU has been rising in New Zealand, and that this is against international trends.²³ While we have not been able to confirm this result precisely, the increasing ARPU trend appears to be driven primarily by an anomaly in the GSMA data used for Vodafone. Figure 14 below plots ARPU by carrier for New Zealand on a monthly basis, taken straight from the GSMA intelligence database without any adjustments. This demonstrates ARPU for Vodafone halving in Q3 2014 and then returning to previous levels in Q1 2016.

²³ Analysys Mason, *Input to Commerce Commission mobile market review*, 28 November 2017, Figure 2.2.

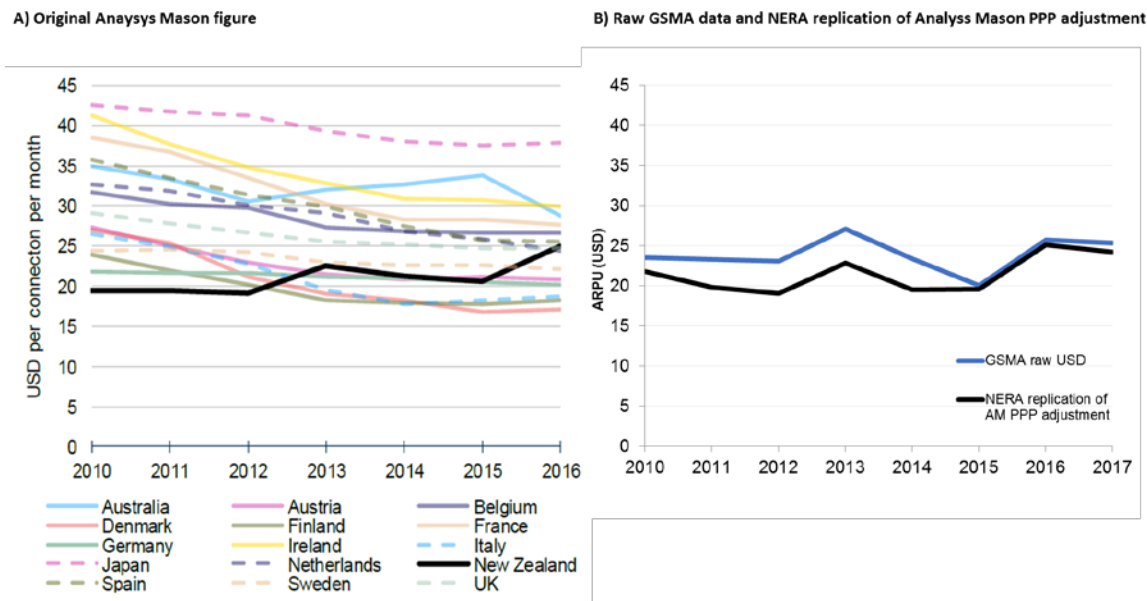
Figure 14: New Zealand GSMA ARPU per connection by carrier, quarterly unadjusted USD



Source: GSMA intelligence.

55. Note also that the average figure for New Zealand, taken straight from the GSMA without any adjustment (the dotted grey line in the graph), does not appear to be trending upwards. This suggests the PPP adjustment Analysys Mason carried out may be driving the increasing trend. To test this, we took the raw USD figures reported by the GSMA and attempted to implement the PPP adjustment described by Analysys Mason. The results of this and the original Analysys Mason graph are shown in Figure 15 below. This suggests that in addition to the data anomaly for Vodafone mentioned above, Analysys Mason’s finding of increasing ARPU is also partly driven by their exchange rate adjustment. It could also be explained by inflation – we return to this below.

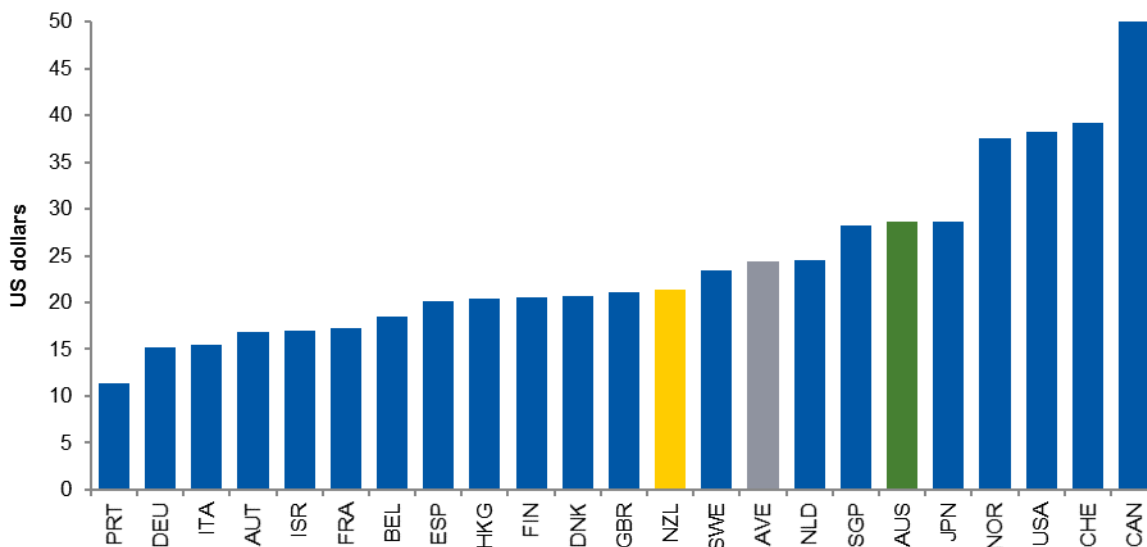
Figure 15: Replication of Analysys Mason ARPU calculations



Source: NERA analysis and Analysys Mason, Input to Commerce Commission mobile market review, 28 November 2017, Figure 2.2.

56. We have therefore analysed ARPU datasets besides the GSMA intelligence to see if they corroborate the Analysys Mason finding. Using the *Merrill Lynch Global Wireless Matrix*, New Zealand is close to the median of developed countries, as demonstrated by Figure 16. Using IDC data, as shown in Figure 17, real ARPU in New Zealand has been falling over time despite an increasing proportion of plans being post-paid.

