Final report for TelstraClear

The use of benchmarking for cost-based mobile termination

Comments on the NERA report

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NETWORK STRATEGIES
• Telecommunications Strategy •

0 Executive summary

The Commerce Commission, in its Reconsideration of its investigation into mobile termination rates[1], uses an estimate of the New Zealand mobile termination rate based on benchmarking of cost-based rates from a sample of jurisdictions. This investigation is not to set a mobile termination rate – the Commission is using the benchmarking to inform the decision about whether to designate the fixed-to-mobile termination service.

There have been claims by both Telecom New Zealand and Vodafone that the costs of a mobile network in New Zealand are high in comparison with other countries. We have found no firm evidence presented that proves this claim. Nor has it been proven that a cost-based mobile termination rate in New Zealand will fall outside the range of the Commission's sample benchmarks.

The evidence that has been presented has been highly selective, and largely speculative in nature. Furthermore a number of factors that would indicate lower costs in New Zealand have been omitted from consideration.

We have found that in New Zealand certain cost drivers would result in reduced costs, while others would have the effect of increasing costs, relative to other jurisdictions. Without knowing the relative importance of each factor in determining total costs, nor how New Zealand compares in terms of the omitted factors, it is impossible to conclude that costs in New Zealand would fall outside the benchmark sample or towards either the high or the low end.

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1 Commerce Commission (2005) *Reconsideration Draft Report on whether mobile termination should become a designated or specified service*, 22 December 2005.

Commissioned by Vodafone, NERA has proposed an adjustment methodology that purportedly modifies UK cost data to the New Zealand environment. We find that this methodology falls short of what would be required to adapt a UK benchmark for New Zealand:

- no adjustments were made for a number of key factors, such as terrain, mix of urban and rural sites, cost of capital and spectrum allocation
- some adjustments were made based solely on assumptions about the New Zealand environment, without any firm basis in fact (such as land costs)
- some adjustments could only be described as partial, such as modifications to labour costs without consideration of productivity differences, and site costs, which are influenced by factors other than land costs that would also vary between New Zealand and the UK
- a number of assumptions relating to the New Zealand environment were clearly flawed.

With so many key factors within the UK data not being adequately amended to capture New Zealand characteristics, the results obtained from NERA's methodology are misleading and should not be used as an estimate of the likely cost-based mobile termination rate for New Zealand.

A partial adjustment approach, as in the NERA methodology, results in an estimate that is a type of hybrid UK/New Zealand cost – certainly not applicable for the New Zealand environment, and not reflective of the true costs.

By using the Commission's approach of benchmarking cost-based mobile termination rates in a sample of operators with varying characteristics, the Commission is actively considering how New Zealand should be placed in relation to those operators. In fact, the Commission has made a conservative judgement in assuming New Zealand will be ranked close to the more costly jurisdictions within the sample. Unless operators can provide conclusive data which can support their claims of even higher underlying costs, there is no reason for the Commission to revise its estimated rate upwards.

The use of benchmarking for cost-based mobile termination

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1 Introduction

In its submission to the Commerce Commission on the Reconsideration Draft Report on the mobile termination rate (MTR), Vodafone included a report by NERA[2] on the use of benchmarking to estimate a cost-based mobile termination rate.

Network Strategies has been requested by TelstraClear to comment on:

- NERA's report and its methodology for adjusting data to obtain a benchmark estimate for the mobile termination rate in New Zealand
- Vodafone's views on the Commission's estimate of a cost-based mobile termination rate, including its views on mobile termination rates and retail prices in other jurisdictions in which it operates[3]
- Telecom New Zealand's views on how the cost-based mobile termination rate may be expected to change over time[4].

Benchmarking is not a simple straightforward process. It is extremely difficult to identify a sample of jurisdictions that closely match New Zealand, with respect to the key factors that influence the costs of mobile termination.

When benchmarking, we recognise that there will indeed be differences between jurisdictions, however the benchmarking methodology should be such that the effects of

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2 NERA (2006) *Use of Benchmarking to Provide an Indication of Costs*, report for Vodafone New Zealand, 3 February 2006.

3 Vodafone (2006) *Submission to the Commerce Commission: Schedule 3 Investigation into Regulation of Mobile Termination*, revised draft report, 7 February 2006.

4 Telecom New Zealand (2006) *Submission in respect of the Commerce Commission's Draft Reconsideration Report for its Schedule 3 Investigation into Regulation of Mobile Termination*, 7 February 2006.

such differences will be minimised. This is achieved using two main approaches where appropriate:

- careful selection of the benchmark sample
- adjustment of the benchmark data to account for differences between jurisdictions.

Further, the use of benchmarking as an initial pricing principle within the Telecommunications Act recognises that benchmarking, while not as accurate as a bottom-up TSLRIC cost-modelling exercise, is an expedient and timely way to estimate a cost-based price.

In this report we discuss:

- whether a cost-based mobile termination rate for New Zealand would fall outside the range of those for the Commission's benchmark sample (Section 2)
- currency conversion (Section 3)
- the NERA methodology for adjusting the UK costs to reflect the New Zealand environment (Section 4)
- mobile termination rates and retail prices in other jurisdictions (Section 5)
- whether it is reasonable for the mobile termination rate to decline in New Zealand (Section 6)
- the ACCC view on benchmarking for mobile termination rates (Section 7).

Finally, our conclusions are presented in Section 8.

Although this paper was commissioned by TelstraClear the views expressed here are entirely those of Network Strategies. There is no restricted information contained within this report – all data presented is publicly available. Consequently there is no restricted version of the report.

2 Is New Zealand an outlier?

In its comments on the Commission's benchmarking approach, NERA states that[5]:

> …it is clear from the available data that circumstances in the 7 countries used by CC for benchmarking purposes vary very widely. Moreover, in certain important respects, New Zealand is at one end of the scale and hence its costs may not necessarily lie within the range defined by the benchmarks. [Section 2.7]

Contrary to NERA's claim, there is absolutely no evidence from this sample that suggests that New Zealand costs would lie outside the range of the sample benchmarks. This deduction may be a possibility if New Zealand was an outlier with respect to various characteristics within the sample, but this is definitely not the case.

