



# **Response to issues in the NZCC draft decision on regulation of mobile termination**

**A REPORT PREPARED FOR VODAFONE NEW ZEALAND**

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# Executive summary

1 In this report Frontier reviews the NZCC's:

- Modelling of the static benefits of regulation;
- Analysis of the effect of a decision to regulate fixed-to-mobile termination on 2G networks on the timing of investment in 3G technology; and
- Comparison of the cost of fixed-to-mobile termination in other countries and the use of this information in determining an estimate of the cost of fixed-to-mobile termination in New Zealand.

## STATIC MODELLING

2 We conclude that the modeling of static benefits of regulation outlined in the Draft Report is flawed. In particular:

1. It focuses, in the first instance, on the change in consumer surplus of parties making fixed-to-mobile calls that results from the proposed regulation. The appropriate basis for considering the costs and benefits to society is an analysis of the public benefits.
2. It employs inconsistent assumptions when modelling the prices of fixed-to-mobile calls under the factual and counterfactual scenarios; and
3. It ignores the effects of regulation on changes in prices other than the prices of fixed-to-mobile calls.

3 As a result of these errors, the modelling in the Draft Report substantially overestimates the static benefits of the proposed regulation of fixed-to-mobile termination on 2G networks.

## TIMING OF INVESTMENT IN 3G

4 In considering the impact on dynamic efficiency, the Draft Report fails to recognise that the proposed regulation will affect incentives to invest in 3G technology. The NZCC's logic that has led it to propose regulation of fixed-to-mobile termination on 2G networks will apply in exactly the same way to 3G networks once the investment has been undertaken. Mobile operators will foresee this and take it into account in considering what investments to make.

5 It is difficult to estimate the welfare effect of a delay in investment in 3G with any precision. There is considerable uncertainty regarding the cost of establishing 3G networks, the demand for the services, the price for use of those services, and the precise effect of the NZCC's proposed regulation on the timing of investment. However it is possible to provide a broad indication of the cost to society if the NZCC's proposed regulation delays investment in 3G technology by one year.

6 We estimate that the costs to society if investment in 3G is delayed by a single year could be in the region of \$80 million. This is around three times the NZCC's estimate of the public benefits of the proposed regulation (\$27 million).

## **BENCHMARKING**

- 7 Our review of the Draft Report's comparison of the cost of fixed-to-mobile termination in other countries has led us to conclude that it provides little useful information on the likely cost of fixed-to-mobile termination in New Zealand.
- 8 It is not clear that the estimates of costs in other countries presented in the Draft Report are sufficiently relevant to provide the basis for establishing a regulatory pricing principle.

# 1 Introduction

9 Vodafone New Zealand has asked Frontier Economics to assist them to respond to certain points raised by the New Zealand Commerce Commission (NZCC) in its Draft Report<sup>1</sup> on fixed-to-mobile termination rates. Specifically, Frontier has been asked to review the NZCC's:

- Modelling of the static benefits of regulation;
- Analysis of the effect of a decision to regulate fixed-to-mobile termination rates on mobile network operators' 2G networks on the timing of investment in 3G technology; and
- Comparison of the cost of fixed-to-mobile termination in other countries and the use of this information in determining an estimate of the cost of fixed-to-mobile termination in New Zealand.

10 This report is structured as follows:

- Section 2 reviews the NZCC analysis of the static benefits of regulating MTRs, discusses the treatment of consumer and producer surplus, and some of the assumptions underpinning its analysis;
- In section 3 we present our analysis of the effects on investment in 3G and seek to quantify the welfare effects of any delay in the roll-out of 3G technology;
- Section 4 reviews the NZCC approach to benchmarking international MTRs; and
- In section 5 we summarise our conclusions.

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<sup>1</sup> Telecommunications Act 2001: Schedule 3 Investigation into regulation of mobile termination, Draft Report, Commerce Commission, 18 October 2004, is referred to as the Draft Report in this paper.

## 2 The NZCC evidence of static benefits of regulation

### 2.1 OUTLINE OF THE NZCC APPROACH

11 The Draft Report bases its assessment of the potential benefits of regulation on an estimate of the gain in consumer surplus that will accrue to fixed-to-mobile callers over the next five years. The argument behind this assessment is that regulation will reduce the prices of mobile termination compared with the decline in prices that would be expected to occur in the absence of regulation. This reduction in mobile termination prices will, in turn, lead to a reduction in the prices of fixed-to-mobile calls and this reduction in fixed-to-mobile prices will produce a gain in the surplus that accrues to those who use this service. The NZCC's estimate of the value of this gain is the basis of the argument in the Draft Report that regulation will yield net benefits.

12 The Draft Report qualifies this gain to fixed-to-mobile users in a number of ways. In the first place, the Draft Report acknowledges that some of the gain to users is a loss to shareholders in the mobile companies. The Draft Report shows alternative results in which the public benefits of a reduction in fixed-to-mobile prices are considered, rather than the change in consumer surplus. Secondly, the Draft Report acknowledges that the process of regulation involves costs and the Draft Report subtracts these costs. Finally, the Draft Report discusses the issue of effects of regulation on incentives to invest. We discuss this point further in Section 3.