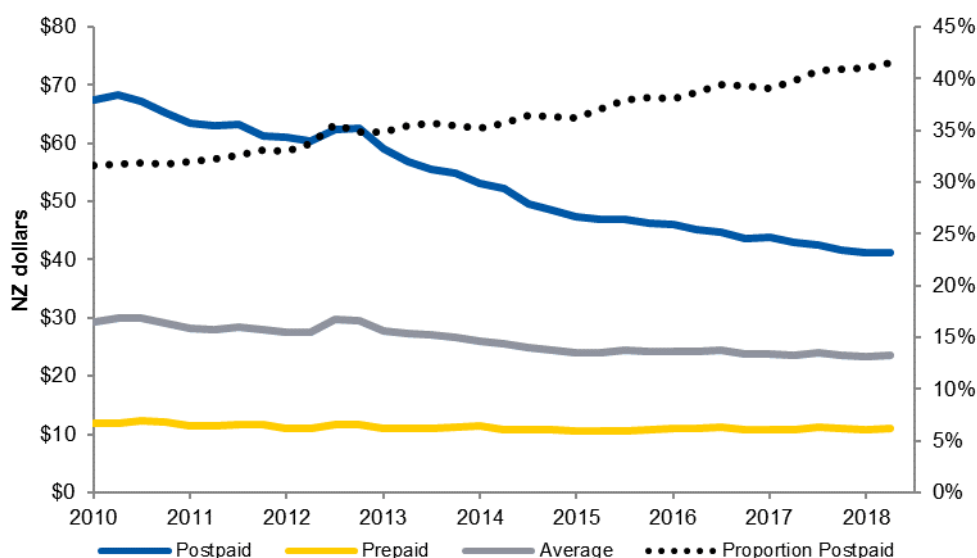
Figure 16
Cross country comparison of ARPU (by subscriber) for developed countries (2017)



Source: Merrill Lynch Global Wireless Matrix.

Note: the countries used are those classified as developed by Merrill Lynch for which data are available.

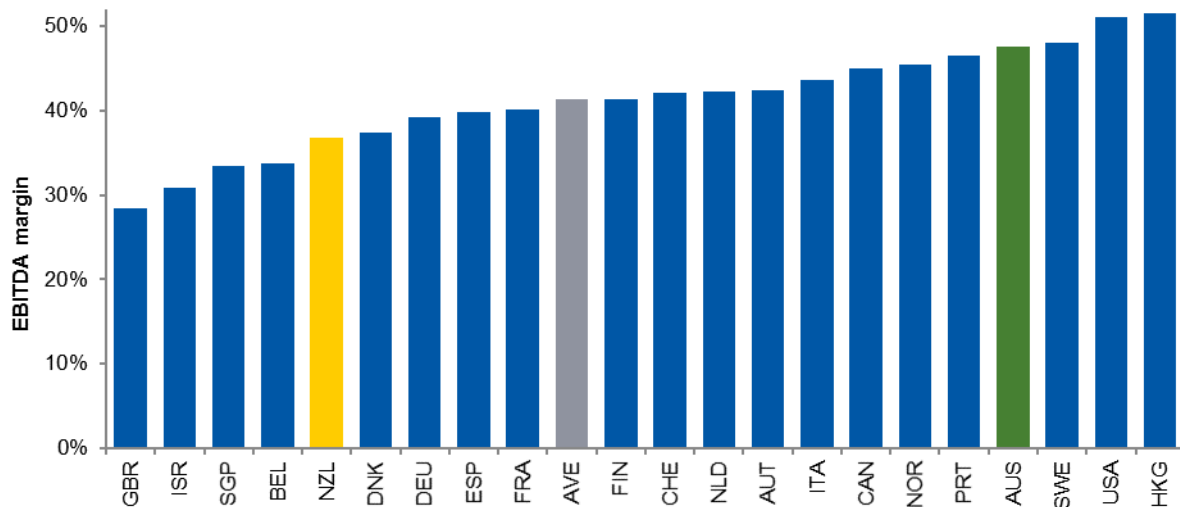
Figure 17
Real NZ ARPU (by connection) time series, quarterly deflated NZD



Source: IDC data deflated using StatsNZ seasonally adjusted CPI index

57. Perhaps more interesting, given the shift in the composition of the customer base towards postpaid customers (see Figure 5), is that real postpaid ARPU has declined sharply. This is consistent with competition for postpaid customers intensifying over the period.
58. However, ARPU in isolation does not control for quality or the breadth of services taken by customers in each country. High ARPU could merely indicate higher quality or a broader set of services, and vice versa for lower ARPU. While we consider quality in Section 5, one way to control for this is to look at margins, which will control for whether firms are incurring higher or lower costs. To do so we look at EBITDA figures collected by Merrill Lynch and GSMA intelligence.

Figure 18
Cross country EBITDA margin comparison (2017)

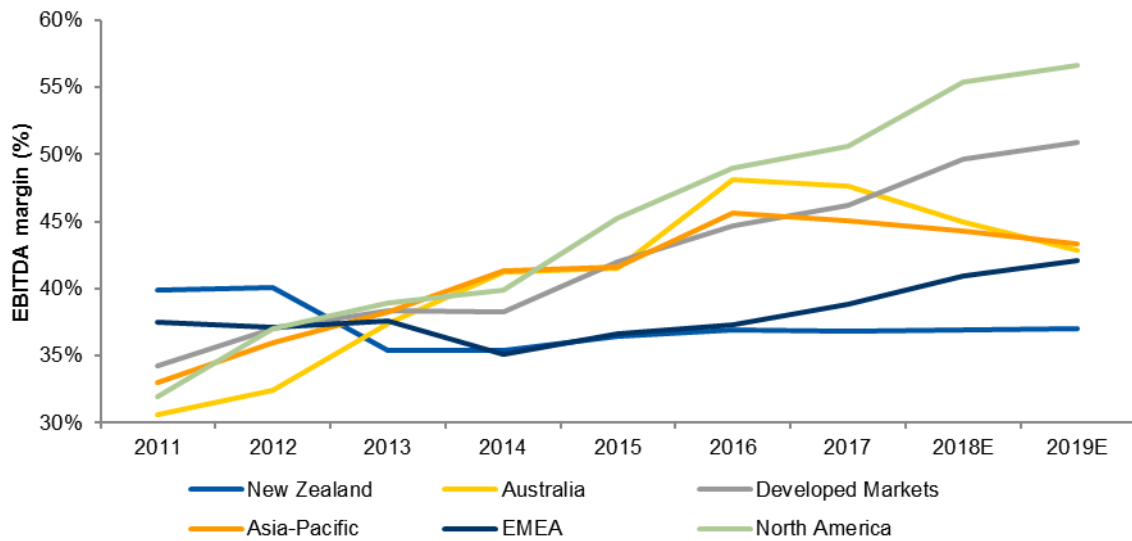


Source: Merrill Lynch Global Wireless Matrix

Note: NZ data does not include 2degrees and the countries used are those classified as “developed” by Merrill Lynch for which data are available.