An 'outlier' is defined to be a value that is outside the bounds of a given range. If, for each and every key factor that drives the cost of mobile termination, New Zealand falls within the range of our sample data – given that our sample includes a broad range of examples with varying characteristics – the resultant cost-based rate is unlikely to be outside that of the sample.

Let us examine in turn each of the key factors discussed by NERA for which New Zealand is at 'one end of the scale'.

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5 NERA (2006) *Use of Benchmarking to Provide an Indication of Costs*, report for Vodafone New Zealand, 3 February 2006.

2.1 Population density and network coverage

New Zealand has the lowest population density of the jurisdictions within the Commission's sample (Austria, Israel, Malaysia, South Korea, Sweden, UK and the US states of California, Florida and New York).

However, any jurisdiction does not have a uniform population density – rather it will have some areas with high population density and others with low population density. The focus of mobile operators is to provide coverage for the population, not to cover areas in which service is not required. Therefore we often see coverage expressed in terms of percentage of the population, rather than percentage of the total area of a country.

A better measure of 'network intensity' would be subscribers per square kilometre of network coverage. Among the operators discussed by NERA, Vodafone New Zealand has the second lowest value for this measure, however we note that this value is over 50% higher than that of a 'generic operator' in Sweden.

Therefore, if we consider this one factor alone, we would expect that costs within New Zealand would fall within the range of the benchmark sample – it is clearly not an outlier on this measure in relation to the sample jurisdictions.

2.2 Volume of traffic

Vodafone New Zealand has the lowest average monthly minutes of use per subscriber among the sample operators considered by NERA, but note that this data is missing for California, Florida and New York.

NERA's data also shows that Vodafone New Zealand has the second lowest minutes of use per square kilometre of network coverage – the generic operator in Sweden has the lowest level of traffic per unit of network coverage.

2.3 Labour and land costs

To compare relative labour costs for countries other than the US NERA uses data on labour cost per employee in manufacturing, sourced from the International Labour Organisation (ILO). For the three US states, NERA uses average wages, but does not identify the source of this information.

It is unclear whether the US wage data includes non-salary costs, such as employee benefits and superannuation. Nevertheless, this information is not comparable across jurisdictions and so cross-country comparisons would be misleading.

Manufacturing sector data is inappropriate to use for labour cost comparisons in the telecommunications industry. Characteristics of the manufacturing sector in each country would differ markedly, and so the labour costs would reflect very differing mixtures of labour force skills. We do not believe comparisons of the manufacturing sector would thus be relevant to the telecommunications industry.

The OECD publishes personnel costs per employee for incumbent operators (Exhibit 2.1). This is probably a better proxy for relative labour costs within the mobile sector than the data on the manufacturing industry used by NERA, however not all countries within our sample are within the OECD. Note that the OECD data ranks Telecom New Zealand higher than Korea Telecom, yet these positions are reversed if the manufacturing industry data is used. Information on staff costs is normally available from company annual reports. We would expect that labour costs in Malaysia would be lower than those in New Zealand, and thus New Zealand would have at a minimum the third lowest labour costs per employee among our sample.

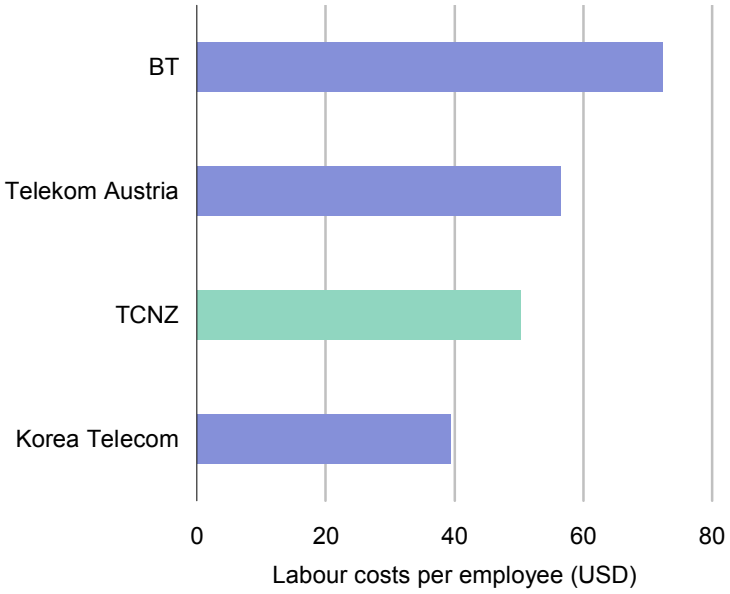

Exhibit 2.1:
Labour costs per employee for a selection of incumbent operators (2003) [Source: OECD]

NERA does not discuss the relative productivity levels within the sample. We have obtained data from the OECD on mobile subscribers per mobile employee (Exhibit 2.2) and clearly mobile operators in New Zealand are more efficient than in the UK, Austria and the United States. Greater efficiency, and thus higher productivity, would result in lower costs in New Zealand.

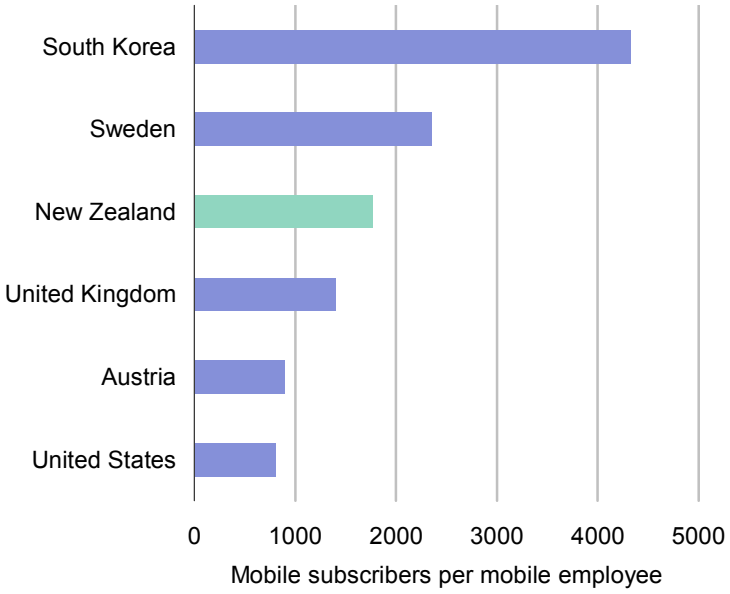

Exhibit 2.2:
Mobile subscribers per mobile employee for selected countries (2003) [Source: OECD]

We agree with NERA that land costs would have an impact upon relative mobile termination costs, however since comparable data is not available, it is impossible to make any conclusions as to the relative position of New Zealand with respect to land costs. We therefore cannot determine whether New Zealand would be an outlier with respect to this factor.