13 The static modelling of the Draft Report suffers from a number of defects. In particular it:

- Seeks to elevate the benefits to a particular class of consumers above those of benefits that accrue to society as a whole. That is, it presents changes in the consumer surplus of parties making fixed-to-mobile as the starting point for its consideration of the benefits of the proposed regulation. The appropriate basis on which to assess the impact of the intervention is to review the public benefits or economic efficiency expected to be generated.
- Employs inconsistent assumptions when modelling the prices of fixed-to-mobile calls under the factual and counter-factual scenarios.
- Ignores the effects of regulation on changes in prices other than the prices of fixed-to-mobile calls.

14 Each of these three problems is examined in turn.

### 2.2 CONSUMER SURPLUS VERSUS EFFICIENCY

15 Economics distinguishes considerations of economic efficiency from considerations of the distribution of wealth (or income). When evaluating the effects of a proposed policy on economic efficiency, economics employs what is

widely known as Hume's law: that a dollar is a dollar. This means that dollars are counted equally no matter what category of person gains or loses them.<sup>2</sup>

16 The logic behind Hume's law is very simple. The policy tools that are available to the state to promote economic efficiency are relatively inefficient in achieving a good distribution of wealth. Tools such as antitrust policy or price controls are useful in promoting economic efficiency but they are highly inefficient in promoting a fair distribution of wealth. Standard texts on antitrust law and policy stress the primacy of economic efficiency and economic growth among the various goals of antitrust policy. These treatments generally follow the classic statement of Kaysen and Turner:

To sum up, efficiency and progressiveness are the most important results whose achievement can be substantially influenced by antitrust policy. Thus they furnish the criteria by which antitrust policy aimed at producing desirable economic results must be judged.<sup>3</sup>

17 Consider the control of mobile termination prices. This may have certain effects on economic efficiency. It may also redistribute wealth from certain groups to others. In considering the change in consumer surplus, the Draft Report takes the view that a redistribution of wealth from any group to users of fixed-to-mobile calls is a good thing. Any extra dollar in the hands of the users of fixed-to-mobile calls is counted as a net benefit even if that dollar is a straight transfer from another group in society.

18 The problem with this approach is that the Draft Report presents no evidence of the extent to which users of fixed-to-mobile calls are particularly deserving compared with those from whom the dollars are transferred. Suppose that a large proportion of fixed-to-mobile calls are undertaken by businesses. Suppose, further, that the dollars that are transferred are transferred principally from shareholders in mobile phone companies to shareholders in the businesses that undertake fixed-to-mobile calls. On these assumptions, any judgment about the merits of this transfer would have to investigate the wealth of the two groups of shareholders – not the wealth of the companies, but the wealth of the ultimate owners of the profits, including the beneficiaries of the relevant pension funds.

19 This simple example shows that the economic efficiency is a superior standard to use in evaluating public policies (such as the benefits of price controls) rather than consumer surplus. The adoption of the standard of economic efficiency does not mean that one devalues the importance of the distribution of wealth. It merely acknowledges that policy tools, such as price control, that may be useful weapons in the search for economic efficiency are highly inefficient as weapons to secure a fair distribution of resources.

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<sup>2</sup> Robert R Officer and Philip L Williams, "The Public Benefit Test in an Authorisation Decision", in Megan Richardson and Philip Williams (eds.), *The Law and the Market: Essays in Honour of Maureen Brunt*, (The Federation Press, 1995).

<sup>3</sup> Carl Kaysen and Donald F Turner, *Antitrust Policy, An Economic and Legal Analysis*, Harvard University Press, 1959, pp 13-14.

20 Paragraph 62 of the Draft Report attempts to tie its valuing of redistributed dollars to consumers:

As discussed in Chapter 4, the Commission's view is that limited competition in the market for mobile termination is resulting in mobile network operators setting mobile termination rates considerably above cost, and this is resulting in limited competition to the detriment of end-users in the downstream retail market for tolls and fixed-to-mobile services. The Commission considers that the consumer welfare approach applied in Chapter 5 of the Report ensures that the Commission makes a valid assessment on whether regulating mobile termination rates will achieve the purpose in section 18 of the Act, by taking into account the transfer of any monopoly profits from producers to consumers that would occur over time if the market was competitive.

21 The burden of this paragraph seems to be that the regulation of mobile termination charges is justified because it replicates the results of a competitive process in redistributing wealth towards users of fixed-to-mobile calls. This seems to confuse: (i) the outcomes of a competitive market; with (ii) the reasons why economists favour competitive markets. Economists favour competitive processes because they promote economic efficiency –not (to repeat) because of the ways in which they redistribute wealth. It would strike any economist as exceedingly odd to favour regulation on the ground that it produces a distribution of wealth similar to that which would be produced by a competitive process. Yet this seems to be the argument that the Draft Report is using to justify its use of a consumer surplus standard.

22 The Draft Report's use of a consumer surplus standard is contrary to the standard principles of economics. Economics argues against using instruments such as antitrust policy or price controls to redistribute wealth on the simple ground that these are inefficient instruments to achieve those objectives.

23 The appropriate basis on which to consider the effects of the proposed regulation is to consider the impact on public benefits. This analysis is undertaken by the NZCC as an alternative to its consumer surplus approach. This approach yields an estimate of public benefits of \$27 million, a fraction of its estimate of the increase in consumer surplus (\$185-\$217 million).

24 Although we consider that a public benefits test is conceptually the correct approach, we consider the methodology used to estimate the public benefits in the Draft Report is likely generate an over-estimate of the actual public benefits. This is discussed in the sections below.

