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**Review of the Cost-Benefit Analysis of  
Fixed to Mobile Termination**  
Schedule 3 Investigation in the regulation of mobile termination

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*A report prepared by Marsden Jacob Associates  
for TelstraClear*

**Final: 23 November 2004**

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*Associates*

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# 1. Introduction

1. TelstraClear has requested that Marsden Jacob Associates (MJA) undertake a review of the Cost-Benefit Analysis (CBA) conducted by the Commerce Commission (hereafter the 'Commission') in the "Schedule 3 Investigation into the regulation of mobile termination".
2. The comments and opinions expressed in this paper are those of MJA and do not necessarily reflect those of TelstraClear. No part of this submission is confidential and MJA has no objection to it being made publicly available.

## 1.1. Background

3. The application of section 18 and section 19 of the Telecommunications Act together requires that, if the Commission were to recommend designation of mobile termination to the Minister, it must have formed the view that such regulation represents the option that best gives, or is likely to best give, effect to the section 18 purpose statement.
4. If competition is ineffective, the Commission must assess whether appropriate regulation could promote competition, subject to an overall assessment of the net costs and benefits of regulation.
5. In order to guide the Commission in this decision a cost-benefit analysis (CBA) has been conducted which focuses on allocative efficiency gains, and wealth transfers from producers to end-users. In addition, the Commission has also considered a number of matters (mainly to do with dynamic efficiency) that it could not quantify within their cost-benefit framework.
6. The Commission calculates the net benefits associated with designation of mobile termination (MT) rates based on the increase in consumer surplus arising from a reduction in retail Fixed to Mobile (FTM) prices. The approach adopted is fairly simple and relies on a limited number of assumptions. The Commission distinguish between a 'pure' net benefit approach<sup>1</sup> and a Public Benefits Approach (PBA).<sup>2</sup>

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<sup>1</sup> Otherwise known as a "consumer surplus" test.

<sup>2</sup> Otherwise known as a "total surplus" (consumer plus producer) test.

7. The Commission's methodology involves comparing a counterfactual ("the future without designation") with a factual ("the future with designation"). Broadly, the Commission considers efficiency gains and wealth transfers from producers to end-users under each of these scenarios. The conclusion reached is that the factual would bring about the benefit of significant allocative efficiency gains and wealth transfers to end-users. In terms of dynamic efficiency the Commission conclude:<sup>3</sup>

*"...that the dynamic efficiency detriments of regulation of non-3G mobile voice termination are minor, and that the balance of consumer benefit from such regulation remains overwhelmingly positive. This conclusion is strengthened when account is taken of the potentially positive dynamic efficiency effects of increased investment in infrastructure to support fixed-to-mobile services."*

8. Given these considerations and analysis the Commission recommends designation MT.
9. We consider the basic elements of the CBA framework used by the Commission to be reasonable as it captures the main variables relevant to consideration of the benefits of designation, including:
- FTM termination costs with/without designation;
  - level of pass-through of reductions in FTM termination rates in retail prices;
  - FTM retail prices with/without designation; and
  - volume of FTM calls with/without designation.
10. However, we have a number of methodological concerns related to the CBA. Overall, it is our view that the Commission has been conservative in its approach and thus understated the net benefits from designation of MT. To further exacerbate this conservatism, we are of the view that key parameters have been misstated resulting in a reduction of net benefits.

## 1.2. Report Structure

11. In conducting our review we seek to follow the structure of section 5 in the Commission's Draft Report. As such our review is structured in the following manner:

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<sup>3</sup> Commerce Commission (2004), p 106.

- section 2 reviews boundary issues;
  - section 3 discusses the study period adopted;
  - section 4 discusses the counterfactual scenario;
  - section 5 reviews the factual scenarios;
  - section 6 compiles a number of additional issues that have arisen from our review;
  - section 7 assesses the sensitivity of the model; and finally
  - section 8 concludes and provides recommendations.
12. Through-out the report we make use of the CBA contained in two Excel spreadsheets produced by the Commission and used in the Draft Report. The results we derive are based on adjustments to these spreadsheets.

## 2. Boundary Issues

### 2.1. The Waterbed Effect

13. The Commission's dismissal of the 'waterbed' (or 'swings and roundabouts') effect is important for the overall approach to the CBA as it set the appropriate boundaries for the analysis. As noted by Vodafone, if the mobile sector operates under a zero profit constraint the approach adopted by the Commission which only focuses on FTM calls could be inadequate.
14. The Commission's preliminary conclusion is that competition in the retail mobile market is not sufficient to ensure that excess MT profits will be dispersed through competition at the retail level. We agree with this conclusion and note that this view is strengthened by regulatory investigation from markets which are potentially far more competitive than the New Zealand market with only two operators. These include, for example, regulators in Australia and UK who assessed that mobile operators on their respective markets were making economic profits.
15. We therefore regard the Commission's assumption in the CBA that a reduction in MT rates will not affect retail mobile charges to be appropriate.

### 2.2. Indirect Benefits of a Reduction in FTM rates

16. When FTM prices are reduced, this will result in an increase in the number (and duration) of calls from fixed subscribers to mobile subscribers. This will be of benefit to mobile subscribers (as well as to the fixed subscribers). The latter welfare effect is reflected in the CBA, but not the former.
17. This type of indirect benefit may be termed a call externality. The issue is that both the caller and the called party derive utility from communicating with each other. When a 'calling party pays' principle is in place, it is only the welfare of the calling party which defines the willingness to pay for a particular call. Such externalities lead to a sub-optimal outcome if the caller chose not to make a call, because his or her benefit was less than the price, even though the combined benefit of the caller and call recipient exceeded the price. Welfare may be improved by lowering termination rates in order to encourage calls.

18. In other words, the act of calling generates its own value beyond that reflected by the usage charge paid by the caller: the party that is called receives the benefit of the call but doesn't have to pay for it.
19. One possibility is that mobile customers value the call as much as the person calling (the fixed network customer). In this case the benefit would be undervalued by half.
20. Ofcom believe that call externalities are roughly internalised:<sup>4</sup>

*“Call externalities – while they almost certainly do exist ... are likely to be internalised by callers, as a high percentage of calls are from known parties and there are likely to be implicit or explicit agreements to split the origination of calls.”*
21. While we concur that there is likely to be some internalisation of call externalities they nevertheless represent a benefit in the Commission's CBA that is not accounted for. Further, they are important as they involve interactions among all consumers (not just marginal consumers as is the case of network externalities). Unfortunately we are not aware of any studies that attempt to measure the size of the call externality. However, market research of the calling patterns of fixed and mobile customers may assist in the estimation of these indirect benefits.
22. Such research is beyond the scope of this report. The Commission should note, therefore, that our conclusions on the CBA (see Tables 18 and 19, in particular) understates the net benefits of designating MT.

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<sup>4</sup> Ofcom (2004), Annex D The network externality surcharge

### 3. Study Period

23. The Commission calculates the welfare gain as the net present value of net benefits over the period 2005 – 2010 and excludes a terminal value. Hence the CBA does not take into account potential welfare gains for periods subsequent to 2010.
24. The Commission implicitly assumes that designation of MT has no welfare effects five years hence.
25. We assume that this relates to the five-year sunset clause for regulated services in the Telecommunications Act. The effect, however, is that the Commission is implicitly assuming (in the Factual) that designation of MT would not extend beyond the initial five year period (ie the Commission would recommend against continuation of the designation of MT after the initial five years).
26. The Commission should only make such an assumption if it considers that the problems that regulation is seeking to address are expected to only be medium term. The analysis provided by the Commission in the Draft Report does to indicate that the monopoly problems associated with MT would not be enduring. Hence, it is difficult to believe that the benefits of designation would not endure subsequent to 2010.
27. Even if designation was lifted at this point, the industry structure would be (and would likely remain) more competitive than it would otherwise have been. Given that, some terminal value should be used to capture welfare gains subsequent to 2010 as a result of designation today. Alternatively, the CBA could be extended beyond five years, to say ten years (by which time the Commission would be required to have conducted two sunset clause reviews).
28. The failure to use a terminal value means that the Commission has not carried out a CBA of designating the MT. Instead the result reached by the Commission should be interpreted as the costs and benefits of designating MT today against designating the service in five years time. This is because the estimated benefits are the difference between the present value of designating today and the present value of designating at the end of the evaluation period, i.e. the stream of net benefits from now to 2010 only.

29. The lack of a terminal value (or not extending the CBA beyond five years) can have a very significant effect on the estimated welfare gains. Assuming that the net benefits diminish progressively to zero from 2010 to 2015 has the following effects.

**TABLE 1: NET BENEFITS – INCLUSION OF TERMINAL VALUE**

	<i>Factual 1</i>		<i>Factual 2</i>	
	Net benefits (\$m)	Net benefits - PBA (\$m)	Net benefits (\$m)	Net benefits - PBA (\$m)
Change	247.9	27.3	141.5	5.2
Level	464.6	55.2	326.5	32.5

## 4. The Counterfactual

### 4.1. Appropriateness of Counterfactual

30. Net benefits are calculated as the relative difference between factual and counterfactual. The counterfactual is not a 'status quo' scenario but assumes that FTM prices will decline over-time. Changes in Counterfactual FTM prices are not linked to changes in Counterfactual MT rates. This gives rise to some consistency problems in the treatment in pass-through as we discuss in the following sections.

#### 4.1.1. Pass-through

31. The Commission applies pass-through to different scenarios and the projections used to evaluate the benefits of regulation. For the period 2005 – 2010, the model assumes that Counterfactual FTM prices decline annually by 4.08% and that the cost of MT falls by 4.01% pa.
32. This implies that the proportion of pass-through rises to 152% under the Counterfactual. In other words, by using the historical annual decline in FTM prices of 4.08% while at the same time (in Factual 2) assuming a decline of 1 cpm or 4.01% annually in the MT, translates into a pass-through far above 100%. This is clearly inappropriate. A pass-through greater than 100% implies that the all MT reductions are being passed through and additional (competitive) pressures are reducing the FTM price.
33. Further, compared to Factual 2, the proportion of the difference between the Counterfactual and Factual MT that is passed through rises from 65% to 100% by 2010. The pass-through in the Counterfactual should be lower (not equal or greater) than the pass-through in the Factual. We consider it should reflect the historical pass-through. Given that increased competition is assumed to result in the reduction in MT in Factual 2 being passed through into retail FTM rates, with the pass-through rate increasing to 100% by 2010 due to an increase in competition in the FTM market, it would be inappropriate to assume the Counterfactual would follow the same pattern.
34. The importance of the decline in the MT cost underlying the Counterfactual price is that the benefit from regulation reflects the difference between this

assumed level and the target. The table below extracts the relevant section of the Commission's CBA model.