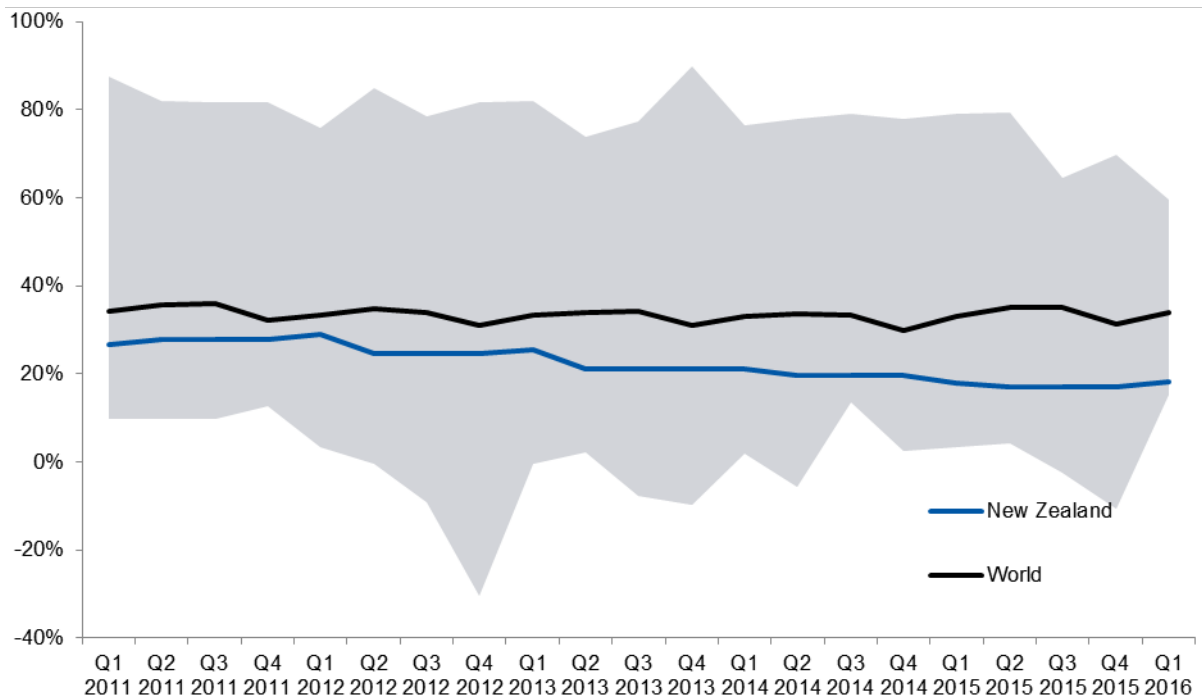
59. Looking at EBITDA margins on a percentage basis, we can see in Figure 18 that New Zealand was in the bottom half of developed countries in the Merrill Lynch Global Wireless Matrix for 2017. We can also look at this metric over time, with a particular comparison to Australia and the developed country average, as shown see Figure 19.
60. Figure 19 is interesting as New Zealand had a higher EBITDA margin than average in 2011, materially higher than Australian operators (40% vs ~30%). However, between 2011 and 2016 the EBITDA margin of Australian operators increased substantially while the New Zealand margin decreased and then stabilised over the same period. While the Australian EBITDA margin has been falling since 2016, it is still materially above the New Zealand figure.
61. Figure 20 shows New Zealand EBITDA margin on a percentage basis over time compared to the range of other countries tracked by the GSMA and the world average. New Zealand has an EBITDA margin which is consistently under the world average and this gap is increasing over time.

Figure 19
EBITDA margin over time



Source: Merrill Lynch Global Wireless Matrix
Note: NZ data does not include 2degrees

Figure 20
EBITDA margin over time (NZ vs world range and average)

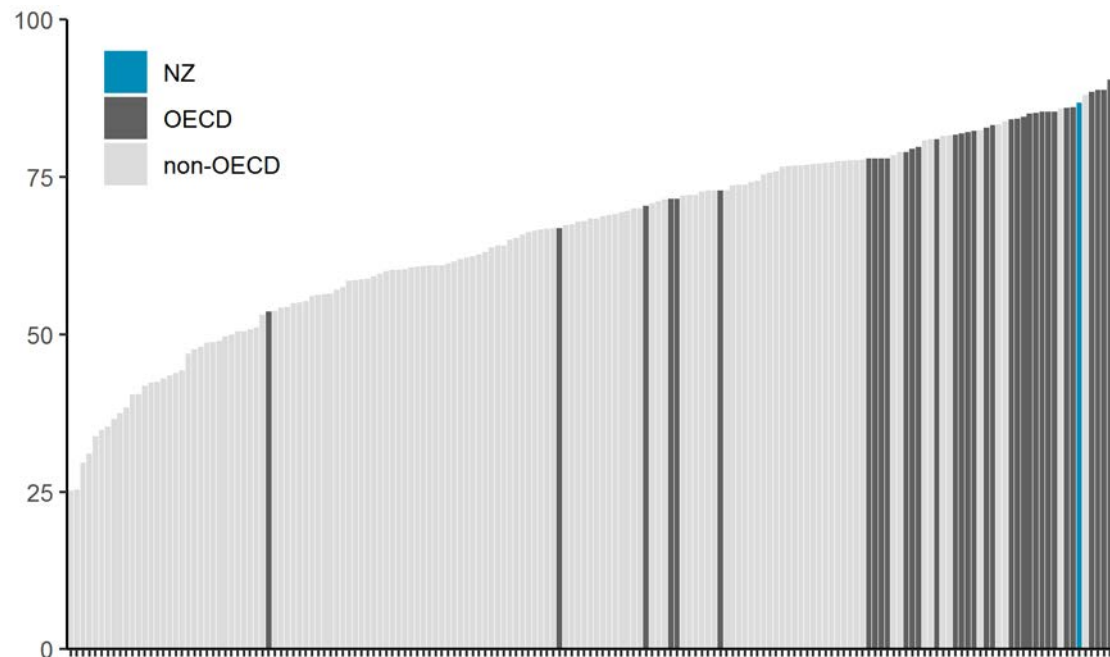


Source: GSMA Intelligence.

Note: We have excluded Ethiopia on the basis that it presented an EBITDA margin of above 100% (107.84%) and that the same figure. We also note that not all countries present data across the entire time series and therefore the world range and average may change purely due to the sample composition changing.

62. The GSMA mobile connectivity index²⁴ also attempts to make cross country comparisons of, among other things, affordability and pricing. The “Affordability index” scores countries based on mobile tariffs, entry-level handset prices, income, inequality and taxation.²⁵
63. The graph below shows the 2017 affordability index (where a higher number is better) for all 150 countries in the sample. On this measure, New Zealand is the 7th (out of 163) most affordable country in the world for mobile phone use and the 5th (out of 35) most affordable in the OECD.

Figure 21
GSMA mobile affordability index (2017)



Source: NERA analysis of GSMA mobile connectivity index (<http://www.mobileconnectivityindex.com/>).