2.4 Size of subscriber base

Three operators considered by NERA have a lower subscriber base than Vodafone New Zealand (2.02 million) – in Florida, New York and Israel (1.47 million, 1.62 million and 1.93 million respectively). Seven of the ten sample operators have a subscriber base of less than 3.4 million (Exhibit 2.3), and Vodafone New Zealand is ranked in the middle of these – clearly not an outlier.

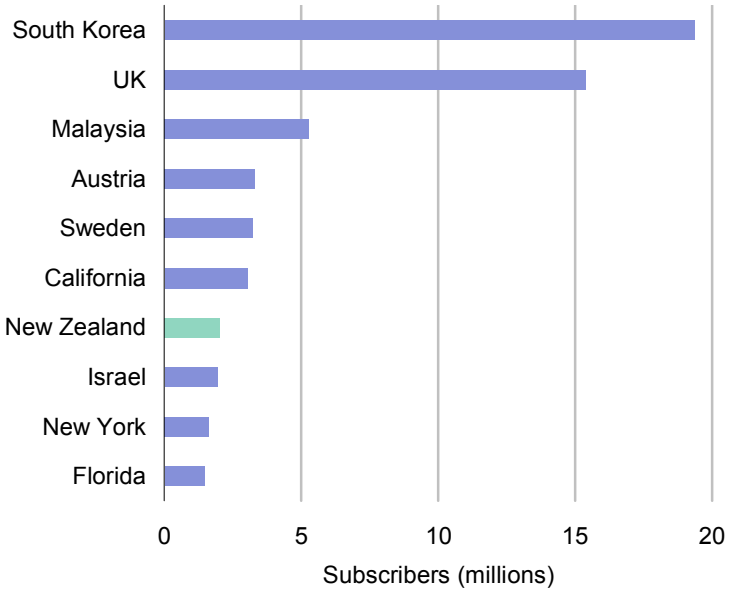

Exhibit 2.3:
Subscriber base for sample operators
[Source: NERA]

New Zealand would therefore be expected to have roughly similar purchasing power to many of the operators within the sample. NERA also notes that Vodafone New Zealand would have better purchasing power than operators of comparable size due to the scale of Vodafone's global operations. Sprint, the sample operator selected by NERA for the three US states, would also have a better purchasing power than the size of the individual state operations may suggest.

2.5 Comparing the New Zealand MTR with the benchmarks

Vodafone disagrees with the Commission's estimate of 15cpm (and falling) for mobile termination[6]. We consider Vodafone's arguments below.

6 Vodafone (2006) *Submission to the Commerce Commission: Schedule 3 Investigation into Regulation of Mobile Termination*, revised draft report, 7 February 2006, paragraph 14.

Is New Zealand a higher cost country than the UK?

Vodafone's claim that New Zealand would be a more expensive place to run a mobile network than in the UK is not supported by evidence. That New Zealand has 40% of the coverage area of the UK, but only 10% of the demand (as stated by Vodafone), is only one factor that would influence costs. There are other factors, not mentioned by Vodafone, which would reduce New Zealand costs as compared with the UK, such as:

- lower labour costs
- higher productivity levels
- lower land costs
- operators have more spectrum
- higher purchasing power for local goods and services.

Without a detailed analysis of costs, it is impossible to state definitively that the costs of mobile termination in New Zealand should be more or less than those in the UK.

We therefore find no conclusive evidence that New Zealand is a more expensive country than the UK in which to provide mobile services.

How should the New Zealand rate compare with that in other jurisdiction, such as Sweden?

Vodafone rightly states that network coverage area and the number of voice minutes are key factors that influence the cost of providing services, and that voice minutes per square kilometre would be a useful indicator for costs. However, as discussed elsewhere in this report, there are many other factors which also have a significant influence on costs, such as:

- labour costs
- productivity levels
- land costs
- terrain
- economies of scale

- spectrum costs and allocation.

Reference to a subset of indicators without also considering all the other key factors that influence costs will provide misleading results when comparing relative costs.

As an example, let us examine the case of Sweden. The network coverage area is almost 19% greater than that in the UK, but the traffic is only one-fifth of UK traffic, yet the cost-based mobile termination rate in Sweden is 11cpm, as compared to 16cpm in the UK (Exhibit 2.4). Swedish voice traffic per square kilometre is even lower than that in New Zealand, so that if we were assessing cost based mobile termination rates on this one factor alone (as does Vodafone in comparing New Zealand with the UK), we would conclude that the rate in New Zealand should be lower than that of Sweden. We also know that labour rates in New Zealand are less than those in Sweden, so this would provide further support to our hypothesis. However, our simple analysis omits a number of key factors for which New Zealand may be more expensive than Sweden – it is impossible to determine the net effect of these without a detailed analysis of costs.

	Network coverage (km^2)	*Subscribers per km^2*	*Total annual minutes (millions)*	*Minutes per km^2 ('000s)*	*Mobile termination cost (NZ cpm)*
New York	20 000	81	12 257	613	9.11
South Korea	98 190	197	45 492	463	4.98
Israel	20 127	96	7 552	375	8.14
Californiа	70 000	43	22 882	327	11.69
Florida	60 000	24	11 091	185	15.43
UK	207 767	74	25 232	121	16.05
Malaysia	82 281	73	9 941	121	5.89
Austria	79 971	41	5 283	66	13.15
New Zealand	**99 168**	**20**	**2 453**	**25**	**15.00**
Sweden	246 560	13	5 334	22	11.05

Exhibit 2.4: *Comparison of mobile termination rates for benchmark sample jurisdictions [Source: Vodafone, NERA, Commerce Commission]*

It is clear from our brief comparison of Sweden and the UK that there are factors other than network coverage and traffic volumes that influence the level of a cost-based termination rate.