**TABLE 2: EXTRACT OF FACTUAL 2 SCENARIO**

	2004	2005	2006	2007	2008	2009	2010
MT Rate (\$)	0.28						
- <i>counterfactual</i>		0.27	0.26	0.25	0.24	0.23	0.22
- <i>factual</i>		0.27	0.16	0.16	0.16	0.16	0.16
Reduction in MT rate		0.00	0.10	0.09	0.08	0.07	0.06
Assumed pass-through of MT into retail FTM		65.00%	65.00%	72.39%	80.62%	89.79%	100.00%
Assumed pass-through of MT into retail FTM (\$)		0.0000	0.0650	0.0652	0.0645	0.0629	0.0600
Counterfactual price (\$)	0.4221	0.4049	0.3884	0.3725	0.3573	0.3428	0.3288
<b>Factual price</b>			<b>0.3234</b>	<b>0.3074</b>	<b>0.2928</b>	<b>0.2799</b>	<b>0.2688</b>

35. The Counterfactual FTM price and the Counterfactual MT rate should be internally consistent.
36. If the annual decline of 4.01% in MT rates is retained (as well as the constant pass-through of 65%), then the annual decline in FTM charges should be 1.62%. However, as we discuss in the following section we are also sceptical of the annual decline in MT rates. If we change the development in the Counterfactual MT rate, this will influence the annual decline in FTM prices (depending on pass-through assumption). Hence we can only evaluate changes in the Counterfactual FTM price once we have made an appropriate assumption of the likely development of the Counterfactual MT rate.

#### 4.1.2. Development of MT rate

37. Given the monopoly characteristics of the MT service as is well recognised by the Commission and lack of competitive dynamics in the industry, it is surprising that the Commission assume that the historical development in FTM prices simply may be taken as a proxy for the future development in the absence of regulation.
38. First, rises in MT rates is not an impossible outcome in a market where there is no regulation, cf. table below that shows selected European countries where MT rates have risen.<sup>5</sup>

<sup>5</sup> Note that our analysis shows that mobile termination rates on average have fallen slightly in Western European countries over the selected period.

**TABLE 3: MOBILE TERMINATION RATES (EURO CENTS PER MINUTE)\***

Country	2000	2001	2002	2003	CAGR
Portugal	23.7	23.7	20.7	27.8	4.0%
The Netherlands	15.7	15.7	21.3	22.0	8.7%
Italy	18.6	22.8	21.3	20.7	2.7%
Belgium	n/a	16.9	20.0	18.8	5.4%
Austria	13.8	13.8	15.5	14.5	1.2%

\*Figures prior to 2002 refer to termination rates for operators with Significant Market Power (SMP). MT rates for 2002 and 2003 are simple averages of rates charged by the reported operators in each country.

Source: European Commission reports on the Implementation of the telecommunications regulatory package (6<sup>th</sup>, 7<sup>th</sup>, 8<sup>th</sup> and 9<sup>th</sup> reports).

39. Second, when extrapolating from historical data it should be recognised that the threat of regulation may have played a role in past reductions. First with the Ministerial Inquiry (and ensuing introduction of the Telecommunications Bill) and secondly the Commission's current investigation, where both Vodafone and Telecom argue against regulation and hence may have reacted accordingly.<sup>6</sup> If the Commission were to decide against regulation the threat of regulation would disappear (in the short run) and should be reflected in the counterfactual scenario.
40. Finally, the Commission's estimate of a 1 cpm decline in MT rates seems to reflect Vodafone's expectations for 2005 and 2006. However, Vodafone provide no expectations for subsequent years.
41. In our view, the Commission has been too aggressive in its determination of the likely reductions in the MT rates in the counterfactual scenario. Accordingly, we suggest that the Commission adopt a 1cpm reduction for 2005 and 2006, and no reduction thereafter or a 0.5 cpm reduction in the next five years. In our evaluation of the net benefits we have modelled the former.
42. With this development in Counterfactual MT rates and assuming a constant pass-through of 65% the annual decline in FTM charges would only be 0.31%. This has the follow effects on the net benefits.

<sup>6</sup> An equivalent affect was seen very clearly with Telecom's pricing of residential telephony. Under the Kiwi Share Obligation Telecom is allowed to increase residential telephony prices at the rate of inflation (CPI). Telecom, however, refrained from increasing prices for 3 years and 4 months (November 1998 to March 2002) during the Ministerial Inquiry and Telecommunications Bill phases, waiting until after the Telecommunications Bill was enacted before increasing prices.

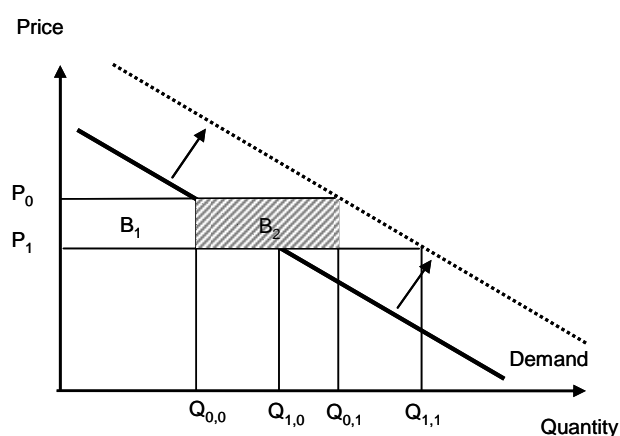
**TABLE 4: NET BENEFITS – CONSTANT PASS-THROUGH AND 0.31% DECLINE IN COUNTERFACTUAL FTM**

	<i>Factual 1</i>		<i>Factual 2</i>	
	Net benefits (\$m)	Net benefits - PBA (\$m)	Net benefits (\$m)	Net benefits - PBA (\$m)
Change	135.4	34.3	32.5	16.3
Level	352.1	62.2	167.9	33.9

## 4.2. Growth of FTM Calls

43. The growth of FTM calls (traffic) is solely driven by the changes in the elasticity of demand. This is a simplistic assumption. In the past FTM is likely to have grown without adjustments to the FTM price. For example, due to the rapid growth in mobile penetration.
44. In other words, the demand curve is shifting outwards.<sup>7</sup> This is illustrated in the figure below.

**FIGURE 1: DEMAND CURVE SHIFT OUTWARDS**



45. An increase in demand results in an increase in transfers from mobile networks to fixed to mobile consumers. This is illustrated in the figure above by an increase in the shaded area from  $B_1$  to  $B_1 + B_2$ .<sup>8</sup>

<sup>7</sup> The Commission recognise that such a development may occur in their footnote 97, Commerce Commission (2004).

<sup>8</sup> When there is no change to the slope of the demand curve the pure efficiency gain is unchanged. Note that that the parallel lines do not have the same (constant) elasticity for the same price. In the current context, a shift in demand due to organic growth will affect the relative quantity demanded in factual and counterfactual. The change in quantity is calculated as the product of the constant elasticity, the change in price and the original quantity relative to the original price. An organic increase in (original) quantity will therefore result in an increase in the total surplus.

46. Two key statistics indicate that there is room for organic growth over and above that solely driven by changes in price:
- the number of mobile users in New Zealand are 3 million, equivalent to a mobile penetration of 74.6%.<sup>9</sup> While this is a high penetration rate, it is still below Western Europe where penetration is at 87.6%;<sup>10</sup> and
  - from 1998 to 2004 the average FTM price has declined from 52.5 cpm to 42.2 cpm (or 20%). With the same time intervals traffic has increased from 362 million minutes in 1998 to 900 million minutes in 2004, an increase of nearly 150%.<sup>11</sup> If the elasticity of demand is  $-0.6$  and there was no organic growth we would have expected traffic to have only increased to 463 million minutes. The majority of the growth can therefore be attributed to organic growth and not changes in MT rates.
47. The Commission's assumptions that price changes (and the underlying price elasticity) will be the sole driver of traffic increases is therefore not realistic. Accordingly an allowance for organic growth should be included in both factual and counterfactual scenarios.
48. Assuming that mobile penetration will increase to 90% by 2010 we estimate using historical data that the FTM traffic will increase to just above 1,000 million minutes.<sup>12</sup> See figure below.

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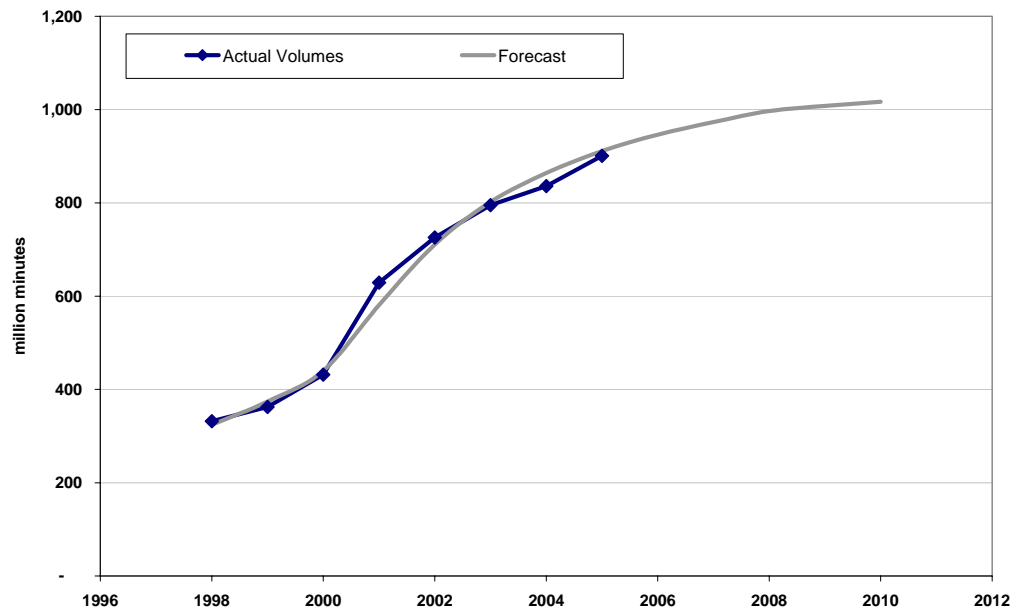
<sup>9</sup> Commerce Commission (2004), p 46.