Note: The affordability index takes into account: Mobile Tariffs, Entry-level handset prices, Income, Inequality and Taxation.

²⁴ <http://www.mobileconnectivityindex.com/>

²⁵ Methodology available at:
http://www.mobileconnectivityindex.com/widgets/connectivityIndex/pdf/Mobile_Connectivity_Index_Methodology_1007_2017.pdf

5. Non-price competition and bundling

64. In this section we consider aspects of competition/consumer outcomes beyond price and data/voice/SMS inclusions. We begin by considering bundling of mobile with fixed line broadband. We then consider free add-ons or bonus features that are included in plans in addition to the standard data/voice/SMS allowances, which is in some sense another form of bundling. We then consider the quality of the mobile service, with a particular focus on data performance.

5.1. Bundling

65. Regarding the bundling of fixed and mobile products, the Commission has stated that competition concerns may arise if a service provider offers bundles that its competitors cannot replicate.²⁶ However, it is important to note that bundling is typically only a concern if a firm bundles a product that it has market power over with a product that is supplied in a competitive market.²⁷ We have explained in this report that there is no market power in the mobile market.

66. We have been provided with data by Spark on the extent to which its mobile customers receive a discount for also having their fixed broadband connection with Spark (referred to by Spark as a “bundle up bonus” (BuB)). The share of customers benefiting from BuB can be measured in two ways, depending on how the total number of customers is measured:

- a) One way is using the proportion of mobile ‘accounts’ (the number of customer bills that contain a mobile connection) that receive a BuB.²⁸ This percentage is [] SPKCI.²⁹
- b) Alternatively, given individual bills can and do contain multiple connections, we could also use connections.³⁰ Measuring the proportion of customers that receive a bundled discount this way gives a figure of [] SPKCI.³¹

67. Either way it is calculated, this suggests the proportion of Spark’s post-paid customers that would lose a bundled discount if they switched mobile providers, is relatively small.

5.2. Free add-ons/bonus features

68. Table 2 shows the free add-ons/bonus features offered by each company for pre-paid and post-paid plans. Some of these inclusions (such as free Spotify, Lightbox, Netflix, Wi-Fi and social data) will not show up in price benchmarking but are an important part of the value that consumers receive. This table also demonstrates the differentiated nature of the offerings amongst the three MNOs, with the number and type of inclusions varying between Spark, Vodafone and 2degrees.

²⁶ New Zealand Commerce Commission, *Study of mobile telecommunications markets in New Zealand: Issues Paper*, August 2018, par.87

²⁷ This is sometimes characterised, including by the Commerce Commission, as requiring the firm to include in the bundle a “must-have” product. Commerce Commission (2014), “Bluescope Steel (NZ) Limited and Pacific Steel Group”, NZCC 8, 15 April, at [90.1]. See also OECD (2008), “Fidelity and Bundled Rebates and Discounts”, DAF/COMP(2008)29.

²⁸ Essentially, the number of post-paid bills that contain mobile connections.

²⁹ Data provided by Spark

³⁰ For a customer with multiple connections, so long as they keep one connection with Spark they keep the BuB discount, and thus the rest of their connections do not incur a switching cost (in the form of a lost discount) if they leave Spark

³¹ Data provided by Spark

Table 2: Free add-ons/bonus features offered by each mobile company

	Post-paid			Pre-paid		
	Spark	Vodafone	2degrees	Spark	Vodafone	2degrees
Carry over data	✓		✓	✓	✓	✓
Social data		✓ ^a		✓ ^b		
Bonus data	✓ ^c		✓ ^d	✓ ^e		✓ ^f
Wi-Fi	✓			✓		
Data sharing	✓ ^g	✓ ^h	✓ ⁱ			
Spotify	✓			✓ ^j		
Lightbox	✓					
Netflix		✓ ^k				
Handset subsidy	✓ ^l	✓ ^m	✓ ⁿ			
Misc. deals (movie discounts etc.)	✓	✓	✓	✓	✓	✓

Source: Spark, Vodafone and 2degrees websites

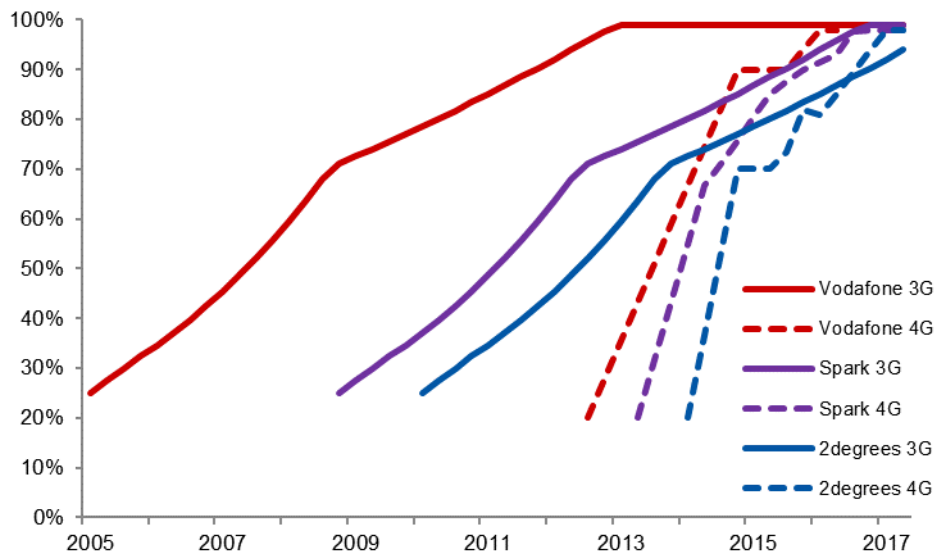
Note:

- a. Plans below \$79 get bonus social data, plans \$79 and over get bonus social, video, music and chat data
- b. 1 GB bonus socialiser data on \$20 and \$40 data lovers plans
- c. Bonus data on all plans
- d. Double data for first 3 months for plans \$40 and over
- e. Bonus data on \$29 and \$49 plans
- f. Double data for first 3 months for plans \$29 and over
- g. Data sharing with other devices is available on a 'share leader' plan of which plans \$59 and over are eligible to be
- h. Non-unlimited plans \$59 and over can share data
- i. On all plans users can share data with another user. Plans \$55 and over are able to be purchased as a shared plan between two or more people
- j. 50% off Spotify premium
- k. Plans \$79 and over get free Netflix for a year
- l. For certain phones different discounts on pay monthly plans if paid off over 24 months
- m. On certain phones, size of discount is linked to plan
- n. Some discount for some phones (more limited than Spark and Vodafone offers)

5.3. Coverage

69. An aspect of user experience/competition is coverage. Figure 22 shows 3G and 4G population (as opposed to geographic) coverage for each New Zealand operator.