2.6 Summary

If we summarise the position of an operator in New Zealand in relation to a selection of measures for operators within the sample (Exhibit 2.5) we find that there is no evidence to suggest that a cost-based mobile termination rate in New Zealand will fall outside the range of the sample benchmarks.

	New Zealand ranking based on NERA data (1=low, 10=high)	*Expected effect on cost as compared with the sample midpoint*
Subscribers per sq km of network coverage	2	↑
Volume of traffic per sq km of network coverage	2	↑
Labour costs	3 (minimum)	↓
Productivity	4 (out of 6)	↓
Land costs	not known	not known
Size of subscriber base	4	neutral

Exhibit 2.5: *Summary of New Zealand's ranking for a selection of key factors among the benchmark sample [Source: Network Strategies]*

Furthermore it should be noted that NERA's comparative analysis (and the table above) omits a number of other key factors recognised by the ACCC (discussed in Section 7) as having a significant effect on costs. These missing factors include:

- cost of capital
- geographic terrain
- spectrum allocations
- the extent to which mobile network operators (MNOs) are vertically-integrated fixed and mobile network operators
- the mobile network technology employed in different countries (i.e. GSM or CDMA).

Our partial results are mixed, with some factors causing costs to be reduced, while others would have the effect of increasing costs, relative to other jurisdictions. Without knowing the relative importance of each factor in determining total costs, nor how New Zealand compares in terms of the omitted factors, it is impossible to determine conclusively whether costs in New Zealand would fall towards either the high, or the low, end of the benchmark sample.

3 Currency conversion

We agree with NERA's recommendation for the use of purchasing power parity rates for currency conversion, rather than the Commission's ten-year average spot rates. Our position on currency conversion has been previously stated[7] in a previous report for TelstraClear.

However, we do not agree with NERA's suggestion that a hybrid method combining spot and PPP rates be used. NERA proposes that the spot and PPP rates be weighted based on the proportion of mobile network costs that are represented by internationally traded goods and services and the proportion represented by non-traded goods and services (labour and local services). This approach has two key problems:

- It would only be valid if both PPP and market exchange rates qualified as inter-currency price indexes which can be used to convert various national interconnection prices into a common unit. While PPP is indeed a suitable index for this purpose, market exchange rates are not[8].

- Certain goods and services that are internationally traded by one country, may be purchased domestically in another, and therefore the weightings may need to be adjusted for each jurisdiction in the benchmark sample. This introduces an additional level of complexity into the analysis (and an increased likely margin of error) which is totally unnecessary, given that PPP rates are perfectly adequate for benchmarking comparisons.

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7 Network Strategies (2002) *Currency conversion for telecommunications benchmarking*, report for TelstraClear, 5 June 2002.

8 *Ibid.*

4 Benchmarking adjustments: the NERA methodology

In its report, NERA illustrates a methodology that purports to adjust UK cost information to estimate the costs of mobile termination in New Zealand.

4.1 Can UK data be used as a benchmark for New Zealand?

When undertaking a benchmarking exercise, it is usual to collect data from a sample of jurisdictions. It is recognised that data for different jurisdictions will always exhibit variation which will be due to numerous parameters, some of which will be quantifiable, while other parameters will be impossible to measure.

Mobile termination rates from the Commission's sample illustrate the variation in cost-based termination rates over those sample jurisdictions, ranging from 5 to 16 cents per minute (Exhibit 4.1). We have previously discussed some of the factors that influence the cost of mobile termination, and clearly these parameters have a significant impact on the costs.

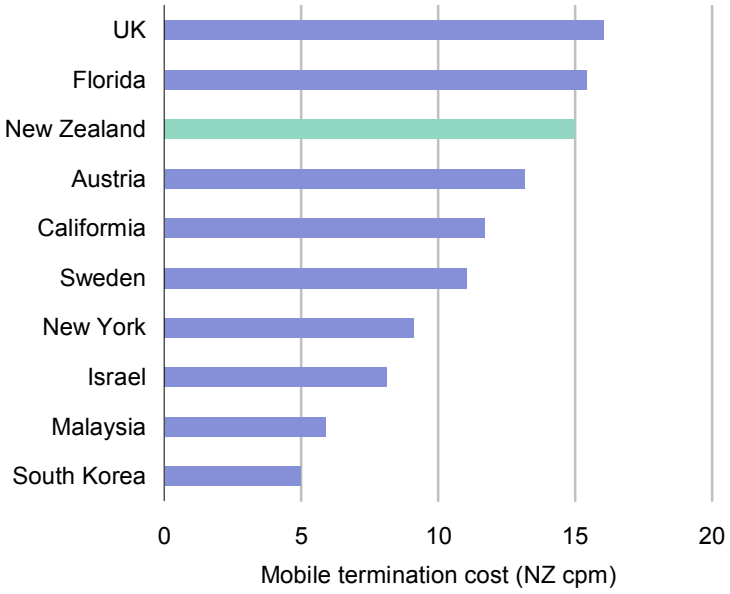

Exhibit 4.1: *Mobile termination charges for the sample jurisdictions (NZ cents per minute) [Source: Commerce Commission]*

Collecting data from a well-chosen sample of suitable jurisdictions allows the decision maker to assess how New Zealand should be placed in relation to the sample members, and thus be guided as to an appropriate benchmark estimate for mobile termination rates.

Clearly, the sample should be such that New Zealand would be placed within the upper and lower bounds of the sample data. If New Zealand were to lie outside this range, there is no guidance for the decision maker to determine how far beyond the boundary New Zealand should be positioned.

Without a large enough sample, the decision maker has little evidence on what the benchmark estimate for New Zealand should be – it becomes more difficult to assess how New Zealand should be placed relative to only a few data points, and indeed those few data points may contain some underlying bias. In a larger sample, where the data points will exhibit a wider range of underlying characteristics, the chance of bias is reduced.