<sup>10</sup> Mobile subscribers in Western Europe reached a total of 342.43 million as of 1 August 2004, up 8.54% from 315.50 million a year earlier, for a penetration rate of 87.63%. Source: Mobile Communications.

<sup>11</sup> Commerce Commission spreadsheet: *FTM revenues and quantities 1997-2004.XLS*. Revenues, volumes and the calculated average FTM price is based on responses from individual FTM carriers (1998-2004).

<sup>12</sup> It is normally assumed that 2G mobile markets follow an S-shaped development. As a proxy we have superimposed this development on the development on the FTM market.

**FIGURE 2: FORECAST OF COUNTERFACTUAL TRAFFIC**



49. Since our forecast implicitly includes increases due to changes in FTM prices we need to correct for the price effect. Given that historical price changes only explain 20% of the growth from 1998 to 2004 we would expect the FTM market to increase by approximately 80 million ‘organic’ minutes from 2005 to 2010. The Commission should factor in this additional growth into their analysis.

50. Inclusion of organic growth has the following effects on the net benefits.

**TABLE 5: NET BENEFITS – INCLUSION OF ORGANIC GROWTH**

	<i>Factual 1</i>		<i>Factual 2</i>	
	Net benefits (\$m)	Net benefits - PBA (\$m)	Net benefits (\$m)	Net benefits - PBA (\$m)
Change	17.7	2.8	13.1	2.4
Level	234.4	30.7	198.1	29.7

## 5. The Factual

51. The Commission rely on two factual scenarios. They differ in the treatment of pass-through:
- under Factual 1 it is assumed that FTM retail prices will gradually decline towards the underlying cost of providing the FTM call service; and
  - under Factual 2, the reduction in MT is assumed to be passed through into retail FTM rates, with a pass-through rate in year 1 equal to historic pass through, increasing to 100% by year 5 (reflecting an increase in competition in the FTM market). This pass-through is then used to determine the reduction in retail FTM prices under the factual over the period (cf. section 4.1.1).
52. In the following subsection we review the key assumptions that, together with the counterfactual scenario enable the Commission to calculate the net benefit of designating MT.

### 5.1. Pass-through

53. Under Factual 2, it is assumed that the impact of regulation of MT rates allow operators to cut the cost of fixed-to-mobile rates in line with historical pass-through of cost savings.
54. Between 1997 and 2004, MT costs fell by 22 cents. Over the same period, the fixed-to-mobile charge fell by 14.3 cents, implying a pass-through of 65%. For the purposes of Factual 2, the price benefit from regulation is the extra decline in FTM prices over that in the Counterfactual.
55. The declines in both MT costs and FTM rates occurred predominantly in the first three years from 1997 to 1999. Changes in the most recent four years were significantly lower. This is illustrated in the table below.

**TABLE 6: PASS-THROUGH (AVERAGE ANNUAL ESTIMATES)**

	1997 - 2004	1997-1999	2000-2004
<i>Average growth rate:</i>			
Mobile termination cost	-7.95%	-11.21%	-7.17%
Fixed-to-mobile charge	-4.08%	-5.50%	-4.00%
<i>Average pass-through:</i>			
$\Delta\text{FTM} / \Delta\text{MT}$	65.05%	58.78%	78.50%

56. We would expect a more reasonable representation to follow more recent developments. Hence 65% may be regarded as a conservative estimate.
57. However, care must be taken in using a short time-period (of 4 years) to determine the historic pass-through. Since there are likely to be lags between MT price reductions and FTM retail price reductions, part of the FTM reduction in 2000-2004 will relate to the MT reduction in 1997-99. The smaller the time-periods selected the greater the size of this affect will be. We do therefore not recommend any changes to the historic pass-through. Table 6 does however provide additional evidence that substantial pass-through of MT reductions can be expected from designation of MT (regardless of the extent that designation increases competition).

## 5.2. Mobile Termination Cost Input<sup>13</sup>

58. The MT rate used in the CBA is just above the 75<sup>th</sup> percentile of the range of benchmarked MT rates. The Commission considers the use of the 75<sup>th</sup> percentile as appropriate “*in the light of the risks attached to using a small number of benchmarks*”<sup>14</sup>
59. Consideration of how the Commission undertook the benchmarking is outside of the scope of this report. This matter is dealt with in a separate report commissioned by TelstraClear from Network Strategies.<sup>15</sup>
60. Network Strategies’ concluded that correction of flaws in the Commission’s benchmarking reduces the upper quartile from 15.42cpm to 14.11cpm. Use of Purchasing Power Parity (PPP) instead of nominal exchange rates, further reduces the upper quartile to 12.56cpm.
61. The one matter that we do comment on is that of the selection of MT price within the benchmark range. We do not consider it appropriate to select the 75<sup>th</sup> quartile. Instead the Commission should select the median price.
62. We consider it appropriate to select the median price because:

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<sup>13</sup> Review of the mobile termination rate used by the Commission is outside the scope of this report. We therefore focus on the overall methodology used to select between the different benchmarked values or range implied the benchmarks.

<sup>14</sup> Commerce Commission, (2004), footnote 104, p 70.

<sup>15</sup> Network Strategies “Estimating the Cost of Mobile Termination - A Review of the Commerce Commission’s Benchmarking Study”, 18 November 2004.

- this would result in greater net benefits to end-users;
  - this would reduce the gap between the pre-control and competitive prices – a concern that the Commission has expressed in relation to indirect costs;
  - the MT cost should be the best estimate of the TSLRIC price that would be calculated under the final pricing principle;<sup>16</sup> and
  - the value of none of the variables involved in the analysis can be observed, but rather has to be predicted. In the current case it is not possible to estimate the probability or likelihood of the appropriate termination price, hence the degree of risk cannot be quantified. In such cases it is appropriate to select an average or a median point as the best estimate.<sup>17</sup>
63. Unless the Commission can document that it is appropriate to deviate from the median point in the context of the CBA it should not do so. In this respect it should be noted that a risk assessment leading to an increase in the estimate is even more dubious in the current context where account is taken of indirect costs (refer to section 5.5 for a discussion of indirect costs).
64. Selection of the median price results in a MT price (with Network Strategies' corrections) of 10.75 cpm or 11.29 cpm using PPP.
65. The effect of this adjusted MT prices on the CBA are detailed in the tables below.

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<sup>16</sup> Particularly as we would expect that if the Commission selected a “conservative” (ie favouring access providers) MT rate under the initial pricing principle (of benchmarking), access seekers would be compelled to seek a final price determination. From discussions we have had with TelstraClear, we understand this has been a substantial factor behind their decisions to seek final price determinations for fixed PSTN interconnection and wholesaling.

<sup>17</sup> We note that the Commission’s selected benchmarks are spread reasonably evenly within the range. The best estimate would therefore have to be the median point within the range of sampled estimates.

**TABLE 7: CHANGE IN NET BENEFITS FOR CHANGES IN THE MT PRICE**

<i>Parameter</i>	<i>Factual 1</i>		<i>Factual 2</i>	
	Net benefits (\$m)	Net benefits - PBA (\$m)	Net benefits (\$m)	Net benefits - PBA (\$m)
75 <sup>th</sup> quartile price with NS correction (14.11cpm)	53.3	15.9	49.2	15.5
75 <sup>th</sup> quartile price with NS correction using PPP (12.56cpm)	99.3	31.3	90.3	30.3
Median price with NS correction (10.75cpm)	156.0	51.9	139.0	49.8
Median price with NS correction using PPP (11.29cpm)	137.1	44.9	123.0	43.1

**TABLE 8: LEVEL OF NET BENEFITS FOR CHANGES IN THE MT PRICE**

<i>Parameter</i>	<i>Factual 1</i>		<i>Factual 2</i>	
	Net benefits (\$m)	Net benefits - PBA (\$m)	Net benefits (\$m)	Net benefits - PBA (\$m)
75 <sup>th</sup> quartile price with NS correction (14.11cpm)	270.0	43.8	234.2	42.8
75 <sup>th</sup> quartile price with NS correction using PPP (12.56cpm)	316.0	59.2	275.3	57.6
Median price with NS correction (10.75cpm)	372.7	79.8	324.0	77.1
Median price with NS correction using PPP (11.29cpm)	353.8	72.8	308.0	70.4

66. MJA recommends that the Commission select the median price, based on PPP of 11.29cpm.<sup>18</sup> We note that is a deviation from the approach that the Commission has taken previously, in determining the benchmarked price for fixed PSTN interconnection.

### 5.3. Price Elasticity of Demand for FTM calls

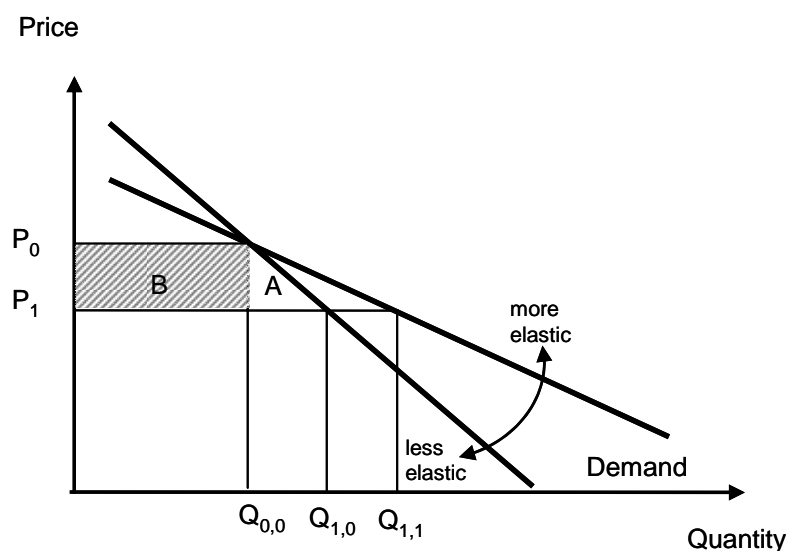
67. In the Commission's CBA a price elasticity of demand for fixed-to-mobile calling services of -0.6 is used. This figure is based on an examination of

<sup>18</sup> Selection of the median price without using PPP results in the lowest price – 10.75cpm.

different sources including the ACCC and figures submitted by Vodafone and Telecom.