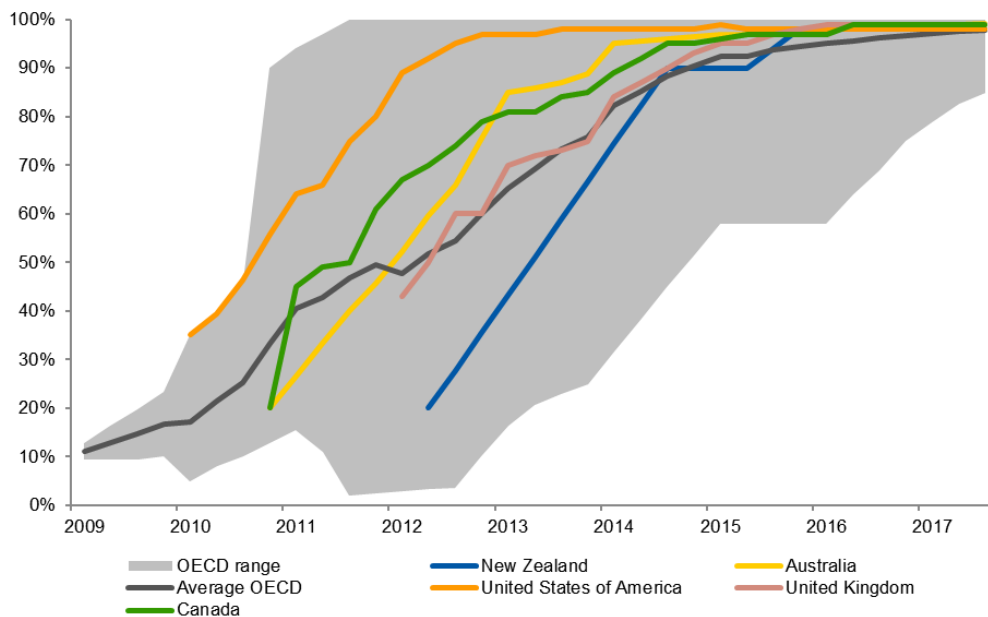
Figure 22
3G/4G coverage (by population) by operator



Source: GSMA Intelligence.

70. Figure 23 shows the increase in coverage over time for 4G in New Zealand compared to the rest of the OECD.

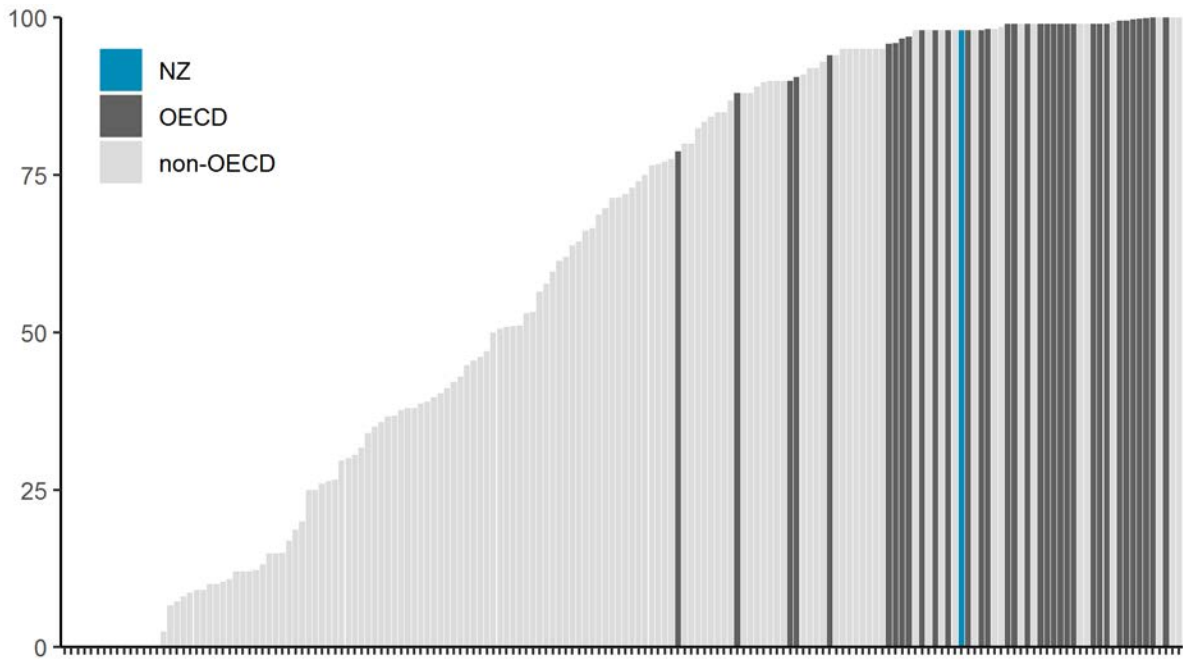
Figure 23
4G coverage (by population) OECD



Source: NERA analysis, GSMA Intelligence

71. This demonstrates that, while the 4G rollout began later in New Zealand compared to the other four countries shown and the OECD average, population coverage expanded rapidly and today is pretty similar.
72. Turning to a broader cross country comparison, the GSMA mobile connectivity index contains data on 4G coverage. We have graphed this data in Figure 24 (note the scale is an index, not percentage coverage).
73. This graph demonstrates that there is little variation in 4G coverage across the majority of OECD countries, except for a few countries with materially worse 4G coverage (Turkey, Mexico, Slovakia, Chile and France). New Zealand also has better coverage than the majority of the countries outside the OECD.