So is it possible to develop a suitable benchmark estimate for New Zealand based on one single data point for the UK? Only if it were possible to quantify and adjust for every parameter that has a significant influence on cost and where New Zealand differs from the

UK. Use of a single data point without any adjustment would be equivalent to assuming that New Zealand characteristics are the same as the UK – clearly an inappropriate assumption.

If this adjustment was only possible for some key parameters but not all, or if the adjustments were to be based on imperfect information, there is a risk that the results will be misleading. In such situations, the safer option would be to use an appropriate sample of data points.

4.2 What adjustments are made?

NERA states that the factors that will have the most impact on costs will be:

- the extent and nature of the rural areas covered
- traffic volumes
- labour costs
- land costs
- differences in technology
- cost of capital.

Adjusting for rural areas

We agree with NERA that a higher proportion of rural areas within the coverage area will increase costs, as these areas are provisioned for reach rather than to provide network capacity. More base stations will result in higher costs.

NERA proposes the following to adjust for the differing levels of rural areas between the UK and New Zealand:

- costs be scaled by the differing numbers of macrocells
- further adjustments be made to account for terrain differences.

However, NERA appears to adjust only for the total number of base stations – this total includes base stations in both urban and rural areas – and terrain differences are not considered. Hence it is misleading for NERA to claim that the costs are adapted for New Zealand conditions.

Furthermore, the number of base stations assumed for the UK operator is 6500, yet NERA notes that this figure was based on a reference of 'more than 6000' base stations on the O_2 website. In fact, the true number of base stations for O_2 may be as little as 6001, which would indicate a worst cast overestimate by NERA of 8.3%. We note that the Orange UK website states that there are 'over 11,000 sites' within its network. Clearly there is substantial variation in the numbers of base stations between UK operators. Scaling the 'generic operator' costs without knowing more precisely how many sites generate those costs would produce flawed results. No sensitivity testing of this assumption was performed by NERA.

We also note that Vodafone New Zealand's website states that Vodafone has 'over 1100' phone sites (which we assume are equivalent to base stations) – at least 7.2% more than the 1026 base stations assumed by NERA.

However, there are fundamental differences between rural areas in New Zealand and in the UK. For example, in the UK, villages may be only two to three kilometres apart, whereas in New Zealand, distances of 30km are more typical. This would influence the types and configurations (and thus costs) of base stations in rural areas.

Furthermore, NERA's claim that the more mountainous terrain in New Zealand requires more base stations to provide coverage is not strictly correct. Such terrain also allows base stations to be positioned higher, thus enabling the base station to achieve a greater coverage than that possible if the terrain was relatively flat.

Volume of traffic

In NERA's discussion concerning the adjustment of UK data to allow for the New Zealand traffic volumes we note the following:

- no information is supplied to indicate the relative number of macrocells and microcells in the UK and New Zealand networks
- adjusting purely the number of equipment elements such as base station controllers, switches and transmission links imposes the implicit assumption that these elements are dimensioned and provisioned in New Zealand similarly to that in the UK
- NERA provides no information on the cost of capital used in the UK.

It should be noted that when dimensioning a mobile network, it is not the total traffic that is most relevant – the crucial driver is the busy hour traffic. The use of UK assumptions for conversion of total traffic to busy hour traffic may be inappropriate for New Zealand. NERA provides no information on the UK busy hour assumptions.

Labour costs

We agree with NERA that it is difficult to obtain appropriate comparative labour rates for the mobile telecommunications sector. Without a detailed study into relative wage costs, such as NERA suggests, analysts must use some more aggregate level of data.

NERA's use of labour costs in the manufacturing sector is inappropriate to apply to the telecommunications industry. We note that the OECD data on labour costs for incumbent operators (discussed in Section 2.3) suggests that New Zealand labour costs are 70% of those in the UK – somewhat higher than NERA's assumption of 60% – although we note that the Telecom New Zealand costs are inflated by the high labour costs of its Australian operations.

NERA also rightly points out that labour rates alone are not sufficient – labour costs would also be influenced by productivity levels, however no adjustment for differences in productivity are made to the UK data.

NERA omits to mention that in addition to wage costs and productivity levels, labour costs are also affected by differences in non-salary personnel costs, such as superannuation and other employee benefits or charges. It is therefore essential that the measure used for comparing labour rates includes these additional costs.

We therefore conclude that all factors driving labour cost differences were not accounted for by NERA. In our view, deriving appropriate estimates of the relativities between UK and New Zealand labour costs would be a time-consuming exercise.

Land costs

NERA's assumption that New Zealand land costs are 20% of those in the UK is not based on any solid data.

Land costs do vary substantially between jurisdictions – they also vary significantly within a country. For example land costs in dense urban areas are very different to those in rural areas. This means that any adjustment made needs to consider not only the relative land costs, but also the different urban/rural mixes of base station sites between the UK and New Zealand.

However, land costs are only one component of the costs of a base station site. Other factors that influence site costs (but are not considered by NERA) include:

- **site sharing:** in the UK, sites may be shared by up to four mobile operators (thus reducing each operator's individual costs), whereas in New Zealand sharing rarely occurs – note that sharing could be considered a commercial decision by the operators
- **utilities:** site costs also include the provision of power and airconditioning; costs of such utilities would vary between the UK and New Zealand, and in addition the respective climates may require different types (and thus costs) of heating/cooling solutions
- **consent:** as part of the site acquisition process, operators generally need to seek consent or formal permits from various bodies, such as local government; costs are likely to vary substantially between the UK and New Zealand.

As with labour costs, NERA has not adjusted for many of factors driving land cost differences.

Differences in technology

While technologies such as GSM and CDMA have different cost structures, the overall costs may be relatively similar. This is a pricing decision by the vendors, as if it were not the case, sales of the more expensive technology would be difficult to achieve without the technology being able to offer additional clear benefits.

In our experience, there is also some fluidity in the costs of equipment from country to country. As an example, we have found that prices paid in a particular developing country compared to those paid in New Zealand implied a cross-currency conversion rate of approximately 1:1 – yet the spot exchange rate was such that a New Zealand dollar was worth several of the local currency units.