68. The price elasticity of demand is an important variable in determining the overall net-benefit as it translates price reductions to quantities and hence to efficiency gains. The more elastic (inelastic) the elasticity the greater (smaller) the responsiveness to price changes and hence the more (less) consumers are willing to consume relative to reductions in price. The effects on consumer surplus are illustrated in the figure below.

**FIGURE 3: CHANGES IN SURPLUS DUE TO CHANGES IN ELASTICITY**



69. The more elastic the demand curve the larger the efficiency triangle A as shown in the figure above. Choice of elasticity estimate is therefore important for the conclusions reached on net benefit.
70. In order to assist our review of the elasticity estimate used by the Commission we have conducted a benchmark study including a review of some of the estimates relied on by the Commission.

### 5.3.1. Background

71. Price elasticities are complicated and time consuming to estimate in practice and require access to large data sets comprising time series of prices and demand (and ideally access to other information such as changes in the number of competitors, introduction of new services, major advertising campaigns, etc.).

72. The study by Dotecon for BT in the UK (as referenced by the Commerce Commission) is a good example of a recent formal analysis of the own price elasticity of demand. The analysis was conducted using different econometric models and based on monthly data from January 1997 – February 2001.
73. Another approach to estimate elasticities by applying survey techniques. In essence a survey seeks to determine reactions to price changes by asking a representative sample of people how they would react to changes in price noting their reactions in terms of market interest, choice etc.
74. Due to lack of data and time constraints it has not been possible for us to adopt any of the above mentioned approaches. As an alternative we have conducted a benchmark study of recent estimates of the own-price elasticities of FTM calls.

### **5.3.2. Issues in Estimating Price Elasticities**

75. There exists little public analysis of the price elasticity of demand for FTM services. Table 2 in the following section provides a summary of these estimates.
76. The Commission listed three sources for its decision to use an elasticity of  $-0.6$ : Telecom, a survey by Vodafone and the results from the ACCC. In commenting on the elasticity estimates, it is important to recognise that the analyses listed by Vodafone include the DotEcon analysis which formed the “*only recent professional study*” cited by the ACCC. As such, there may be an element of double counting of this ‘mid-range’ estimate.
77. The examination of Ramsey allocations of common costs by the Competition Commission and by Oftel in the UK provided the forum for examination of the FTM elasticity estimates. These estimates were derived in the context of obtaining elasticity estimates for mobile access and mobile originating calls.
78. In this examination, DotEcon provided an estimate of the (own price and super) elasticity of demand of  $-0.43$ . The DotEcon analyses included analyses across three time categories: Day, Evening and Weekend and for different models. In terms of examining different types of consumers, it is likely that business users are relatively more important in Day estimates ( $-0.375$ ) than for Evening ( $-0.860$ ) or Weekend ( $-0.485$ ).

79. In contrast, a Frontier Economics analysis estimated that the own price (and super) elasticity was  $-0.18$ .
80. The Competition Commission raised a series concerns regarding the econometric analyses used by DotEcon and Frontier. The Commerce Commission reported a number of these in its Draft Report (paras 410-411).
81. In particular, Oftel had commissioned a review by Dr John Hunter and Professor Christos Ioannadis in 2001. The review raised concerns about the validity of the model used by DotEcon. They suggested that it was not clear that the estimates obtained from the defined models were in fact estimates of the own-price elasticity.
82. In reviewing the Frontier Economics analysis, the Competition Commission noted that the estimates for fixed-to-mobile were not stable over time.<sup>19</sup> The stability of the estimates is particularly of concern where prices change by significant amounts. In these cases, there may be different elasticity estimates unless a constant elasticity is assumed across the entire demand curve.
83. Holden and Pearmain undertook a survey of some 1,500 people to estimate their responsiveness to hypothetical price movements. This derived an elasticity estimate of  $-0.11$ .
84. In reviewing the results provided by Holden Pearmain, the Competition Commission relayed opinions that such surveys are possibly biased to providing under-estimates of elasticity. As the investigation was highlighting the differences between elasticity estimates for different products, this potential drawback was less important as all estimates could be considered to be under-estimates.<sup>20</sup>
85. As noted above, the analysis of the elasticity for FTM was part of an analysis of applying Ramsey pricing. In its evaluation, Oftel:<sup>21</sup>

*“...saw no compelling reason to believe that the own-price elasticities of mobile-originated calls, fixed-to-mobile calls and mobile subscriptions were significantly different from one another. ... Oftel assumed that all three own-price elasticities were equal to  $-0.3$  ... In that work it assumed that all cross-price elasticities, with the*

<sup>19</sup> Competition Commission (2003), para 8.24, p. 210.

<sup>20</sup> *ibid*, para 8.49, p. 215.

<sup>21</sup> *ibid*, para 8.53, pp. 216-217.

*exception of the cross-price elasticity of the number of subscribers with respect to the mobile-originated call price, were equal to zero. It is said that the welfare implications of such cross-price elasticities were captured through the application of the R-G [Rolf-Griffen]<sup>22</sup> factor and so to include values for cross-price elasticities would involve double counting.*

86. The Competition Commission was also wary of using the elasticity estimates

*“First, we were not satisfied that there was any way of establishing reliable estimates of elasticities of demand in the mobiles sector with enough precision to inform pricing decisions. Hence, we believe that there are problems in calculating reliable Ramsey prices.”<sup>23</sup>*

87. There is limited information available from other jurisdictions. In the recent ACCC review of MT, it noted:

*“With respect to the cost bases, none of the submissions specify these for any of the services included. Further, there is little or no specification of the elasticities used.”<sup>24</sup>*

and

*“Given such [own-price] elasticity estimates as are available are subject to disagreement across a broad range of values, that cross-price elasticity estimates are virtually non-existent, and that their misapplication could generate inferior efficiency-in-use consequences than they try to correct for, the Commission believes at this stage that it would not promote the LTIE to base markups to account for common organisational-level costs on a Ramsey-Boiteux<sup>25</sup> framework.”<sup>26</sup>*

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<sup>22</sup> The Rolf-Griffen factor is a way of describing that amount of indirect benefit that is generated by additional subscribers – hence a network externality.

<sup>23</sup> Competition Commission (2003) para 2.431, p. 99.

<sup>24</sup> ACCC (2004), p. 170.

<sup>25</sup> The Ramsey-Boiteux framework seeks to answer the question: Which price structure is efficient when a firm supplies many different services, the production of which has common costs, and when the firm should be able to fully recover its costs at the same time? Marcel Boiteux examined this very question using key insights from Frank Ramsey. More specifically, he concluded that the price for a service should be proportionally inverse to the elasticity of demand for this service. Prices that correspond to such a structure are therefore called Ramsey-Boiteux prices or more commonly Ramsey prices.

<sup>26</sup> *ibid*, p. 210.

88. The ACCC analysis, surprisingly relegated to a footnote, relied on a range of estimates.<sup>27</sup>

*“The Commission considered a variety of sources of information about the magnitude of the own-price elasticity – market inquiries; estimates used by market analysts; and the only recent formal professional study (DotEcon 2001, p. 3). All of these sources suggest an elasticity in the range between roughly –0.4 and –0.8, with a mid-value of –0.6. The most sophisticated of these studies is that for the United Kingdom of DotEcon.... Australian analysts have, based on market inquiries, used elasticities within this range. For example, Macquarie Research Equities, has applied an elasticity of –0.75... and CommSec has applied an estimate of –0.50 ... Elasticities in this range are also suggested by the Commission’s own market inquiries.”*

89. In this regard, the ACCC appears to have relied on a narrower base for econometric/survey estimates of elasticity than the UK authorities but has supplemented this with analysis from market analysts.
90. Separate from the reports associated with regulatory decisions, estimates of elasticity of demand for FTM have been derived in Australia (Francis) and France (Aldebert).
91. The analysis by Francis (2000) relates solely to Optus customers. As such, it will not be an appropriate estimate of the market’s own-price elasticity due to significant substitutability between Optus’ product and its competitors. This was raised by the Competition Commission:<sup>28</sup>

*“Firm-specific elasticities are concerned with how a change in the price of a particular firm’s price (the prices charged by all other firms remaining the same) affects the quantity consumed of that particular firm’s output. Where the products of two firms are substitutes for one another, the elasticity of demand facing each firm is likely to be more negative (ie more elastic) than the overall market elasticity for the product. In terms of considering the changes in output that are relevant to economic efficiency, increases in sales made by one firm at the expense of another are not relevant. What is relevant is the overall change in output across all firms.*

92. Further, the Francis estimate also appears to relate to a short time period.

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<sup>27</sup> *ibid*, p. 154 fn 409.

<sup>28</sup> Competition Commission (2003), para 8.10, p. 206

93. The concerns about company-specific estimates of price elasticity would also apply to those provided by Telecom New Zealand for its business customers. As noted above, firm-specific estimates of elasticity are likely to be above those for the market but the estimate of business elasticity is likely to be below for all consumers.
94. Aldebert (1999) estimated an own-price elasticity of  $-0.491$  for residential consumers. In contrast to the other studies, this analysis used individuals' data rather than an aggregation.
95. The current New Zealand review has provided a further forum, albeit also without encouraging new research.
96. US studies have not been investigated as receiving party pays. An elasticity based on these rates would reflect propensity to receive calls which may or may not be equivalent to propensity to make calls. This argument was used by the Competition Commission in disregarding evidence from the US of estimates of elasticity of  $-0.5$  and  $-0.6$ .<sup>29</sup>

### 5.3.3. Results

97. Table 9 provides a summary of the results of our survey. Detailed results are found in appendix A.

**TABLE 9: SUMMARY OF RESULTS FROM STUDIES**

Source	Range	Point estimate
Access Economics (Aust), 1998	$-0.08$	$-0.08$
Aldebert (France), 1999	$-0.491$	$-0.491$
Francis (Aust), 2000	$-0.3 - -0.5$	$-0.40$
DotEcon (UK), 2001	$-0.33 - -0.76$	$-0.43$
Frontier Economics (UK), 2001	$-0.18$	$-0.18$
Holden Pearmain (UK), 2001	$-0.11$	$-0.11$
Macquarie (Aust), 2003	$-0.75$	$-0.75$
CommSec (Aust), 2003	$-0.50$	$-0.50$
Telecom (NZ), 2004	n/a*	n/a*

\*Commerce Commission (2004), Restricted Version

98. Our review of elasticity estimates suggests that reliance on any point estimate is placing too great a burden on that estimate. A more appropriate

<sup>29</sup> *ibid*, para 8.27, p. 211.

approach would be to examine the robustness of the estimate through sensitivity analysis, using the extreme estimates and determining the 'breakeven' rate at which either test is conducted.