### **2.3 INCONSISTENT MODELLING OF FACTUAL AND COUNTERFACTUAL PRICES**

25 To estimate the change in consumer surplus and the public benefits caused by the implementation of regulation, the Draft Report estimates the prices of fixed-to-mobile calls over the next five years with regulation (the factual) and without regulation (the counterfactual). The counterfactual estimates are based on a simple extrapolation of recent trends. According to the Draft Report, prices of fixed-to-mobile calls have fallen at an average rate of 4 per cent per annum since

1997, so they assume as the counterfactual that prices will continue to fall in this manner.<sup>4</sup>

26 These assumptions about the prices of fixed-to-mobile calls in the counterfactual are in marked contrast to those of the factual scenarios. The factual scenarios assume that the prices of fixed-to-mobile calls will fall at a faster rate than under the counterfactual scenario for two reasons. The first reason is that mobile termination charges will be reduced through regulation and this saving will, to some extent, be passed through to users of fixed-to-mobile calls. The second reason is that the provision of fixed-to-mobile services is likely to become more competitive over time.

27 The Draft Report gives three reasons why it assumes that the provision of fixed-to-mobile services is likely to become more competitive in the factual than it will be in the counterfactual.<sup>5</sup>

- The first reason is that the wholesale provisions in Schedule 1 of the Act will allow for access and unbundling of Telecom's retail services;
- Secondly, pre-selection; and
- Finally, reduced ability of Telecom to engage in price-squeezing.

28 The inconsistency arises because these factors have little or nothing to do with the proposed regulation of mobile termination charges. That is, they will apply equally in the factual and in the counterfactual.

29 In relation to point 3, it is not clear that regulation of fixed-to-mobile termination will prevent an integrated carrier from engaging in price squeezing. If regulation forces mobile operators to recover less fixed and common costs through their fixed-to-mobile termination charges it may reduce the scope for price differences between integrated and non-integrated carriers. However, if it is optimal for an integrated carrier to price on-net fixed-to-mobile termination at marginal cost (or LRIC) in setting its retail price for on-net fixed-to-mobile calls, it will be able to charge customers less than any fixed line operator that pays for fixed-to-mobile termination at a rate that enables mobile operators to recover some proportion of fixed and common costs. This is true in both the factual and the counterfactual.

30 Points one and two relate to competitive conditions that exist for fixed line operators irrespective of whether the fixed-to-mobile termination rate is regulated. The Draft Report should have assumed that the increased competition caused by these two factors will be present in both the factual and in the counterfactual. If these factors were applied consistently to the factual and to the counterfactual, the Draft Report would have assumed a faster rate of reduction of fixed-to-mobile prices in the counterfactual. The effect of the inconsistency is to exaggerate the magnitude of the benefit of regulation.

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<sup>4</sup> Draft Report, paragraphs 354-356

<sup>5</sup> Draft Report, paragraphs 481-484

31 For example, if factors one and two apply equally in the counterfactual as they do  
in factual 1, the counterfactual prices should reflect the erosion of the NZCC's  
estimate of fixed-to-mobile operators' margin of 8.39 cpm on fixed-to-mobile  
calls by 2010. Even if we adopt the NZCC's estimate of the rate of decline in  
mobile termination rates this would result in a counterfactual price of 27.82cpm  
in 2010.<sup>6</sup> This is significantly lower than the NZCC's assumed counterfactual  
fixed-to-mobile price of 32.87 cpm in 2010.

## 2.4 THE EFFECTS OF CHANGES IN OTHER PRICES.

32 The final defect with the static modelling of the Draft Report is that it confines  
itself to measuring the effects of changes in the prices of fixed-to-mobile  
services. In fact, many prices will be affected by the proposed regulation and  
even static modelling must take these effects into account. Obvious prices that  
will be affected are the prices of mobile originated calls and mobile subscriptions.

33 There are three ways in which these prices will be affected:

- Any reductions in prices will cause changes in demands for services that are substitutes for, or complements with, the service whose price has changed;
- Changes in the profitability of mobile operators may lead to changes in the level of investment and a subsequent rebalancing of tariffs; and
- If changes in tariffs affect the process of competition in the mobile services market, this may also drive changes in the prices of other mobile services.

34 A proper modelling of the effects of regulation on prices and social welfare  
would take these effects into account. The Draft Report acknowledges that  
mobile origination charges may increase as a result of the regulation<sup>7</sup> but the  
effects of this on consumer welfare are not quantified. It disregards any cross-  
price effects, and discounts the 'waterbed effect'.

35 The waterbed effect postulates that an enforced reduction in mobile termination  
charges would be offset by an increase in charges associated with mobile  
origination and subscription costs. It has been a topic of much debate in  
regulatory proceedings regarding fixed-to-mobile termination rates in various  
jurisdictions.

36 The intuition behind the waterbed effect is very simple. Consider a mobile  
carrier. A significant proportion of its costs are common between terminating  
and originating services. In order for it to be viable (in the long run) it must  
recover these costs and make a return on funds invested sufficient to cover the  
opportunity cost of shareholders' funds. *If we assume an effectively competitive mobile  
services market*, carriers will just recover their costs (including the opportunity cost  
of shareholders' funds) in the long term. If a regulator comes into such a market

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<sup>6</sup> This is calculated by adopting the NZCC estimates of network and retail costs (5.82 cpm), and assuming that unregulated F2M termination rates fall by 1 cpm over the period (Draft Report, Table 14)

<sup>7</sup> Draft Report, paragraph 342.

and requires a reduction in terminating prices, then prices of mobile origination and subscription must rise. If the market is effectively competitive, the reduction in revenue from terminating services will be exactly offset by an increase in revenue from originating services.