Fixed-mobile integration

As NERA states, an integrated fixed and mobile operator, such as Telecom New Zealand, has the opportunity to save costs through shared resources that mobile-only operators (such as the four operators in the UK) do not.

However we note that mobile operators that are part of a larger operation – such as Vodafone New Zealand, via Vodafone Pacific and also the Vodafone Group – also have some scope for cost savings.

Cost of capital

Although NERA states that it would be possible to estimate the effect of differences in the cost of capital applied to a UK operator and a New Zealand operator, this adjustment was not made.

Based on our experiences with other regulatory cost modelling exercises, we would expect the results to be sensitive to the value of the cost of capital.

4.3 What adjustments were omitted?

We have previously noted that NERA has not made any adjustments for cost of capital, fixed-mobile integration (although we note that this could be modelled implicitly through economies of scale assumptions), site costs other than land costs, productivity levels or terrain. These are not the only adjustments that have been omitted.

Spectrum

NERA does not appear to have made any adjustment for the differing amounts of spectrum held by the operators.

In New Zealand, Vodafone has 2 × 15MHz in the 900MHz band, while Telecom New Zealand has 2 × 20MHz in the 800MHz band. Note that in the UK, Vodafone and O_2 each have 2 × 12.2MHz in the 900MHz band[9].

The amount of available spectrum is an issue in areas with high traffic, such as in urban areas. With more spectrum, operators can put additional carriers in a base station to meet higher demand; with a lesser amount of spectrum operators must reuse the spectrum, via cell splitting and installing additional base stations. Costs will therefore be greater for an operator with less spectrum (such as in the UK).

Input costs

It is unclear as to what adjustment (if any) NERA applied to allow for differences in the cost of local goods and services between New Zealand and the UK. These differences are normally adjusted for through use of PPP rates. NERA certainly discusses the use of PPP and spot rates, but does not state definitively which rate was used for the adjustment of UK data.

9 Source: European Commission.

If the 10-year average spot rate was used, then the UK costs have not been adjusted to reflect differences in cost of components such as power, construction and other locally sourced items.

4.4 Other assumptions made by NERA

Network Management System

NERA assumes that the Network Management System (NMS) is a fixed cost, and thus a New Zealand operator would pay the same as a UK operator.

We believe that there may be some scaling in the price of an NMS, with the price being driven by the number of network nodes, which may include local switches, tandem switches, remote line units (RLUs) and digital loop carriers (DLCs).

This would mean that the NMS price would be influenced by the network size and configuration.

Vendors may offer a different (and cheaper) solution for an operator with around two million subscribers (such as Vodafone or Telecom in New Zealand) to that offered to a larger operator (such as NERA's generic UK operator).

Spectrum costs

NERA appears to have made an assumption that the cost of New Zealand spectrum was 7.5% of the UK spectrum cost, without any firm data.

Home Location Register

NERA has assumed that the Home Location Register (HLR) costs are driven by the number of subscribers. We note that the relationship between HLR costs and subscribers is

not strictly linear, due to the large capacity of HLRs, and the future growth expectations of the operator. For example, the generic UK operator may have an HLR with capacity of 20 million subscribers, but a New Zealand operator may choose to select one with a capacity of 3 million subscribers.

'Other costs'

NERA describes 'other costs' being driven by volumes of traffic – we assume that this applies to cost components other than those specifically mentioned by NERA, namely NMS, spectrum, sites and HLRs.

We have noted previously that costs for some network elements are driven by busy hour traffic, yet NERA has provided no information on the busy hour assumptions.

4.5 Summary

NERA's adjustment methodology falls short of what would be required to adapt a UK benchmark for New Zealand. We find that:

- no adjustments were made for a number of key factors, such as terrain, mix of urban and rural sites, cost of capital and spectrum allocation
- some adjustments were made based solely on assumptions about the New Zealand environment, without any firm basis in fact (such as land costs)
- some adjustments could only be described as partial, such as modifications to labour costs without consideration of productivity differences, and site costs, which are affected by variation in utilities costs, site sharing and consent
- a number of assumptions relating to the New Zealand environment were clearly flawed.

With so many key factors within the UK data not being adequately amended to capture New Zealand characteristics, the results obtained from NERA's methodology are misleading and should not be used as an estimate of the likely cost-based MTR for New Zealand.

Further detailed analysis of the New Zealand and UK data would be required to obtain a more robust estimate of a mobile termination rate for New Zealand based on a modification of NERA's methodology, however the effort involved would be substantial.

We believe that should the Commission be minded to attempt this then the level of effort is such that more accurate New Zealand-oriented LRIC cost models could be developed for the same budget.

Further, given that there is no evidence that the cost of mobile termination in New Zealand would lie outside the range of the Commission's sample benchmarks, there is no reason why the Commission should not rely on the unadjusted benchmarking for the purposes of the Cost Benefit Analysis. At this point in time, the Commission is not setting the price of mobile termination – rather the Commission is simply recommending that mobile termination be designated as cost-based.

5 Mobile termination rates and prices in other jurisdictions

5.1 Mobile termination rates

In its submission, Vodafone provides a comparison of mobile termination rates in 24 countries across Europe, Japan and Australasia in which Vodafone operates. It should be noted that very few of these countries have cost-based termination rates. Indeed the European Commission has been concerned for some time that mobile termination rates 'bear no relation to costs'[10] and has been active in encouraging rates to fall.

Vodafone's comparison therefore is not reflective of the cost of mobile termination in those countries, and so cannot be used to make any conclusions regarding the cost of termination in New Zealand.

Clearly, Vodafone's claim that the Commission's proposed rate of 15cpm would be 'amongst the lowest in the world' is incorrect, as the Commission's own benchmarking has found seven jurisdictions in which the rates are lower (and in some instances, significantly lower).

In its analysis, Vodafone compares the current New Zealand rate to the average of these 24 countries. Note that this average is inflated by the very high rates in just three countries (Greece, Romania and Switzerland). This means that in only seven of the 24 countries (including New Zealand) is the mobile termination rate higher than the average.