99. However, based on information provided by the table above we consider a reasonable elasticity interval for FTM calls in New Zealand is -0.2 to -0.8. This interval represents the entire range of estimates excluding the Access Economics estimate and an adjustment to the Holden Pearmain estimate.
100. The Access Economics figure is based on data from two studies from 1980 and 1988 which were not even their own estimates. This coupled with the apparent age of the estimate and that it is a clear outlier in the data set means we have little or no confidence in the estimate. Further, our review of the comments provided to Competition Commission on the Holden Pearmain study suggests that the estimate is too low. As such we have set the lower point estimate at -0.2. With regard to the upper limit in our interval we are guided by the Dotecon and Macquarie estimate.
101. We note that the Commission's selected elasticity of -0.6 is within the interval of -0.2 to -0.8 we consider appropriate. While not the mid-point (which we would normally recommend), we do not consider it to be unreasonable given the evidence provided. Therefore we do not recommend a change to the price elasticity of demand.

#### **5.4. Estimate of Direct Costs**

102. The estimate of direct costs relate to the costs incurred by access seekers, access providers and the Commission in conducting or participating in the regulatory process.
103. The Commission base their estimate on that used in the LLU Investigation. We are not able to review this estimate. Nevertheless we provide some comments on the current figure.
104. First, regulatory costs are unlikely to be constant over time. While there may be substantial 'start-up' costs, over time costs are likely to fall as the entities involved become more familiar with the regime.
105. Second, it should be ensured that any direct costs that would be incurred in the counterfactual are netted off. It is sometimes argued that (heavy-handed) regulation is extremely costly. However, proponents of this view often fail

to recognise that there may be substantial costs related to negotiation, litigation etc. where regulation has not been introduced.

106. Third, the Commission's application of the direct costs estimate for LLU is inappropriate, because LLU and MT are not comparable services in terms of the regulatory costs that would be involved in making a determination.
107. MT is a generic form of interconnection service, in which:
- disputes are likely to focus primarily on price, with non-price terms being relatively non-contentious;
  - network-to-network interconnection arrangements are straightforward; and
  - regulated or negotiated outcomes are likely to be equally applicable to all access providers and all access seekers.
108. In contrast, LLU is a unique and highly complex form of access service, in which:
- price terms typically involve multiple elements and differ between access providers and different types of access seekers;
  - non-price terms are extremely complex, contentious and differ between access seekers. These include competitively significant terms relating to facilities access, collocation, customer line provisioning, traffic forecasting and billing; and
  - contentious issues may recur over time despite the putative resolution of disputes.
109. Accordingly, the direct cost is likely to be substantially lower than for LLU. Further, as regulated prices are unlikely to differ materially between access seekers and access providers, the determination will be readily applicable to other disputes (and may result in concurrent disputes being enjoined). This warrants a reduction of the LLU direct cost estimate of say 50% and a reduction of the current scale-up factor from 1.5 to say 1.3. This results in a direct cost estimate of \$1.04 million.
110. Reducing the direct costs from \$2.4 million to \$1.04 million has the following effects on the net benefits.

**TABLE 10: NET BENEFITS – DIRECT COSTS OF \$1.04 MILLION**

<i>Factual 1</i>		<i>Factual 2</i>	
Net benefits (\$m)	Net benefits - PBA (\$m)	Net benefits (\$m)	Net benefits - PBA (\$m)

Change	5.7	5.7	5.7	5.7
Level	222.4	33.6	190.7	33.0

## 5.5. Indirect Cost Approach

111. The Commission’s approach to modelling indirect costs involves a scaling down or discounting of net-benefits. This approach has been used several times by the Commission in the past, including CBA studies conducted in relation its Airport Inquiry, Gas Control Inquiry and LLU Investigation.

112. The approach was first introduced in the Airport Inquiry. In the Airport Inquiry indirect costs of control are defined as:<sup>30</sup>

*“... related to the inefficient forms of behaviour stimulated by control, and can theoretically include:*

- *The distortions to behaviour caused by the potential for poor, or uncertain, regulatory decision making (in terms of allocative, productive and dynamic inefficiencies).*
- *The scope given for opportunistic behaviour on the part of the regulator and the regulated firm.*
- *The potential for regulatory capture (with the regulator coming to serve particular groups’ interests), and a subsequent movement away from efficient outcomes.”*

113. In the current investigation the Commission define indirect costs as those *“relating to the impact of the proposed regulation on efficiency incentives”* and *“the extent [to which] not all of the potential benefits of regulation would actually be realised in practice.”*<sup>31</sup>

114. In practice the Commission seem only to be modelling the indirect costs relating to the inability to strike the competitive price when designating the service. By scaling down net benefits by 25%, the Commission therefore implicitly assume that the regulation will only ‘close the price gap’ between factual and counterfactual scenarios by 75%.<sup>32</sup>

<sup>30</sup> Commerce Commission (2002a), p 176.

<sup>31</sup> Commerce Commission (2004), footnote 104, pp 57-58.

<sup>32</sup> Note that this is actually an understatement as the 25% only relates to for excess returns. Any deadweight gain in consumer surplus is reduced by 43.75%.

115. While we agree that it cannot be assumed that all the potential benefits of designation would actually be realised in practice as there is a certain bluntness attached to any regulatory remedy, we have a number of concerns with the approach adopted by the Commission.
116. First, indirect costs will be small if counterfactual prices are close to the factual level even though the indirect costs of designation may not be lower in these circumstances. Similarly, indirect costs will be high when the counterfactual prices are high relative to factual prices. The Commission's methodology (or functional form of their approach) may therefore systematically underestimate indirect costs when the difference between factual and counterfactual is small and overestimate them when the difference is great.
117. In the current context, the calculated indirect costs are very substantial. Just as an explicit allowance for indirect costs should be included when the difference between counterfactual prices and factual prices are small, a cap should be put on indirect costs when they are large.
118. Second, it is unclear whether the Commission's indirect cost approach considers the inefficiency that may arise if the result of designation is that the MT price is below the cost of providing the service. However, given that the Commission's benchmarked MT rate is clearly a conservative estimate, cf. section 5.2, we would regard the risk of setting a regulated charge that is too low to be very low or zero. Accordingly, any adverse effects or indirect costs resulting from this scenario should not be included.
119. Third, the factor of 75% is founded in the Commission's work in the Airport Inquiry, where a comparison was made to price cap regulation. It is not clear that the same analogy may be applied in the context of designating MT.
120. In the Airport Inquiry the Commission conclude:<sup>33</sup>

*“...the Commission considers that price cap regulation may be better at achieving allocative efficiency and eliminating excess returns than it would be at achieving productive and dynamic efficiencies. The Commission considers that control would result in a 75% reduction in the difference between the actual and efficient price.*

*This means that the indirect costs of control related to the price level can be measured as the non-attainment of a portion of the total*

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<sup>33</sup> Commerce Commission (2002a), p 185.

*potential benefits, caused by a failure of control to lower price all of the way to the efficient level.”*

121. One of the main problems with a price cap is that it does not guarantee that the resulting price reflects the costs of production. If it does not, the result is an inefficient allocation<sup>34</sup>. Where cost-plus regulation primarily is designed to ensure allocative efficiency, price-caps are primarily designed to ensure productive efficiency.
122. More generally, price cap regulation will not reduce the price to the required efficient level unless the cap is very narrowly defined on the specific service. In this respect the Commission discuss different option in relation the Airport Inquiry.<sup>35</sup>

*“A ‘pure’ form of price cap would set the initial price with regard to an efficient and comparable benchmark, rather than based on an assessment of the regulated firm’s costs. As it may be quite difficult in practice to find an efficient and comparable benchmark, in practice, internal cost factors have generally been used. This injects a rate-of-return element, making this form of regulation, in practice, an intermediate between pure price cap and rate-of-return regulation.”*

123. The Commission’s reference to price cap regulation does not allow us to assess if a narrow definition is what the Commission has in mind or whether it is basing its estimate on a basket of services.
124. The main issue in the current context seems not to be one of price cap regulation, but more an issue of pass-through. If pass-through is far from perfect, any changes to the MT rates will be imperfectly passed on to consumers. Hence regulation will simply result in a transfer of surplus between mobile and fixed network operators. However, the Commission have already taken this type of development into account by modelling a scenario where less than perfect pass-through occurs.
125. Fourth, the inclusion of indirect benefits is equivalent to including a ‘dampening factor’ in the model. In fact, indirect costs might just as well be regarded as the inability of either regulator, market or both to achieve the outcomes of a competitive market. Every benefit that is realised in theory will only be passed through by 75%.

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<sup>34</sup> An additional problem is that the regulated firm has an incentive to under-supply quality. Price-caps should therefore always be accompanied by minimum-quality requirements.

<sup>35</sup> *ibid*, p 182.