37 Unless it can be demonstrated that regulating the price of fixed-to-mobile termination is not likely to affect the price of other services (e.g. mobile subscription, and mobile origination), any welfare analysis should consider the effect on prices and the quantities consumed.

## 3 Effect of a delay in investment in 3G

### 3.1 A PROBLEM WITH LOGIC

38 Chapter 6 of the Draft Report addresses the issue of the effects of regulation on dynamic efficiency. Understandably, it draws particular attention to the effects that regulation of termination prices may have on investment in 3G networks:

The dynamic efficiency loss that might occur under the factual of regulation is primarily represented by the loss of the additional value to consumers that a 3G network would bring beyond that delivered by the existing networks. This detriment could arise from a more limited deployment of 3G networks, or a deferral in deployment. This loss might be significant, both in terms of access to new services such as high speed wireless internet access, picture messaging, and videoconferencing that are likely to be valued by consumers, and the potential for increased pricing pressure on mobile voice calls as operators seek to encourage mobile users to upgrade to the new network offerings.<sup>8</sup>

39 The Draft Report concludes that, although the loss to consumers of delay or limited deployment of 3G networks is hard to quantify, regulation should be confined to services provided by 2G networks so as to avoid the risk of these delays or restrictions in coverage:

In weighing these detriments alongside the quantified consumer surplus, the Commission has, as noted above, recognized that the primary detriment is the risk of delay or restriction of investment by Vodafone or Telecom in their planned 3G networks. The Commission accepts that this risk is large, though unquantifiable on the data available to the Commission. The judgment to be made is whether that large detriment is greater than the quantified consumer surplus together with the positive dynamic efficiency effects. The Commission believes it may be, and therefore the Commission's preliminary view is that it is not convinced that regulation of mobile termination on both existing networks and prospective 3G networks is justified in terms of long-term benefits to New Zealand consumers.<sup>9</sup>

40 This paragraph in the Draft Report suggests the NZCC is placing little weight on (i) the likelihood that investors in mobile telecommunications will look to the future in making investment decisions; and (ii) the literature on sequential games. More regard to either of these may have resulted in the NZCC acknowledging that before investing in a 3G network, any mobile telecommunications company will attempt to estimate the revenue that the investment is likely to generate.

41 A consideration of this nature will immediately show that the NZCC is likely to regulate 3G termination charges as soon as the networks have been established. They will do so because the very arguments that the NZCC is persuaded of in its Draft Report will apply to termination services provided by a 3G service. The only reason why the Draft Report avoids extending the proposed regulation to 3G services is that it would discourage investment in the 3G networks. Once that investment has occurred, the one distinguishing feature will be gone.

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<sup>8</sup> Paragraph 558.

<sup>9</sup> Paragraph 562.

42 But potential investors will look to the end of the game and reason back.<sup>10</sup> They will foresee this future regulation of prices; and that will reduce the incentive for them to invest in 3G networks. That is, the proposed regulation of termination prices provided by the 2G networks will provide a disincentive to invest in 3G networks.

### 3.2 ASSESSING THE DETRIMENT TO DYNAMIC EFFICIENCY

43 A danger in any policy analysis is that the decision-maker will place greater weight on effects that can readily be quantified than on those that are more difficult to quantify. The Draft Report exposes a possible conflict between the immediate gains from regulation of termination charges (where methods of quantification are well established) and the cost in terms of the delay or limitation in the coverage of 3G networks.

44 The Draft Report is sensitive to such conflicts:

The Act does not direct the Commission as to the weight that it should give to efficiencies, as opposed to other considerations. This is a matter for the Commission to consider. Where there are tensions between short-term allocative efficiency and long-term dynamic efficiency, the Commission takes the view that giving greater weight to the latter will generally better promote competition for the long-term benefit of end users.<sup>11</sup>

45 This is precisely the tension caused by the recommendation for regulation.

46 The theory of the timing of investments supports the intuition that decreasing the expected returns from investment in new infrastructure is likely to cause delay or to reduce the coverage of the new infrastructure. The theory points to three forces that influence the timing of such investments.

- i. The first of these is that the sooner one invests, the sooner will one have access to the stream of positive cash flows that one might expect to capture by investing in a 3G network.
- ii. The second is that waiting will reduce the cost because costs of inputs and experience of the roll-out of 3G networks in other locations will enable New Zealand to roll-out its network at a lower cost.
- iii. The third are the strategic considerations among the various potential investors that may lead to delay or racing by a particular network investor.<sup>12</sup>

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<sup>10</sup> This is known as solving a game by backward induction. See for example, Avinash K Dixit and Barry J Nalebuff, *Thinking Strategically*, Norton, 1991, Chapter 2.

<sup>11</sup> Paragraph 58.

<sup>12</sup> For an algebraic model of this kind, see Joshua S Gans and Philip L Williams, "Access Regulation and the Timing of Infrastructure Investment", *Economic Record*, Vol 75, No 229, 1999, pp 127 – 137.

47 The threat of future regulation of termination charges will reduce the expected  
flow of future returns and, thereby, reduce the first of the three factors listed in  
the preceding paragraph. This will increase the net benefit from delaying.