Figure 24
4G population coverage index 2017

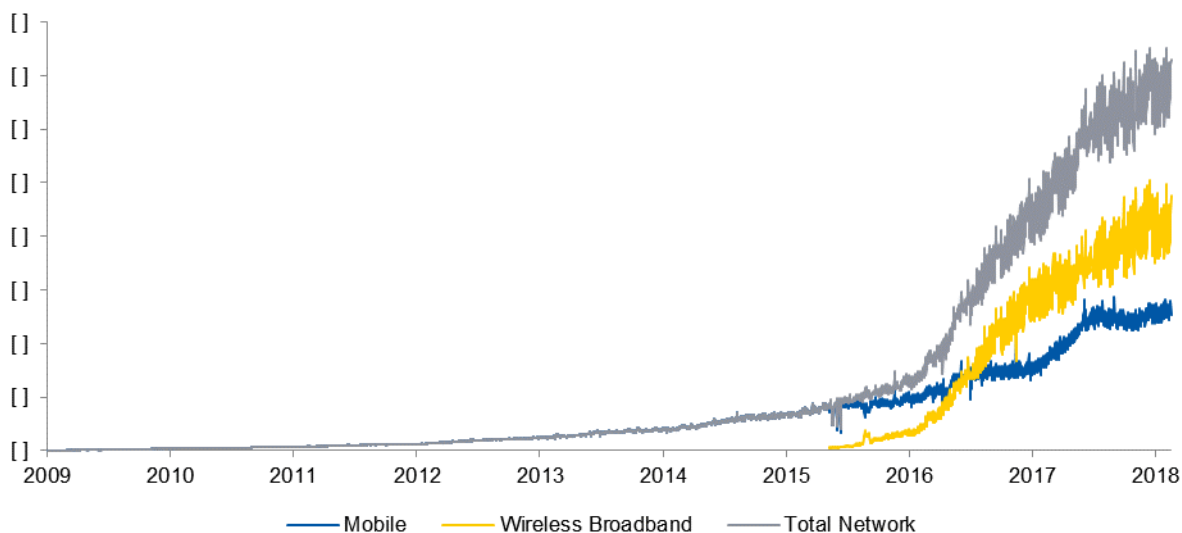


Source: NERA analysis of GSMA mobile connectivity index (<http://www.mobileconnectivityindex.com/>).
Note: Data has been normalised to fall between 0 and 100.

5.4. Network quality/experience

74. As shown in Figure 25, the volume of data consumed on Spark's wireless network has exploded in recent years.

Figure 25
Daily data volumes on Spark's wireless network (MB per day) [] SPKCI



Source: NERA analysis of Spark data

75. Spark reporting differentiates between two broad types of data on its wireless network:
- “Mobile”: cell phones that are also capable of phone calls and SMS messages; and
 - “Wireless Broadband”: which is “data-only” connections, including fixed wireless access (FWA), tablets and data cards/sticks.
76. Figure 25 shows that on the Spark wireless network, data use increased steadily, and really took off after the launch of wireless broadband in 2015. Focusing just on mobile traffic [i.e. the blue line in the graph], in 2009 traffic was less than [] SPKCI MB per day. Today, mobile traffic is over [] SPKCI MB per day, a more than 3000% increase.
77. We have been provided with data measuring the *technical* performance of Spark's network (i.e. mobile and wireless broadband) since July 2015. These technical measures, are only a proxy for customer experience which is much harder to measure. I.e. for a given video playback quality (which will depend on a minimum level of network throughput), consumers will also care about the time it takes a video to start playing and that it doesn't stall/buffer, which are not necessarily captured by average throughput figures over the network. Nonetheless, these “network” measures and how they have changed over time, provide a useful proxy of quality over time. We are advised that three key measures tracked by Spark engineers internally are:
- “Saturated throughput”: Effectively a measure of “speed”. A higher number is better.
 - “Round Trip Time”: Round-trip time (RTT) is the duration in milliseconds (ms) it takes for a network request to go from a starting point to a destination and back again to the starting point. A lower number is better.
 - “Packet loss”: Packet loss is measured as a percentage of packets lost with respect to packets sent and is typically caused by network congestion. A lower percentage is therefore better.

78. Figure 26 below shows the mobile specific data and demonstrates that since July 2015:
- a) Mobile volumes have increased [%] **SPKCI**;
 - b) Wireless broadband volumes have increased [%] **SPKCI**;
 - c) The packet loss rate for mobile users has remained relatively stable and been on a downward trend [] **SPKCI**;
 - d) The RTT for mobile users have been steadily declining, [] **SPKCI**; and
 - e) Saturated down throughput has been steadily rising, [] **SPKCI**, a [%] **SPKCI** increase.

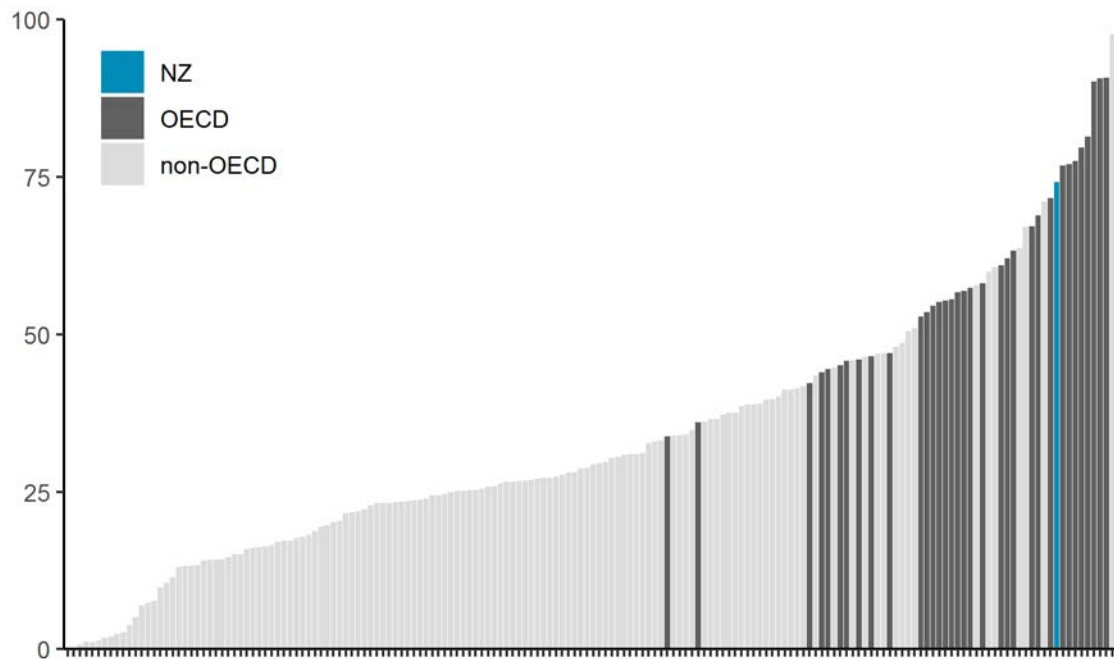
Figure 26
Spark mobile quality metrics

[] **SPKCI**

Source: NERA analysis of Spark data

79. That is, despite large growth in the usage by mobile users and exponential growth in the usage by WBB users, Spark mobile users have experienced an increase in quality.
80. The GSMA mobile connectivity index also tracks the following network performance measures, with the underlying data coming from Ookla's Speedtest Intelligence:
- a) Download speed;
 - b) Upload speed; and
 - c) Latency.
81. The "network performance index", which is a composite ranking of these three factors, is shown in Figure 27 below.