126. The underlying assumption seems to be that once the MT is designated, then it will be an ‘uphill battle’ to achieve the desired reductions in the price. However, this is ill conceived. Once a service is designated strategic incentives are changed and it may be the case that MT prices are reduced faster than at the specified pace.<sup>36</sup> While such strategic interactions are difficult to predict or evaluate the fact remains that prices will not rise over the specified period. There is, however, a possibility that that they may decrease faster than specified.
127. Fifth and similarly, the extent to which outcomes are not achieved in practice could also be said about the counterfactual scenario. Is it likely that FTM prices will decline by 4% per annum over the five year period in the absence of regulation? The Commission might just as well adjust the forecast counterfactual prices to reflect that reductions in prices as suggested by the historical development may not be reached, cf. section 5.1.
128. Sixth, if we regard the Commission’s indirect cost estimate as a measure of regulatory risk and error, it is important to note that regulatory error is not symmetric. The main purposes of Section 18 of the Telecommunications Act, is to promote competition to the long term benefit of end-users (LTBE). Hence, the benefit of end-users should take precedence. If there are benefits that exceed costs the Commission should designate. Any measures taken to reduce benefits may increase the potential for regulatory error (i.e. the risk of not regulating when regulation is to the LTBE) and may ultimately be to the detriment of the LTBE.
129. Finally, the approach to model indirect costs seems to similar to the notion or principle of a ‘high standard of comfort’ which the Commission clearly rejects:<sup>37</sup>

*“Telecom argues that the Commission must be satisfied that its calculation of the benefits of regulation outweigh the costs to a significant degree before recommending the designation of the mobile termination service. The Commission is of the view that the Act does not prescribe a ‘high standard of comfort’. Rather the Act requires the Commission to make a recommendation that best gives, or is likely to best give, effect to the purposes set out in section 18.”*

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<sup>36</sup> This may also be regarded as a dynamic efficiency issue.

<sup>37</sup> Commerce Commission (2004), footnote 104, p 10.

130. By scaling down the benefits, it seems the Commission is in fact employing a 'high standard of comfort' before recommending regulation to the Minister of Communications. The indirect cost practice followed by the Commission therefore seems inconsistent with an approach which best gives an outcome that reflects the purposes set out in section 18, to promote the LTBE. Scaling down the net benefits would increase the chances of this regulatory error, whereby regulation is not introduced where it is to the LTBE.
131. Ideally it would be desirable to estimate indirect costs independently of the benefits of control. However, we recognise that this is difficult and that the approach adopted by the Commission to a large extent is a pragmatic solution.
132. One approach the Commission may wish to consider is a comparison with the designation of fixed access and corresponding indirect costs. Although designation in this case involves fixed network services, designation is similar to extent it deals with termination. We, however, do not have the data necessary to conduct such an analysis.

## 6. Other issues

### 6.1. Treatment of GST

133. The Commission appears to have underestimated the surpluses achieved by excluding the GST from prices. GST should be excluded for estimates of productive surpluses since the GST is a transfer payment; however, it is not correct in the calculation of allocative surpluses.
134. For example, assume that a FTM call sells for \$1 with a 12.5% GST in the counterfactual and for 50 cents with GST in the factual. Using a linear demand curve, the average per unit consumer gain is  $(\$1 - \$0.5)/2 = \$0.25$ . Excluding GST, gives an average consumer gain of  $\$0.25/1.125 = \$0.22$ . This is incorrect.
135. Taking account of GST results in the following net benefits.

**TABLE 11: NET BENEFITS –GST**

	<i>Factual 1</i>		<i>Factual 2</i>	
	Net benefits (\$m)	Net benefits - PBA (\$m)	Net benefits (\$m)	Net benefits - PBA (\$m)
Change	14.2	2.4	-0.4	0.3
Level	230.9	30.3	184.6	27.6

136. Note that under Factual 2, the impact is a decline in benefits. Under Factual 2, the level of the change in price between the Counterfactual and the Factual is not related to the level of price – it is the pass-through percentage multiplied by the difference between the level of the Counterfactual MT cost and the Factual MT cost. Applying GST does not affect this pass-through rate of the underlying costs. However, the level of prices facing consumers (which will include the GST) does affect any quantity change through the elasticity formula. For the same decline in the level of prices, say 4 cents, there is a smaller reduction in quantity at a higher price than a lower price. The net benefit will therefore be lower.

### 6.2. Discount Rate

137. The choice of discount rate in a CBA is potentially a very contentious issue. Lind (1990) provides an overview of problems that may arise. However, in

the simplest theories, the choice of a discount rate is straightforward: it is the consumer's rate of time preference equal to the marginal productivity of capital, in which case the market rate of interest is the appropriate rate of discount.

138. The Commission discounts consumer welfare benefits at a 6% discount rate. The Commission reference this discount rate from the LLU report<sup>38</sup> where it is the yield on New Zealand government bonds.
139. As noted, the CBA discounts costs and revenues over a five year period. At 9 November, the official 5 year bond rate was 6.06%. This is only slightly lower than the average for October (6.07%) but above the average for the twelve months to October 2004 (5.98%).
140. While we agree that a proxy discount rate with reference to a risk-free rate should be used in the current case, where the Commission has adjusted for risks in the estimated benefits and costs, the government bond rate is a nominal pre-tax rate and as such is an overestimate of the relevant consumer rate of time preference. The result is therefore an understatement of the present value of welfare benefits over the five year period.
141. The consumer rate of time preference should allow for the marginal rate of taxation. Assuming a marginal tax rate of 33% the consumer rate of time preference is  $0.06 \times (1 - 0.33) = 4\%$ .
142. Consistency should also be ensured between the underlying data and the discount rate to which it is being applied. Based on the evidence presented by the Commission it is not clear if data is in real or nominal prices. If it real the bond rate needs to be adjusted for inflation. Assuming an inflation rate of 2%<sup>39</sup> yields the following consumer rate of time preference:

$$\frac{1 + 0.06 \times (1 - 0.33)}{1 + 0.02} - 1 = 2\%$$

143. Reducing the discount rate from 6% to 4% results in the following net benefits.

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<sup>38</sup> Commerce Commission (2003), p 41.

<sup>39</sup> Inflation in the September quarter 2004 was running at 2.5%. Under the current Policy Targets Agreement, the Reserve Bank seeks to obtain price stability defined as annual increases in the CPI of between 1 and 3% in the medium term.

**TABLE 12: NET BENEFITS – DISCOUNT RATE 4%**

	<i>Factual 1</i>		<i>Factual 2</i>	
	Net benefits (\$m)	Net benefits - PBA (\$m)	Net benefits (\$m)	Net benefits - PBA (\$m)
Change	19.8	2.6	14.5	2.1
Level	236.5	30.5	199.5	29.4

### 6.3. Fixed origination

144. The Commission has set the cost of fixed origination at 1.13 cpm. This rate is based on the Commission’s interconnection determination, on the basis of a benchmarking study.
145. The Commission concludes that the median point of the benchmark range is the appropriate starting point for the pricing decision. However, to reflect the asymmetric nature of the risk to dynamic efficiency of a low price, the Commission increase their final estimate to the 75<sup>th</sup> percentile. In particular the Commission conclude:<sup>40</sup>

*“The Commission has been unable to identify any rigorous and quantifiable means of accounting for the risk to dynamic efficiency, while recognising that the risk should induce the Commission to set a price at a level that minimises the possibility of undershooting. The Commission has accordingly decided to shift the price point from the median point of the range to the 75th percentile of the range.”*

146. While disputing this decision is beyond the scope of this report, the decision seems symptomatic of the Commission’s conservative approach.

### 6.4. Productive Efficiency

147. While the Commission seems intent on analysing the likely effects on productive efficiency, we have not been able to identify how and where the Commission has dealt with this issue. Nevertheless we offer our view.
148. Productive efficiency is defined as meeting demand at the lowest possible costs. In a short-run static sense this entails choosing and making best use of the appropriate level of variable inputs. In the long run this translates into making investments that ensure that costs can continue to be minimised.

<sup>40</sup> Commerce Commission (2002b), p 40.

Where there is productive inefficiency, resources are being wasted. This may be measured as the value of the output foregone by the economy as a whole from those resources not being employed more productively and efficiently elsewhere.<sup>41</sup>

149. Competition is often cited as the key driver of productive efficiency as rivalry forces providers to minimise costs.

150. The competition assessment conducted by the Commission indicates that the mobile network operators are subject to limited competition in the wholesale market for termination services on their respective networks. Further, that the retail market for the tolls and fixed-to-mobile calls is subject to limited competition. Finally, with regard to retail mobile services the Commission state:<sup>42</sup>

*“The Commission has not formed a definitive view on whether the retail mobile services market is subject to limited competition. However, the Commission is not persuaded that competition in this market is sufficient to ensure that excess profits being earned in supplying wholesale mobile termination services are being dispersed through competition for retail mobile calling and subscription services.”*

151. The overall conclusion is therefore clear: the market is subject to limited competition. The question is does this imply that the firms are being productively inefficient?

152. Under perfect competition the firm produces at the lowest point on the average cost curve in the long run, thereby being productively efficient. When there is limited competition, the firm is not forced to operate at the lowest point on the average cost curve. Maximising returns to shareholders will nevertheless motivate cost minimisation. However, in the absence of competition incentives may not be sufficient to encourage productive efficiency. We can therefore conclude that an increase in competition has the potential for increasing productive efficiency.

153. The Commission clearly believe that designation will increase competition – a view that we share:<sup>43</sup>

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<sup>41</sup> Or alternatively production should be maximized for a given amount of input/level of costs (society should "produce on the production curve").

<sup>42</sup> Commerce Commission, (2004), footnote 104, p 3.

<sup>43</sup> Commerce Commission, (2004), footnote 104, p 3.

*“A reduction in mobile termination rates is likely to increase competition in the fixed-to-mobile market and result in a sustainable lowering of the retail price for fixed-to-mobile calls. Such a reduction in retail prices will benefit consumers in two ways: first by increasing the viability of entry for competitors into the market for tolls and fixed-to-mobile calling and thereby increasing competition for the provision of those services; and second, by encouraging increased fixed-to-mobile calling.”*

154. To the extent that intervention in the market increases competition, productive efficiency enhancements should be expected. In particular, entry by more cost-effective producers lowers production costs and forces prices toward costs. The former increases productive efficiency and the latter allocative efficiency.
155. However, there may be other benefits associated with entry and competition. If entrants offer differentiated products, entry also increases diversity for consumers. Even when the entrant is not more cost effective, diversity alone increases welfare. Increased competitive pressure is also likely to spur innovation.
156. While it may be argued that productive losses occur when regulators set termination rates at an incorrect level, it is very clear that the current MT prices are far above any reasonable cost level. As such it is our view that no inefficiencies are likely to occur.
157. While these benefits are difficult to quantify, the Commission should be mindful of the potential productive efficiency gains in their overall evaluation. Ideally the Commission should undertake a productive efficiency study as it conducted in the LLU investigation.
158. We have not attempted to calculate the productive efficiency gains that would result from designation of MT, as this would be outside the scope of this report. The Commission should note, therefore, that our conclusions on the CBA (see Tables 18 and 19, in particular) understate the net benefits of designating MT.