48 It is almost impossible to produce any useful estimates of the extent to which  
investment in 3G networks might be delayed by the threat of future regulation of  
the price of termination services provided by 3G technology. The models suggest  
too many factors that might affect the delay; and choosing values for these  
parameters would make any modelling rather arbitrary.

49 Furthermore, one cannot get any feel for the likely effect on investment by  
asking the likely investors. The models suggest that the timing of any investment  
will be dependent upon the strategic interaction among the potential investors.  
No individual investor will want to commit itself to the timing of its roll-out  
because that would give its rivals an opportunity to gain a strategic advantage by  
racing or delaying.

50 Although it is difficult to estimate the effect of the threat of regulation on the  
timing of the 3G roll-out, we might be able to get some feel for the cost to  
society of each year of delay. This is considered below.

### 3.3 FRAMEWORK FOR QUANTIFYING THE COST OF DELAY

51 The benefits of the roll-out to users is reflected in the increased willingness to  
pay for the range of services available through 3G technologies. The cost of the  
roll-out is the difference between the opportunity cost of persisting with the  
current technologies and the cost of the introduction of the new technologies.  
The value created by any investment is the difference between the willingness to  
pay of consumers and the costs of that investment.

52 The framework for assessing the net welfare effects of delay in investment is  
based on the literature on the timing of investments.

#### 3.3.1 Value to society

53 The value of an investment to society can be expressed as the NPV *at the  
commencement of the roll-out* of the net benefits (consumer willingness to  
pay less the expected costs of roll-out) of the investment.

54 The concept of the value of an investment to society is illustrated in Figure 1.  
The portion of total value that is consumer surplus (triangle ABC) is shaded  
green, and the portion that is comprised of producer surplus (rectangle BDEC) is  
shaded red.

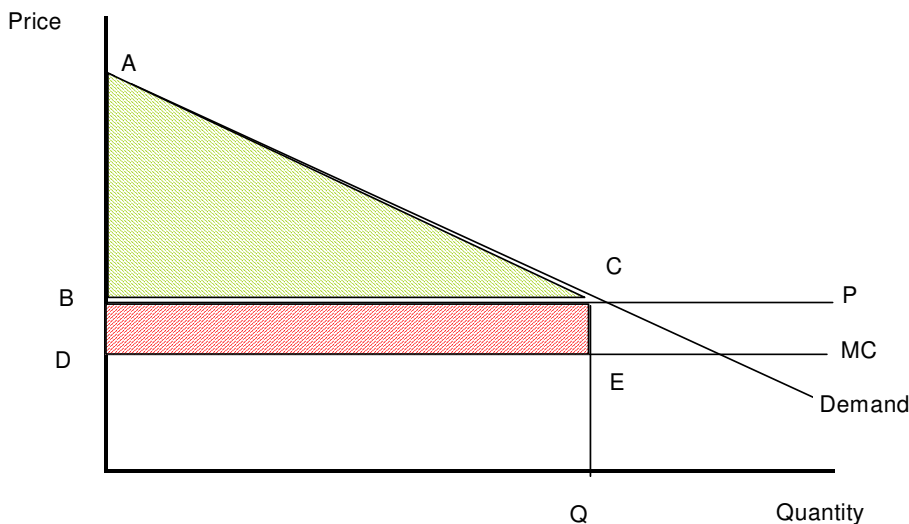


Figure 1: Social surplus associated with the roll-out of 3G technology

55 In the figure above price is shown to be above marginal cost. Prices will be based on (short-run) marginal cost and demand conditions. Potential investors in 3G technology will only be willing to incur the incremental costs of 3G if they anticipate that there will be sufficient operating surpluses from the 3G investment to justify the incremental costs of that investment. That is, the producer surplus in the figure is what Marshall called a ‘quasi rent’. Although it is a surplus (‘rent’) once the capital costs have been incurred, it is not a surplus when considered before those costs have been incurred. When considering social surplus prior to the investment we must subtract from the area under the demand curve the total incremental costs (including capital costs) of 3G.

56 The cost to society of delaying investment for one year is simply the change in present value by delaying the benefits to society for one year.

57 As an example, suppose that the roll-out is expected to commence in one year’s time. Suppose, further, that the NPV (for the nation) of this 3G network is 100 (this NPV is valued at the time of the commencement of the roll-out). The present value of the investment in 3G is then:

$$\frac{100}{(1+i)} \quad (1)$$

58 Delay by one year will have two effects. In the first place, it will reduce the costs of the roll-out because of cheaper inputs and extra learning that the delay will make available. Suppose that this will decrease the incremental capital costs of the investment. That is, it will increase the NPV to  $100(1+k)$ , where  $k$ ,  $0 < k < 1$ , is the rate of increase in the NPV caused by the reduction in the (fixed) investment costs. However, the delay will increase the extent to which the future benefits are

## Effect of a delay in investment in 3G

discounted by an extra year, so that the present value of the investment in 3G is now:

$$\frac{100(1+k)}{(1+i)^2} \quad (2)$$

59 The cost to society as a result of delay of the roll-out is then expression (1) minus  
60 (2).

### 3.3.2 Consumer surplus approach

60 If, instead of adopting a net welfare approach, we follow the NZCC's approach  
and consider the effect of delay on consumer surplus, we undertake the above  
analysis considering only the change in the NPV of consumer benefits resulting  
from a delay in investment in 3G, and not the change in producer surplus  
associated with a delay.

61 That is, to estimate the effect on consumer surplus we consider the change in the  
NPV (at the time of the commencement of roll-out) of consumer benefits of  
delaying for one year.