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10 European Commission (2004) *European Electronic Communications Regulation and Markets 2004*, 2 December 2004.

When data is skewed by a small number of extreme data points (such as in Vodafone's example), use of the statistical average is not recommended as those few data points will have a large influence on the result. In such cases, the median is recommended, as this indicates the mid-point of the observations and is not affected by extreme outliers. However in this instance the median would not represent an appropriate cost estimate for mobile termination as the rates charged are not all cost-based.

Vodafone's analysis of incoming revenue per voice minute is similarly flawed, with a small number of relatively expensive countries having a large effect on the statistical average. The median would be a better measure of how New Zealand compares with this sample.

5.2 Retail mobile prices

The Teligen study of mobile prices in OECD countries has certainly shown New Zealand to be one of the most expensive countries in the world. While the most recent study (November 2005) has found improvements in New Zealand's rankings, these improvements have only been three or four places. Price still remain expensive in comparison with other OECD countries.

Vodafone notes that the Teligen analysis leaves out promotions and multi-connection plans. In fact these are omitted for all countries. In Australia, mobile operators offer a wide range of discounts, promotions and other offers, as well as multi-connection plans. If Vodafone wishes to include such factors for New Zealand, they must also be included for all countries. Vodafone's analysis where its own promotions are included within its prices, but no other operator is similarly adjusted, provides a misleading comparison.

As an example, we recently undertook a comparison of mobile prepaid rates in New Zealand and Australia[11] and found that Australians pay substantially less than New Zealanders largely due to the extensive discounts offered to prepaid customers in Australia. Similar discounts are not offered in New Zealand.

11 See http://www.strategies.nzl.com/wpapers/2006011.htm.

The usage profiles used by Teligen are not those of a typical Vodafone subscriber. However clearly the usage patterns would be influenced by call charges, and so customising the benchmarking to suit an operator's typical user – who clearly optimises their calling behaviour based on affordability constraints – will always advantage that operator.

5.3 Summary

From the data Vodafone provides, it is unclear if retail prices would rise in response to mobile termination rate reductions. Independent analysis has shown that retail mobile rates are high in New Zealand, and we have been offered no firm evidence that costs are higher in New Zealand than in countries like the UK and Sweden.

6 Should the mobile termination rate decline?

In its submission[12], Telecom discusses the Commission's new factual scenario in which the mobile termination rate declines from 15cpm in 2006/07 to 12cpm in 2010/11. Telecom claims that it would be more prudent to set the initial mobile termination rate to be constant for this period.

Telecom states that the 15cpm starting point is only an estimate, and that if the Commission undertook a TSLRIC costing exercise, a different rate may result. This is indeed true. However, at this point the Commission is using the estimate only to inform the decision regarding whether to designate the fixed-to-mobile voice termination service – the Commission is not seeking to set the mobile termination rate.

Furthermore, a TSLRIC costing exercise is very likely to result in a rate other than 15cpm – and given that only two jurisdictions in the Commission's benchmark sample (UK and Florida) have mobile termination rates higher than 15cpm, there is a definite possibility that the resultant rate would be lower. When compared with Sweden, which has a mobile termination rate of 11cpm, New Zealand has:

- greater traffic per square kilometre of coverage
- greater subscribers per square kilometre of coverage
- greater proportion of people in urban areas
- lower labour costs.

12 Telecom New Zealand (2006) *Submission in respect of the Commerce Commission's Draft Reconsideration Report for its Schedule 3 Investigation into Regulation of Mobile Termination*, 7 February 2006.

In addition, Telecom claims that the Commission's analysis to support the decline of the mobile termination rate is based on incorrect traffic projections. Contrary to Telecom, we believe that the Commission's traffic per subscriber forecasts are reasonable. The Commission has assumed a slight decline in minutes per subscriber and fixed-to-mobile minutes per subscriber. Traffic will be influenced by four factors:

- take-up of services by users currently without a phone but who are most likely to have lower than average usage levels
- increases in the numbers of people with multiple phones, who will be splitting usage over two (or more) services – these users are most likely to be higher than average users
- increased usage as a result of falling price trends
- stimulation of usage levels due to lower prices as the reduced cost of mobile termination is passed through to the customer (assuming this will occur).

We also note that average usage levels in New Zealand are relatively low in comparison with other jurisdictions (Exhibit 6.1). Users in countries with penetration rates of over 100% (such as Ireland, the UK and Sweden) generate far more traffic than those in New Zealand. While the 'free' local calls in New Zealand may impose some constraints on mobile traffic, we note that in Canada where there is also 'free' local calling, Bell Canada subscribers generate 2.5 times the amount of traffic than that generated by Vodafone New Zealand subscribers. So what other factor may influence the low traffic levels in New Zealand? With mobile services being one of the most expensive in the OECD, it seems likely that price is constraining usage in New Zealand. There is clearly considerable opportunity for increases in demand if prices fall.

Operator	*Mobile penetration*	*Monthly traffic per subscriber (minutes)*
Bell Canada	47%	255
O_2 Ireland	100%	215
Maxis Malaysia	57%	210
Telenor Mobil Norway	91%	186
Sonofon Denmark	98%	183
DiGi Malaysia	57%	175
Pannon Hungary	86%	145
O_2 UK	105%	144
Telenor Mobil Sweden	110%	144
O_2 Germany	87%	114
Vodafone New Zealand	**86%**	**101**

Exhibit 6.1: *Monthly incoming and outgoing traffic per subscriber for a selection of mobile operators [Source: operators, ITU, NERA, Commerce Commission, Baskerville]*

Telecom claims that the Commission's usage assumptions are not plausible if the penetration rate is over 100%. In 2006/07 the Commission assumes outgoing traffic of 71 minutes per month per subscriber, and fixed-to-mobile traffic of 23 minutes per month per subscriber – still very modest in comparison with traffic in other jurisdictions.

With increased traffic on the network – via a combination of growth in subscribers and changes in calling behaviour – the cost of mobile termination, and thus the termination rate should decrease (if costs remain constant).

As we have noted previously, there is likely to be increases in the level of non-voice usage, such as data and various content services, as operators seek to access additional revenue streams as growth in voice revenues slows. This will mean that an increasing proportion of costs will be shared with non-voice services, resulting in further declines in voice mobile termination costs.