## 7. Sensitivity Assessment

159. The estimate of Net Benefit and Net Benefit (Public benefits approach - PBA) is provided through two Excel spreadsheets.<sup>44</sup> The analysis below uses these spreadsheets to obtain an estimate of the Net Benefit and Net Benefit (PBA).<sup>45</sup>
160. As suggested by our analysis above, we consider that a sensitivity analysis provides an important element of any cost benefit analysis. In particular, we have examined the changes in inputs into the model that generate the greatest change in the Net Benefits and change in the Net Benefit (PBA).
161. The term “sensitivity analysis” describes the simple process of establishing the extent to which the outcome of the CBA is sensitive to the assumed values of the inputs used in the analysis. These input values are:<sup>46</sup>
- the price elasticity of demand;
  - the cost of MT;
  - the discount rate;
  - the expected price changes in the Counterfactual (CF); and
  - quantity demanded.
162. As an indication of the sensitivity of the model, we have varied these inputs by 10%. In the Factual 1 model, increasing each estimate by 10% results in the following:

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<sup>44</sup> On an administrative note, the CBA model would benefit from clearly identifying inputs and only inputting these figures once (elasticity, for example, is entered in two separate locations in the Factual 1 model).

<sup>45</sup> The approach uses a constant elasticity but transforms price movements using a linear relationship for each change. This has a minimal impact on the estimate of demand quantities. For example, if the 2010 price of the Counterfactual were achieved in 2005, the model predicts demand would be 1,020m rather than 1,042m. In estimating the true demand effect, the greater the number of changes (and the smaller each change), the ‘better’ the estimate of demand. For the purposes of this exercise as this underestimation of demand effects applies to both the Counterfactual and Factual, we would expect there to be only a minor impact on the estimate. That impact would, however, be to increase the size of the benefit.

<sup>46</sup> Note that we have not varied the estimate of 25% for the indirect costs. As it scales down net benefits the workings of this input is clear.

**TABLE 13: SENSITIVITY OF RESULTS FOR FACTUAL 1 TO 10% INCREASE**

<i>Variable changed</i>	<i>Old value</i>	<i>New value</i>	Change in level	
			<i>Net Benefit (\$m)</i>	<i>Net benefit (Public benefits approach) - \$m</i>
<b>Base case</b>				
Elasticity	-0.6	-0.66	\$3.6	\$4.2
MT cost	\$0.160	\$0.176	-\$43.0	-\$11.2
Discount rate	6%	6.6%	-\$5.5	-\$0.7
CF price change	-4.08%	-4.49%	-\$19.9	-\$4.0
Quantity <sub>0</sub>	900.7m	990.8m	\$16.6	\$3.0

163. Taking a simple proportionate impact, adjusting the MT cost has the greatest impact on the Net Benefit, and a similar result is obtained for the Net Benefit (PBA) estimate.

164. These can be shown in the following ranking for each measure:

**TABLE 14: RANKING OF ALTERNATIVES – FACTUAL 1**

<i>Rank</i>	<i>Net Benefit</i>	<i>Net Benefit (PBA)</i>
1	Mobile termination cost	Mobile termination cost
2	Counterfactual price change	Elasticity
3	Quantity	Counterfactual price change
4	Discount rate	Quantity
5	Elasticity	Discount rate

165. Similarly for Factual 2, the impact of a 10% increase in each variable is

**TABLE 15: SENSITIVITY OF RESULTS FOR FACTUAL 2 TO 10% INCREASE**

<i>Variable changed</i>	<i>Old value</i>	<i>New value</i>	Change in level	
			<i>Net Benefit (\$m)</i>	<i>Net benefit (Public benefits approach) - \$m</i>
<b>Base case</b>				
Elasticity	-0.6	-0.66	\$1.8	\$4.1
MT cost	\$0.160	\$0.176	-\$41.0	-\$11.2
Discount rate	6%	6.6%	-\$4.1	-\$0.7
CF price change	-4.08%	-4.49%	\$2.0	-\$1.0
Quantity <sub>0</sub>	900.7m	990.8m	\$19.5	\$3.7

166. In contrast to Factual 1, the direction of impact is now counter-intuitive for some elements. Under Factual 2 if the Counterfactual declines at a faster rate, the model estimates a greater net benefit. This reflects the relationship

in the model between Counterfactual price declines and Factual 2 price declines. In rank order, these are:

**TABLE 16: RANKING OF ALTERNATIVES – FACTUAL 2**

<i>Rank</i>	<i>Net Benefit</i>	<i>Net Benefit (PBA)</i>
1	Mobile termination cost	Mobile termination cost
2	Quantity	Elasticity
3	Discount rate	Quantity
4	Counterfactual price change	Counterfactual price change
5	Elasticity	Discount rate

167. This analysis suggests that it is of greatest importance to obtain accurate estimates of the MT cost, the base period quantity demanded and the price elasticity of demand.

## 8. Conclusions and Recommendations

168. Our review of the Commission's CBA clearly indicates that the approach adopted by the Commission is one of caution, that layers conservatism on conservatism. The Commission employs a methodology which imposes a "high standard of proof". In our view, the CBA should instead strive to yield a best estimate of the benefits or costs that designation may bring.
169. One interpretation of the Commission's approach is that if a conservative approach yields a positive net-benefit then comfort should be provided that regulation will promote the long-term benefit of end-users. However, such a "high degree of comfort" approach creates a bias against regulation, and creates the risk that regulation will not be recommended where it is to the long-term benefit of end-users. Such an approach should only be used therefore to test the sensitivity of the model.
170. The conservatism employed by the Commission is most clearly exemplified by the following observations:
- indirect costs are arbitrarily set at 25% of wealth transfers and 43.75% of efficiency gains. While we acknowledge that indirect costs will be incurred, it is very unlikely that the implied level is appropriate in the current context. In fact, the indirect costs may be characterised as a 'dampening' factor in the model. Taking account of indirect costs is equivalent to assuming that regulation will only 'close the gap' between factual and counterfactual scenarios. In other words, the Commission seem to be adopting a 'high level of comfort'. In our view, the current estimate of indirect costs implied by the CBA are of a magnitude many times too great. Instead of relying on a scaling factor the Commission should seek to estimate these indirect costs more directly; and
  - the Commission consistently use of the 75<sup>th</sup> percentile approach. The 75<sup>th</sup> percentile is selected for the MT input and estimate of fixed origination. In our view the Commission should instead use the best estimate (i.e. median).
171. In addition, the following observations from our review of the methodology solutions adopted leads to clear understatement of the net benefits:
- call externalities are not taken into account.
  - no terminal value is used. The Commission's approach implicitly assumes that designation of MT has no welfare effects fiver years

hence. This is surprising since we would expect designation to have positive net benefits in clear excess of the five year period. Uncertainty in estimates following 2010 is not a valid argument for discarding a terminal value. With no terminal value the Commission are taking an overly cautious approach;

- MT rates are expected to decline at 1 cpm in the counterfactual scenario. Our review of overseas evidence supports that the MT rates may in fact increase with no regulation. Further, threats of regulation may have caused termination prices to decrease historically. Hence we are very reluctant to accept a year on year reduction of 1 cpm from 2005 – 2010. The counterfactual scenario should model the outcome with no designation. Given the clear lack of competitive pressures on MT this assumption seems overly conservative;
- no growth of FTM calls has been included in the analysis. Our analysis indicates that there is still room for growth in the FTM. Without taking account of this growth the Commission understates the net benefits;
- no account is taken of GST. Excluding GST has the effect of reducing surpluses that arise from allocative efficiency gains;
- the discount rate used does not account for tax. The higher the discount rate the lower the NPV of benefits. Taking account of tax lowers the discount rate and increases the net benefit;
- no account is taken of likely productive efficiency gains;

172. In addition to the above, our review of the Commission's cost-benefit model also shows that there is an internal inconsistency in the way the Counterfactual and Factual 2 scenario is specified. The Counterfactual scenario should be re-specified so it is consistent with the proposed changes in MT rates in the Counterfactual. With the current approach the Commission implicitly assume that the level of pass-through is greater than 100% in the counterfactual scenario.

173. Our proposed solution to this problem is outlined in the next section. However, the result is a counterfactual scenario where the price reductions in FTM rates are lower than in the Commission's scenario.

174. We have also reviewed the price elasticity estimate of -0.6 used by the Commission. The result of our benchmark exercise suggests that an appropriate elasticity range is -0.2 to -0.8. We note that the Commission's selected elasticity of -0.6 is within this interval. While is not the mid-point (which we would normally recommend), we do not consider it to be

unreasonable given the available evidence. Therefore we do not recommend a change to the elasticity of demand.

175. Finally, we have conducted a comprehensive sensitivity analysis of the model. This analysis shows that the two most sensitive parameters are the MT cost input and price elasticity.

## 8.1. MJA proposal

176. Based on our analysis above, we consider that the Commission currently significantly understate the net benefits of designation. A summary of our recommended inputs are provided below.