62 Using the example outlined above, the present value of consumer surplus if roll-  
out occurs in two years time is:

$$\frac{100}{(1+i)} \quad (3)$$

63 If roll-out is delayed by one year the present value of consumer surplus if roll-out  
is delayed one year is:

$$\frac{100}{(1+i)^2} \quad (4)$$

64 The change in consumer surplus as a result of delay of the roll-out is then  
expression (3) minus (4).

## 3.4 PARAMETERS USED TO ESTIMATE THE COSTS OF DELAY

65 The principal obstacle to estimating the costs of delay in the roll-out of 3G is  
obtaining reasonable estimates of the NPV of the costs and benefits of 3G.  
Given the data available it is only possible to provide an indication of the order  
of magnitude of the costs of delay. The basis for each of the parameters used in  
the calculation is discussed below.

### 3.4.1 Discount rate

66 The NZCC uses a discount rate of 6 per cent in its Draft Report for the purpose  
of estimating the NPV of the change in consumer and social surplus associated  
with its proposed regulation.<sup>13</sup>

67 We adopt this discount rate for estimating the change in consumer and social  
surplus associated with a one year delay in 3G investment.

### 3.4.2 Costs of 3G roll-out

68 Estimates of the costs of rolling-out a 3G network vary widely. For the purpose  
of this analysis we base our estimate of industry wide cash (costs) on data  
provided by Vodafone.

69 For simplicity, we double the Vodafone estimates to obtain industry wide  
estimates of the cost of roll out. This essentially amounts to an assumption that  
two 3G networks are rolled out in New Zealand at the same time and that each  
costs the same amount, and has an equal market share.

70 This may understate the actual costs of 3G roll-out if:

- TelstraClear or another entrant decides to roll out a (full or partial) 3G network; and
- Telecom's actual costs associated with the deployment and operation of a 3G network are higher than those projected by Vodafone.

71 As discussed in Section 3.3, given that we are considering the roll-out of 3G it is  
appropriate to regard all costs as incremental in calculating the social surplus.  
That is, we include all forward looking capital costs associated with establishing  
3G networks and operating costs.

72 We exclude the costs of spectrum rights acquired by the industry in 2001 for use  
in 3G operations. The social cost of delay is that the spectrum will not be used  
in its next best alternative for the period of the delay. This opportunity cost is  
likely to be low because the delay would make it available only for one year, so  
we exclude this cost from the calculations.

### 3.4.3 Reduction in investment costs due to learning

73 As discussed in Section 3.3, the costs of rolling out a 3G network could be  
expected to change over time. Delaying investment would be expected to reduce  
the costs of the roll-out because the costs of inputs are expected to decline as  
more information is available about the relative merits of alternative approaches  
and the technology used.

74 The vast majority of these cost savings are expected to arise from a decrease in  
the capital costs of the technology, rather than from savings in operating costs.

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<sup>13</sup> NZCC Draft Report, page 93, paragraph 505. It notes that this is the rate adopted in the LLU Report (footnote 147).

75 It is difficult to determine the annual rate of reduction in investment costs resulting from learning over time. Based on discussions with Vodafone, we consider the impact of investment cost savings of 5 per cent of capital expenditure as a result of a one year delay in investment.

### 3.4.4 Willingness to pay for 3G services

76 Consumers' willingness to pay for 3G services depends on the shape of the demand curve for those services. At present the extent of demand for 3G, and the shape of the demand curve, is clearly one of the great unknowns confronting mobile network operators.

77 For the purpose of this analysis we estimate consumers' willingness to pay by:

- assuming a linear demand function (we assume the demand function has the general form  $y=mx+c$ );
- adopting Vodafone projections of demand (average number of customers per year) and price (incremental average revenue per customer (ARPU)); and
- assuming that the price elasticity of demand for 3G mobile services will be similar to that for 2G mobile services. In this analysis we assume that the price elasticity of demand for 3G mobile services is  $-0.6$ .

78 Using this information we solve for the slope of the demand curve.

### 3.4.5 Calculation of social surplus: results

79 The social surplus in each year can be estimated by calculating the area under the demand curve and subtracting total costs.<sup>14</sup> We then estimate the NPV of the social surplus at the commencement of roll-out assuming a discount rate of 6 per cent.

80 The change in the social surplus, and the change in consumer surplus resulting from a delay of one year in the roll out of 3G networks is outlined in Table 4.

	\$ million
Decrease in social surplus	80.5
Decrease in consumer surplus	105.6

Table 1: Effect of a delay in the roll out of 3G networks

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<sup>14</sup> That is, we estimate the social surplus by integrating the demand function over the interval  $[0, q]$  and subtracting the total cost.

81 The principal difference between the estimates of consumer surplus and social surplus outlined above are that the former does not take into account the savings to mobile operators associated with delaying. As discussed in Section 3.3, the source of savings is the reduction in investment costs resulting from the learning that takes place in the course of that year. It is for this reason that a one year delay in investment in 3G results in a larger reduction in consumer surplus than in social surplus.

82 The NZCC's estimates the public benefits of its proposed regulation to be around \$27 million.<sup>15</sup> As discussed in Section 2, we consider that the problems with the NZCC's methodology means that it is likely to substantially overstate the static welfare gains associated with its proposed regulation. The estimates presented in Table 4 suggest that the costs to society if investment in 3G is delayed by a single year could be around three times the NZCC's estimate of the public benefits.