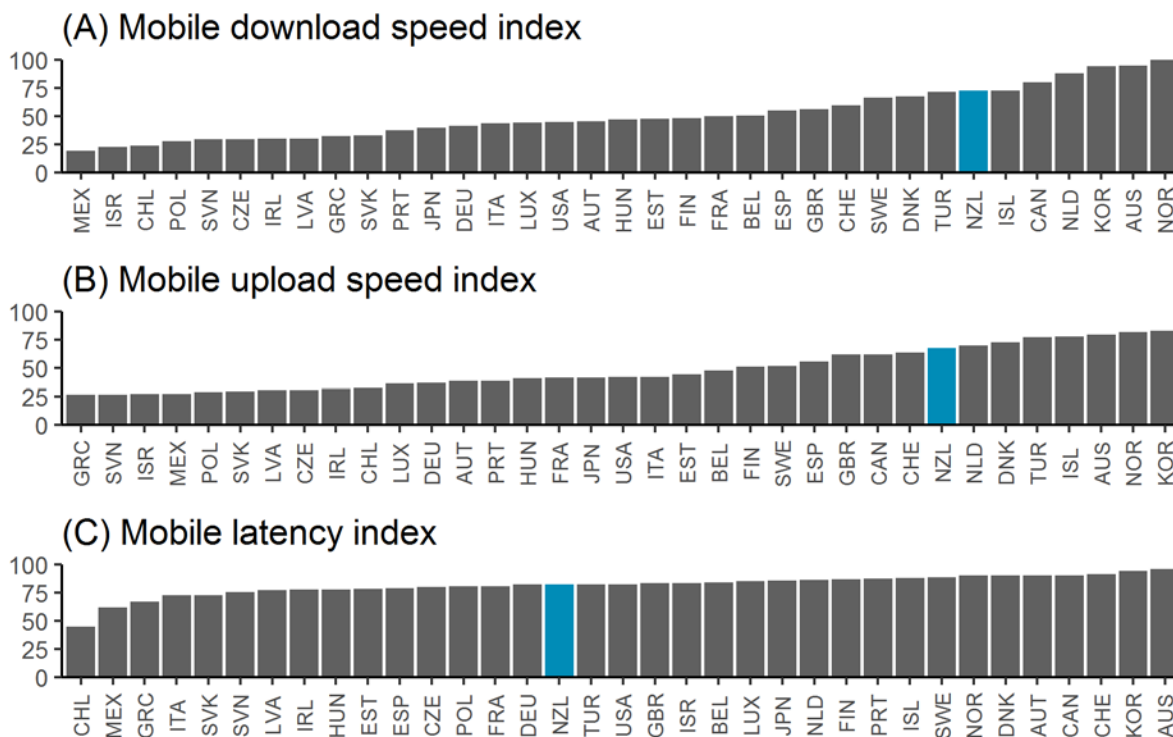
Figure 27
GSMA Network performance index 2017



Source: NERA analysis of GSMA mobile connectivity index (<http://www.mobileconnectivityindex.com/>).
 Note: Index is calculated using Ookla Speed Test data on download speed, upload speed and latency.

82. On this measure, New Zealand has the 10th best performing mobile networks in the world. Breaking this measure down into its components reveals that New Zealand is one of the best performing countries in the OECD with respect to download and upload speeds. While New Zealand is slightly below the OECD average for latency, the variation in latency between countries is much smaller than the variation in download and upload speeds.

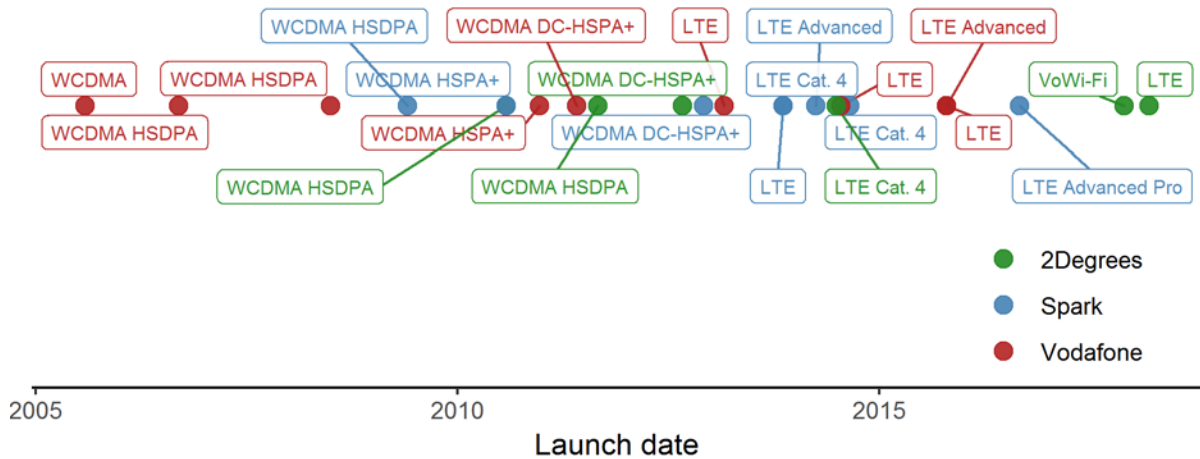
Figure 28
GSMA network performance sub-indices: OECD countries



Source: NERA analysis of GSMA mobile connectivity index (<http://www.mobileconnectivityindex.com/>).
Note: Index is calculated using Ookla Speed Test data on download speed, upload speed and latency. Index is calculated by normalising all values to fall between 0 and 100.

83. A likely driver of these trends is that competition between the MNOs in New Zealand appears to have been continually driving investment in new technologies and quality. Figure 29 below shows the launch date for different network technologies in New Zealand since 2005 and demonstrates that:
- For 3G technologies and the initial launch of LTE, Vodafone appeared to launch new technologies first and then Spark and 2degrees followed;
 - For 4G/LTE technologies, while Vodafone launched LTE first, Spark has been the first MNO to launch LTE Cat. 4, LTE Advanced and LTE Advanced Pro (with the latter two sometimes referred to as “4.5G”).

Figure 29: Network launch dates



Source: NERA analysis, GSMA Intelligence. Note: where technologies repeat this is because the GSMA data tracks the launches on different spectrum bands.

84. Consistent with the above, data from Spark demonstrates that it has been investing ahead of demand to keep a capacity buffer, and has been able to maintain this despite the exponential growth in data usage that has occurred. Figure 30 shows the total “busy hour” data traffic, which is essentially a measure of peak demand over Spark’s network against the total capacity installed.