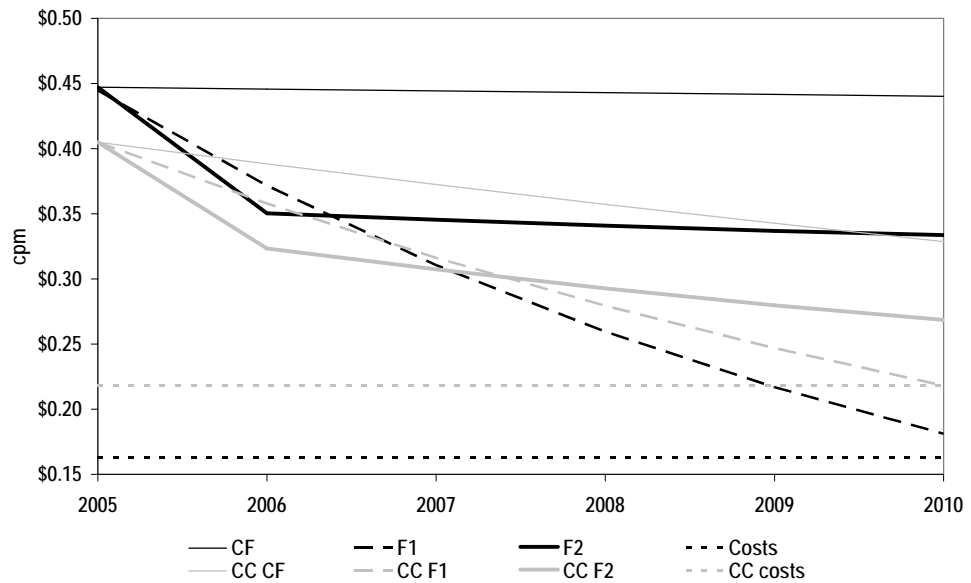
**TABLE 17: RECOMMENDED VALUES**

Parameter	Value	
	<i>In Commission model</i>	<i>MJA estimate</i>
Discount rate	6%	4%
Counterfactual price growth	-4.08%	-0.85%
MT cost	\$0.1600	\$0.1129*
Organic growth	0	80 mill. min.
Direct costs	\$2.4 mill.	\$1.04 mill.
Terminal value	None	2010 benefits are reduced to zero by 2015
GST	None	12.5% (Households are assumed to represent 50% of the market)

\*This estimate is based on the Network Strategies, Estimating the Cost of Mobile Termination - A Review of the Commerce Commission's Benchmarking Study, Report for TelstraClear, November 2004, Exhibit B2.

177. We have retained the Commission's estimate of indirect costs. Although it is our view that the resulting indirect costs are significantly overstated and far above any reasonable level, we do not have the data appropriate to make adjustments to this factor. As such our net benefit estimates should be regarded as conservative.
178. The impact of these assumptions on the price paths under the Counterfactual, and Factual 1 and 2 are shown in the following chart. Our Counterfactual price starts from a higher base than the Commission's, reflecting the impact of GST for residential users and slower annual decline for the Counterfactual.

**FIGURE 4: PRICE PATHS**



179. Under these assumptions, we obtain significant net benefits from designation, cf. tables below.

**TABLE 18: CHANGE IN NET BENEFITS MJA ASSUMPTIONS**

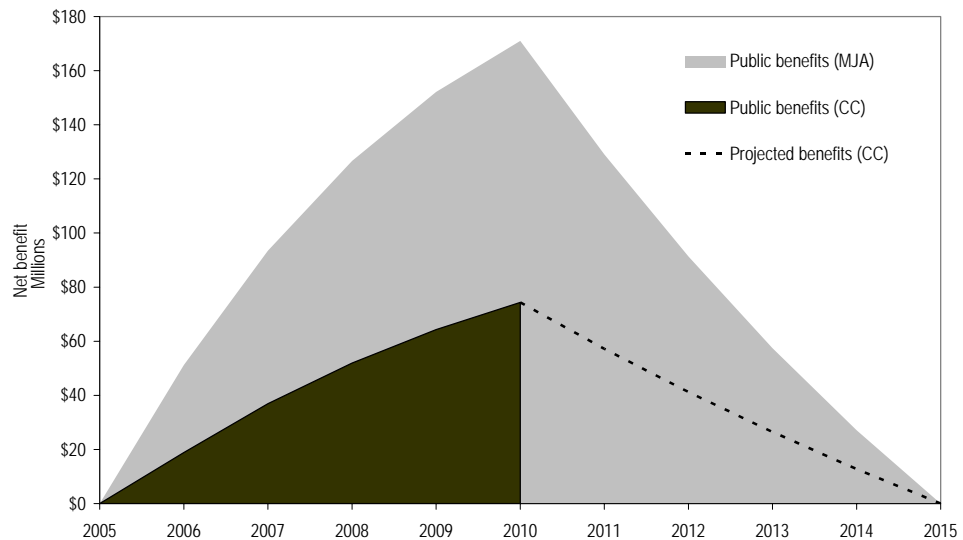
<i>Parameter</i>	<i>Factual 1</i>		<i>Factual 2</i>	
	Net benefits (\$m)	Net benefits - PBA (\$m)	Net benefits (\$m)	Net benefits - PBA (\$m)
Discount rate	19.8	2.6	14.5	2.1
CF FTM price growth, pass-through and MT cost	135.4	34.3	32.5	16.3
Factual MT cost	137.1	44.9	123.0	43.1
Terminal value	247.9	27.3	141.5	5.2
GST	14.2	2.4	-0.4	0.3
Organic growth	17.7	2.8	13.1	2.4
Direct costs	5.7	5.7	5.7	5.7
<b>Total</b>	<b>972.1</b>	<b>243.8</b>	<b>510.9</b>	<b>129.4</b>

**TABLE 19: LEVEL OF NET BENEFITS MJA ASSUMPTIONS**

<i>Parameter</i>	<i>Factual 1</i>		<i>Factual 2</i>	
	Net benefits (\$m)	Net benefits - PBA (\$m)	Net benefits (\$m)	Net benefits - PBA (\$m)
Discount rate	236.5	30.5	199.5	29.4
CF FTM price growth, pass-through and MT cost	352.1	62.2	217.5	43.6
Factual MT cost	372.7	79.8	324.0	77.1
Terminal value	464.6	55.2	326.5	32.5
GST	230.9	30.3	184.6	27.6
Organic growth	234.4	30.7	198.1	29.7
Direct costs	222.4	33.6	190.7	33.0
<b>Total</b>	<b>1,188.8</b>	<b>271.7</b>	<b>695.9</b>	<b>156.7</b>

180. The total effect is significantly greater than the sum of individual parts. This reflects the multiplicative interaction between each input. For example, approximately \$70m is added to the estimate of net benefits under Factual 1 if the total is evaluated without the effect of the terminal value. If we consider the total multiplicative effect the (incl. terminal value) the for Factual 1 is a double as shown in Figure 5.

**FIGURE 5: EFFECT OF MJA ASSUMPTIONS – FACTUAL 1 NET BENEFITS**



181. The total effect of our proposed changes is a very significant increase in net benefit in the PBA of more than 850% in Factual 1 and 382% in Factual 2 compared to the Commission’s estimates. It should be noted that our

recommended amendments still result in a “conservative” estimate on the net benefits of regulation, as they (i) retain the Commission’s approach to indirect costs; (ii) do not include the value of call externalities; and (iii) do not include productive efficiency gains from designation of MT.

182. The result of our recommendations are, however, a more accurate assessment of the net benefits of designating MT. The Commission’s analysis demonstrated that designation would best promote competition to the long-term benefit of end-users. The results of our review of the Commission’s CBA reinforce this conclusion.

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## Appendix A

183. Details of our survey are provided on the following pages.

Country	Study	Elasticity estimates (standard error)	Comments
UK	DotEcon (2001)		Models average daily call minutes against tariffs, handset numbers and real income Monthly data from January 1997 to February 2001. Three models: Simple static, Lagged dependent, Error correcting based on changes Used independent regressions and Seemingly Unrelated Regressions (SURE) All carriers aggregated, monthly data transformed to daily. Estimates for day, evening and weekend Made point that price changes are likely to lead to transfers between time of day rather than absolute lost calls – testing suggested no impact
		Day            -0.413 (0.122) Evening       -0.851 (0.213) Weekend      -0.542 (0.240)	Static        OLS Estimate of long-run elasticities
		Day            -0.332 (0.114) Evening       -0.760 (0.250) Weekend      -0.433 (0.211)	Static        SURE Estimate of long-run elasticities
		Day            -0.416 Evening       -1.213 Weekend      -0.244	Lagged dependent    OLS Estimate of long-run elasticity

Country	Study	Elasticity estimates (standard error)	Comments
		Day -0.258 (0.117) Evening -0.348 (0.208) Weekend -0.050 (0.775)	Lagged dependent OLS Estimate of short-run elasticity
		Day -0.403 Evening -0.953 Weekend -0.258	Lagged dependent SURE Estimate of long-run elasticity
		Day -0.229 (0.111) Evening -0.407 (0.202) Weekend -0.057 (0.096)	Lagged dependent SURE Estimate of short-run elasticity
		Day -0.170 (0.068) Evening -0.404 (0.279) Weekend -0.196 (0.082)	Error correction OLS Estimates of short-run elasticity

Country	Study	Elasticity estimates (standard error)	Comments
		Day -0.156 (0.143) Evening -0.577 (0.292) Weekend -0.196 (0.121)	Error correction SURE Estimates of short-run elasticity
	DotEcon (2001b)	Day -0.33 Evening -0.76 Weekend -0.43 Wtd av -0.43	Quotes the long-run estimates in the Static SURE model of DotEcon (2001) Analysis of 'reduced form' based on assumption that price of fixed-to-mobile had no effect on demand for subscription nor for mobile originated calls
UK	Frontier Economics for Vodafone	-0.18	Reported in Frontier Economics (2004) and Competition Commission (2003) Quarterly data for 1994 to 2001 for four mobile network operators Analysis of 'reduced form' based on assumption that price of fixed-to-mobile had no effect on demand for subscription nor for mobile originated calls It is noteworthy that this analysis found that the own-price elasticity for mobile originated calls was not statistically significant. This may reflect the charging system that provides 'free' minutes per month and a mid-period change in charging to allow a pre-pay option
UK	Holden Pearmain	-0.11	Reported in Competition Commission (2003) Based on 1,570 survey respondents of preferences rather than econometric analysis of behaviour
Australia	ACCC (2001)	-0.3	
Australia	Access Economics	-0.08	Reported in Frontier Economics (2003) & Competition Commission (2003) Competition Commission (2003, p. 210 fn 2) notes that Access' estimates are derived from two studies presented in 1980 and 1988.

Country	Study	Elasticity estimates (standard error)	Comments
France	Aldebert et al (1999) reprinted in Aldebert et al (2004)	-0.491 (1.050)	Uses cross-sectional data by consumer (not aggregated) – 1/10/96 to 30/7/97 Based on residential data only Report states significant at 99%
Australia (Optus)	Francis (2000)	-0.3 - -0.5	Estimates based on Optus' market data from one decrease in their charge rate.
Australia	MacQuarie Research Equities (2003)	-0.75	Reported by ACCC (2004, p. 154)
Australia	CommSec (2003)	-0.50	Reported by ACCC (2004, p. 154)