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<sup>15</sup> NZCC Draft Report, page 96-97

## 4 Benchmarking of MTRs

### 4.1 NZCC'S BENCHMARKING APPROACH

83 The NZCC presented MTRs in five countries in its international benchmarking analysis. The five countries are Australia, the UK, the US (for which the range provided presumably related to US Sprint's CDMA networks in New York, California and Florida), Malaysia, and South Korea.

84 The NZCC's draft report draws heavily on the ACCC's research.<sup>16</sup> It considers essentially the same group of countries as did the ACCC:<sup>17</sup>

- up-dating the analysis undertaken by the ACCC to incorporate developments in some countries (e.g. UK, Malaysia);
- adopting data from some countries that were used by the ACCC without commenting on the extent to which they are relevant comparators for New Zealand MTRs (e.g. US Sprint, South Korea); and
- reaffirming that data from specific European countries that the ACCC chose not to include in its analysis (e.g. Sweden, France, Ireland) should also be omitted in the Commission's current inquiry.

85 The NZCC (and ACCC) selected these countries primarily on the basis that they consider them to provide cost-based estimates of MTRs.

### 4.2 COMMENT ON NZCC APPROACH

86 We consider the approach adopted by the NZCC in its benchmarking of international MTRs to be problematic. In our view its results do not provide any useful information about the likely level of a cost-based MTR in New Zealand.

87 As a starting point, we reject the premise underpinning the NZCC's approach that regulators' assessments of cost-based MTRs are more informative about the welfare maximising level of MTRs than the prevailing prices.

88 Secondly, the NZCC has selected a very small sample of countries for which:

- the cost-basis used to estimate the reported MTR's does not appear to be consistent; and
- there are significant differences in operating environments to those experienced by mobile network operators in New Zealand.

89 Each of these points is discussed below.

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<sup>16</sup> ACCC, *Mobile Services Review Mobile Terminating Access Service, Final Decision on whether or not the Commission should extend, vary or revoke its existing declaration of mobile terminating access service* June 2004. The report is referred to as the ACCC Final Report in this paper.

<sup>17</sup> The countries that the NZCC does not discuss in its Draft Report, but which were considered (and rejected) by the ACCC were: Belgium, Italy, Finland and Austria.<sup>17</sup>

### 4.2.1 Use of regulators' assessment of cost based estimates

90 The process of developing a regulatory cost model is fraught with difficulty. This is particularly true in markets such as mobile telephony where there is a high rate of technological change and in which fixed and common costs account for a large proportion of total costs.

91 We do not consider that cost models developed by regulators necessarily provide a better indication of cost-reflective pricing of the MTR than actual MTRs.

92 Mobile operators will set prices for the set of services supplied (fixed-to-mobile termination, mobile-to-mobile termination, mobile outbound, mobile subscription) by reference to the incremental costs of supplying each service and the need to recover fixed and common costs across the range of services supplied. Prices are likely to be arrived at through an iterative process in which carriers learn about the optimal set of prices by testing the market. Actual prices would be expected to reflect differences in own and cross-price elasticities of demand and externalities associated with the services offered by a mobile carrier. In a workably competitive market the set of prices will be broadly cost reflective. That is, the set of prices will not enable a mobile carrier to earn revenue significantly in excess of its costs (including the cost of capital) over the life of its investment.

93 The NZCC rejects the 18 country comparison of actual mobile termination rates presented by Vodafone primarily on the grounds that in "several instances it is unlikely that the cited rates are cost based."<sup>18</sup> The information presented by Vodafone, at the very least, provides a broader sample and was compiled by an independent source<sup>19</sup> on a consistent and therefore comparable basis. The NZCC has instead opted for a small sample of five countries, in which the reported mobile termination rates have been derived in a variety of ways.

### 4.2.2 Estimates used

94 Regulators in three of the countries selected as comparators by the NZCC (the UK, Malaysia and South Korea) have undertaken some form of analysis to derive cost based estimates of mobile termination rates in those countries. The NZCC:

- reported UK numbers of 5.63ppm (NZ\$0.159cpm ) for 900/1800 MHz operators which are the rates proposed by Ofcom<sup>20</sup> as the rate to apply from 1 September 2004 to 31 March 2006. These mobile termination rates are based on LRIC plus a mark-up for common costs plus a mark-up for network externalities;<sup>21</sup>

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<sup>18</sup> MCMC, 'A Report on Access Price' MCMC/IDD/IRA/AP No 3 of 2002, May 2002, and MCMC, 'A Report on a Public Inquiry under Section 65 of the Communications and Multimedia Act 1998 on Access Pricing', PIR/AP/2/02, July 2002

<sup>19</sup> Cullen International

<sup>20</sup> Ofcom, *Wholesale mobile Voice Call Termination*, 1 June 2004

<sup>21</sup> The proposed Ofcom rates used by the NZCC are different from those reported in the ACCC Final Report. The NZCC refers to 5.63ppm whereas the ACCC refers to 4.43 ppm for 2004-05 and 4.50

- reported average Malaysian mobile termination rates of NZ\$0.086cpm based on the Malaysian Communications and Multimedia Commission's (MCMC) determination. The MCMC regulates mobile termination rates on a TSLRIC+ basis, in which FCC are allocated using an equi-proportionate mark-up approach.<sup>22</sup>
- accepted numbers from South Korea used by the ACCC without comment. The ACCC Final report stated that mobile termination rates were 40 Won (\$NZ 0.0662cpm) in 2003, following regulation based on fully allocated historic costs that has been operating since 2000.<sup>23</sup>