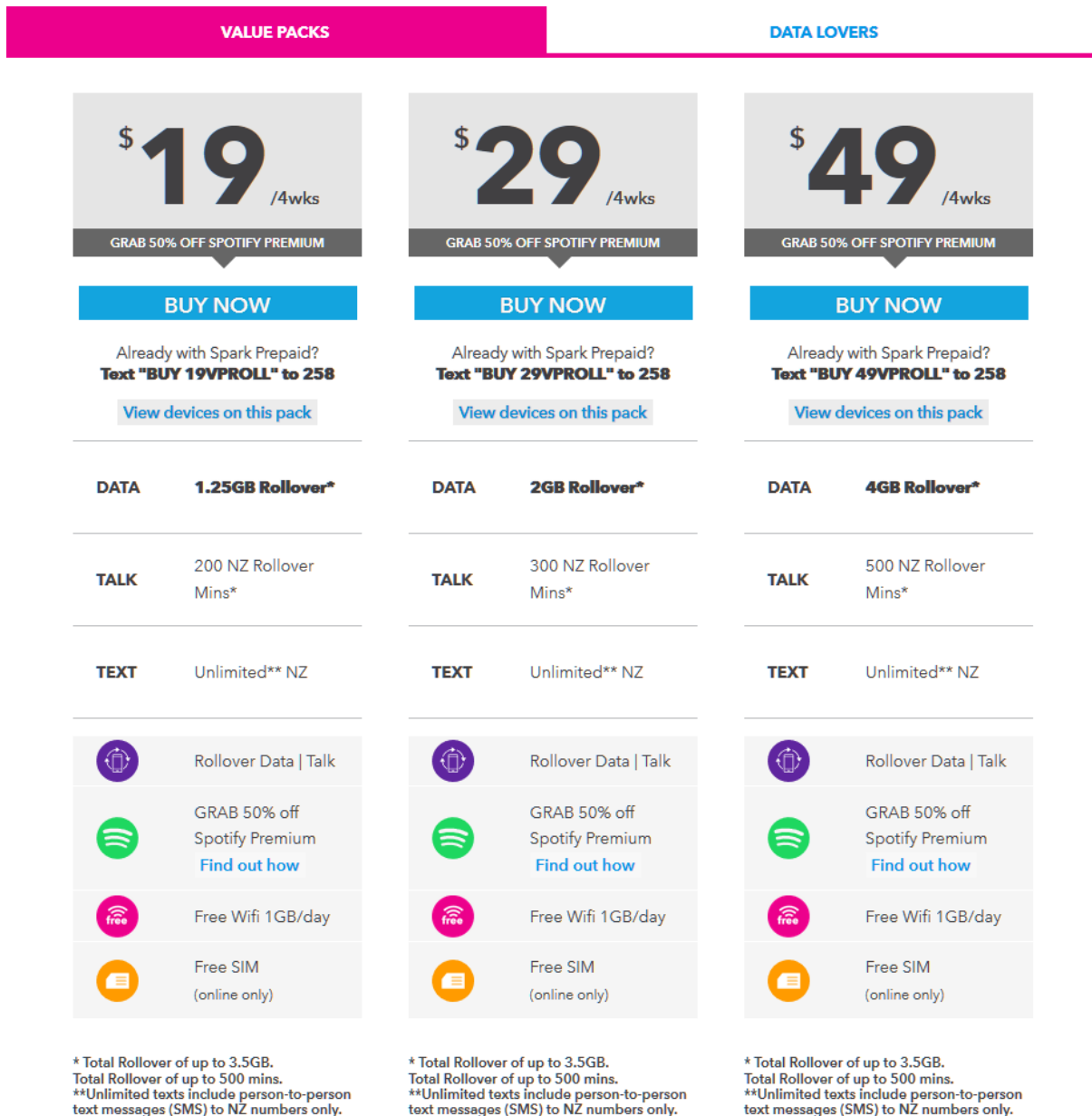
Figure 30
Spark busy hour traffic vs capacity installed (GB)

[] SPKCI

Source: NERA analysis of Spark data

Appendix A. Similarity between pre-paid and post-paid plans

Figure 31: Spark prepaid value packs



Source: <https://www.spark.co.nz/shop/mobile-plans/prepaid.html>. Accessed 05/10/18.

Figure 32
Spark pay monthly plans

OPEN TERM
No fixed term mobile phone plans

<p>Plus Bonus Data 1GB/mth - 12 Mths</p> <p>\$39^{.99} /MTH</p> <p>INCLUDES SPOTIFY & LIGHTBOX</p> <p>BUY NOW</p> <p>View devices on this plan</p>	<p>Plus Bonus Data 4GB/mth - 12 Mths</p> <p>\$59^{.99} /MTH</p> <p>INCLUDES SPOTIFY & LIGHTBOX</p> <p>BUY NOW</p> <p>View devices on this plan</p>	<p>Unlimited Mobile Plan</p> <p>\$79^{.99} /MTH</p> <p>INCLUDES SPOTIFY & LIGHTBOX</p> <p>BUY NOW</p> <p>View devices on this plan</p>
<p>DATA 1GB Rollover Data + 1GB Bonus Data*</p>	<p>DATA 4GB Rollover Data + 4GB Bonus Data*</p>	<p>DATA Unlimited (speeds reduce*)</p>
<p>TALK 300 NZ Rollover Mins*</p>	<p>TALK Unlimited** NZ & Aus</p>	<p>TALK Unlimited** NZ & Aus</p>
<p>TEXT Unlimited** NZ</p>	<p>TEXT Unlimited** NZ & Aus</p>	<p>TEXT Unlimited** NZ & Aus</p>
<p>SHARE Add up to 3 Data Sharers. Find out how</p>	<p>SHARE Add up to 3 Data & 4 Mobile Sharers. Find out how</p>	<p> Free WiFi 1GB/Day</p> <p> Spotify Premium (Worth \$14.99/mth)</p> <p> Lightbox (Worth \$12.99/30 days)</p>
<p> Rollover Data Talk</p> <p> Spotify Premium (Worth \$14.99/mth)</p> <p> Lightbox (Worth \$12.99/30 days)</p> <p> Free WiFi 1GB/Day</p>	<p> Rollover Data</p> <p> Spotify Premium (Worth \$14.99/mth)</p> <p> Lightbox (Worth \$12.99/30 days)</p> <p> Free WiFi 1GB/Day</p>	<p><small>* Max speeds reduced after 22GB. No tethering or hotspots, unless you purchase a Hotspot Extra. **Unlimited texts include person-to-person text messages (SMS) to NZ and Aus numbers only.</small></p>

* Total Rollover of up to 3.5GB. No Rollover on bonus data.
Total Rollover of up to 500 mins.
**Unlimited texts include person-to-person text messages (SMS) to NZ numbers only.

* Total Rollover of up to 3.5GB. No Rollover on bonus data.
**Unlimited texts include person-to-person text messages (SMS) to NZ and Aus numbers only.

Source: <https://www.spark.co.nz/shop/mobile-plans/paymonthly.html>. Accessed 05/10/18.

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