Telecom attempts to illustrate the increasing cost of providing mobile services by claiming that mobile handsets are a major component of mobile equipment costs[13]. In fact, the cost

13 *Ibid*, paragraph 94.

of mobile handsets is irrelevant to the cost of mobile termination. Only traffic-dependent costs can be allocated to the cost of termination.

The various different cost components will be subject to different influences, for example:

- technology costs tend to decrease over time, however there may be some cost increases through the introduction of new technologies – noting that the objectives of implementing new technologies are generally to gain new revenue streams, increase productivity or reduce overall costs
- productivity is likely to improve further, resulting in lower costs
- transmission costs are expected to fall, in line with current trends.

Given the expected trends in demand and costs, it is therefore difficult to support Telecom's recommendation of a constant mobile termination rate.

7 Benchmarking for mobile termination: the ACCC view

The ACCC's view on adjusting for factors which drive cost differences between mobile termination rates (MTRs) in jurisdictions is presented in a recent report[14] (referred to here as the 'ACCC report'):

> ... any analysis that attempts to adjust for factors should be conducted comprehensively, or not at all. This is because, in the Commission's view, different factors will tend to push particular cost estimates in different directions and by different amounts. Therefore, an approach that only makes 'partial' adjustments could lead to misleading results. [p. 124]

The ACCC report presents ten factors which influence the cost of the mobile termination in different jurisdictions:

- cost of capital in different jurisdictions
- exchange rate
- geographic terrain
- land and labour costs in different jurisdictions
- network purchasing power
- network usage and scale
- population density
- spectrum allocations
- the extent to which MNOs are vertically-integrated fixed and mobile network operators
- the mobile network technology employed in different countries (i.e. GSM or CDMA).

14 ACCC (2006). *Optus's undertaking with respect to the supply of its Domestic GSM Terminating Access Service (DGTAS). Final Decision. Public version*. February 2006.

In December 2004 Optus submitted to the ACCC a report[15] on an MTR benchmarking analysis which was conducted by CRA in support of Optus' undertaking to estimate a LRIC MTR for Australia. CRA's analysis attempts to adjust for cost factors. The ACCC report discusses CRA's analysis and dismisses it on the basis that it does not adjust for many of the above factors, only for exchange rates, cost of capital and 'geographic terrain/network coverage'. The ACCC instead favours the results of an earlier ACCC benchmarking analysis which does not adjust for cost factors[16].

Network Strategies contends that the knowledge gained through any exercise seeking to quantify the above factors would be best used in a bottom-up modelling exercise. This is also the stance of the ACCC[17]:

> ... the possession of the information sufficient to make a comprehensive adjustment is tantamount to that necessary to construct a bottom-up model. In the Commission's view, use of the information for the latter purpose would be superior to using it for adjusting cost estimates from other jurisdictions. [p. 124]

In summary, the ACCC's position on adjusting for factors which drive cost differences between mobile termination rates (MTRs) in jurisdictions is that:

- adjustments should be comprehensive or they should not be attempted
- an approach that only makes partial adjustments could lead to misleading results

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15 CRA (2004). *International benchmarking of mobile termination charges – an update*. 20 December 2004.

16 ACCC (2004). *Mobile Services Review, Mobile Terminating Access Service. Final Decision on whether or not the Commission should extend, vary or revoke its existing declaration of the mobile terminating access service*. June 2004.

17 ACCC (2006). *Optus's undertaking with respect to the supply of its Domestic GSM Terminating Access Service (DGTAS). Final Decision. Public version*. February 2006.

- information pertaining to cost drivers could be better used in a bottom-up costing model than in adjusting benchmarks.

8 Conclusions

Despite the claims of Telecom New Zealand and Vodafone, we find that there has been no firm evidence presented that proves that a cost-based mobile termination rate in New Zealand will fall outside the range of the sample benchmarks, nor that New Zealand is a high-cost country.

The evidence that has been presented has been highly selective, and largely speculative in nature. Furthermore a number of factors that would indicate lower costs in New Zealand have been omitted from consideration.

We have found that in New Zealand certain cost drivers would result in reduced costs, while others would have the effect of increasing costs, relative to other jurisdictions. Without knowing the relative importance of each factor in determining total costs, nor how New Zealand compares in terms of the omitted factors, it is impossible to conclude that costs in New Zealand would fall outside the benchmark sample or towards either the high or the low end.

The adjustment methodology proposed by NERA falls short of what would be required to adapt a UK benchmark for New Zealand. We find that:

- no adjustments were made for a number of key factors, such as terrain, mix of urban and rural sites, cost of capital and spectrum allocation
- some adjustments were made based solely on assumptions about the New Zealand environment, without any firm basis in fact (such as land costs)
- some adjustments could only be described as partial, such as modifications to labour costs without consideration of productivity differences, and site costs, which are

influenced by factors other than land costs that would also vary between New Zealand and the UK

- a number of assumptions relating to the New Zealand environment were clearly flawed.

With so many key factors within the UK data not being adequately amended to capture New Zealand characteristics, the results obtained from NERA's methodology are misleading and should not be used.

The ACCC has noted that any adjustment methodology should be comprehensive, and that if this was not possible it would be preferable to use unadjusted data as partial adjustments would cause misleading results.

Using a partial adjustment approach, as in the NERA methodology, would mean that the resultant estimate would be a type of hybrid UK/New Zealand cost which would certainly not be applicable for the New Zealand environment, and will not be reflective of the true costs. Further, as stated previously, at this stage the Commission is not setting the mobile termination rate. Rather, the Commission is using the benchmarking to inform the decision about whether to designate the fixed-to-mobile termination service.

By using the Commission's approach of benchmarking cost-based mobile termination rates in a sample of operators with varying characteristics, the Commission is actively considering how New Zealand should be placed in relation to those operators. In fact, the Commission has made a conservative judgement in assuming New Zealand will be ranked close to the more costly jurisdictions within the sample. Unless operators can provide conclusive data which can support their claims of even higher underlying costs, there is no reason for the Commission to revise its estimated rate upwards.