95 The other two estimates of mobile termination rates used in the Draft Report (Australia and US Sprint) do not come from regulators cost-based estimates:

- The mobile termination rates cited in the Draft Report for Australia is not a cost-based estimate. It is the proposed mobile termination rate of 12 cpm presented in the ACCC's Final Report as the rate that should from 1 January 2007.<sup>24</sup> This rate not based on any cost modelling. It is an estimate informed by a comparison with international mobile termination rates in other countries, a review of data held by the ACCC, inferences from mobile to mobile pricing and market inquiries.<sup>25</sup>
- The NZCC accepted US Sprint numbers used by the ACCC without comment, other than noting that ACCC had referred to them, and found them to be useful comparators. The mobile termination rate data cited for US Sprint is based its own TELRIC cost modelling using 1999 data.<sup>26</sup> There are a number of questions surrounding the estimates.<sup>27</sup> It is far from clear that the US Sprint numbers provide a useful comparator or can add anything to the NZCC's analysis of the mobile termination rates that should apply in New Zealand.

96 The NZCC considered other countries that are apparently moving to cost-based termination. However, the NZCC stated that it considered that either the developments were not 'cost-based' (Sweden, France) or that it was too early to

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ppm for 2005-06. The differences arise because: 1) the number cited by the ACCC includes the LRIC and a mark up for fixed and common costs, but excludes the externality mark-up, 2) the NZCC refers to the proposed charge in nominal terms for 2005/06, whereas the ACCC refers to the proposed charge in real terms.

22 NZCC Draft Report page 68, Paragraph382.

23 ACCC Final Report, page 234,

24 ACCC Final Report, page 221

25 ACCC Final Report, page 212

26 ACCC Final Report, page 233

27 For example it is not clear what exchange rates have been used for conversion between the raw Sprint numbers and the WorldCom submission to the Swedish regulator from which the numbers presented to the ACCC were taken ('Cost Oriented Access and Interconnection in Sweden', WorldCom, Stockholm, Sweden, 14 January 2002, p.5). Nor is it clear why or how the ACCC converted US Sprint's 1999 figures to 7 to 12 cpm using exchange rates for first 10 days for March 2004 (ACCC Final Report, page 233).

tell (Ireland).<sup>28</sup> As such no numbers were used from these countries in the NZCC's benchmarking.

### 4.2.3 Differences in operating environments

97 Differences in the operating environments will affect the extent to which the cost of fixed-to-mobile termination in two countries is likely to be comparable. We have not undertaken a detailed analysis of the country specific effects that may impact mobile termination rates and their underlying costs. However, we can say that, as a general proposition, the presence of the following factors in comparator countries would result in underlying costs, and possibly mobile termination rates, being lower than those in New Zealand:

- higher populations, and higher subscriber densities;
- greater proportions of less expensive network architecture (e.g. 900 Mhz networks relative to 1800 Mhz networks);
- higher interconnect traffic levels; and
- higher penetration rates.

98 In South Korea, the three principal mobile operators have respectively 18.5 million, 11.5 million and 5.5 million subscribers.<sup>29</sup> Seoul has a population of 20 million people. The subscriber base and density alone is likely to mean that cost-reflective mobile termination rates are significantly lower in South Korea than in New Zealand.

99 In all four countries used by the NZCC in which cost-modelling has been undertaken, differences in operating environment mean that the cost of fixed-to-mobile termination provides no indication of the likely cost of fixed-to-mobile termination in New Zealand.

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<sup>28</sup> Commerce Commission, Draft Report, p. 69, Paragraph383–385.

<sup>29</sup> ACCC Final Report page 234.

## 5 Conclusions

101 We consider that the modelling of static benefits of regulation outlined in the Draft Report should:

- Use an analysis of the public benefits as the basis for considering the effects of the proposed regulation.
- Be amended to remove the inconsistency in the assumptions used to model the prices of fixed-to-mobile calls under the factual and counterfactual scenarios; and
- Take into account the effects of the proposed regulation on changes in prices other than the prices of fixed-to-mobile calls.

102 The proposed regulation of termination on 2G networks will provide a disincentive to invest in 3G networks. The justification for the NZCC's proposed regulation of 2G will apply to 3G as soon as investment in 3G has been undertaken. The NZCC's decision not to regulate fixed-to-mobile termination on 3G networks at this juncture does not detract from this point.

103 It is difficult to estimate the effect of fixed-to-mobile regulation on investment in 3G with any precision. There is considerable uncertainty regarding the cost of establishing 3G networks, demand, the price for use of those services, and the effect of any regulation on mobile operators' investment plans.

104 However, it is possible to provide an indication of the cost to society if the proposed regulation delays investment in 3G technology by one year. The results presented in section 3 suggest that if investment is delayed by a year, the costs to society could be in the region of \$80 million. This is around three times the NZCC's estimate of the public benefits (\$27 million) associated with its proposed regulation of fixed-to-mobile termination on 2G networks.

105 Finally, substantially more work is required to determine what the cost of fixed-to-mobile termination might be for the purpose of considering whether or not to designate this service. The comparison of international estimates of the costs of fixed-to-mobile termination outlined in the Draft Report does not provide a useful basis for considering what the costs of the service might be in New Zealand.

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