

Response to the Telecom and Vodafone Submissions on the “waterbed effect” and network externalities

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Introduction

1. The purpose of this paper is to provide comments on Telecom’s and Vodafone’s respective mobile termination submissions to the Commerce Commission, as they relate to the waterbed effect and network externalities.
2. This paper reaffirms the view expressed in our previous paper¹ that:
 - the evidence presented by the Commission² suggests that if the waterbed effect exists at all it is weak and therefore can be ignored; we find nothing in the submissions which refutes this conclusion;
 - network externalities are likely to be small (if they exist at all) – and offset by calling externalities – as market penetration is high; and
 - on this footing, TSLRIC (without a mark-up) is an appropriate principle for pricing mobile voice call termination.

¹ M. Cave and T. Valletti, *Comments on the Commerce Commission’s Draft Report into Regulation of Mobile Termination: Issues of market definition, market power and the application of TSLRIC*, November 2004.

² *Draft Report on whether mobile termination should become a designated or specified service*, paras 242-305, October 2004.

3. As a general comment, the submissions from Telecom and Vodafone (and their experts) to which we refer below are not always explicit as to what assumptions are being made and what the consequences of changing them are. We attempt to make this clear below. We also note that the submissions are silent on whether or not a market failure would exist even under the extreme scenario (a waterbed effect and the presence of fixed-to-mobile network externalities) that seems to be supported by Telecom and Vodafone. In our view, this is the key question.

4. Accordingly, in this note we make two principal points:
 - we first (paras 6-13) consider the claim that there would always be a waterbed effect since its absence is contrary to economic theory under any market structure (cfr. Hausman) or because it always lowers marginal costs (cfr. Katz).
 - we then (paras 14-25) consider the implications of regulation of mobile termination even in the presence of the waterbed effect.

5. At the end of this note (paras 26-28) we also return briefly to the question of market definition.

There is no waterbed effect under a monopoly (or collusive duopoly) market structure

6. There is no waterbed effect under a monopoly market structure. This statement must be true when mobile markets are near to saturation or there are no fixed-to-mobile network effects. A monopolist (or collusive duopolists) would set the outgoing charges to extract the maximum possible surplus in the market for outgoing calls (where the prices are paid by mobile customers) and in the market for incoming calls (the mobile termination rate that feeds into the price paid by fixed users). In the absence of externalities, these two markets are completely separate. Even if the mobile termination rate is changed (e.g.

regulated), the set of prices paid by mobile customers that maximize the profits of the mobile operator (or joint profits for the collusive mobile operators) is unchanged when the market penetration is very high so that it is not possible to have significant new mobile subscribers or when the new mobile subscribers do not significantly increase the fixed-to-mobile traffic. The prices for outgoing calls will still be set at the level that extracts the highest possible surplus from mobile customers (i.e. the price that makes the mobile user with the lowest willingness-to-pay just indifferent between subscribing and not subscribing).

7. Conversely, a monopolist (or collusive duopolists) would change their set of outgoing prices only if it were possible to significantly increase the penetration of mobile subscribers and there are network effects, in the sense that the last mobile subscribers attracted on the mobile network induce fixed users to make significantly more calls.
8. Our claim is entirely consistent with Professor Hausman's analytical approach (para. 16), since Professor Hausman assumes that:
 - the number of mobile subscribers will decrease as the subscription charge increases ($x_1 < 0$), and
 - the number of terminating calls will increase with the number of mobile subscribers ($q_{22} > 0$).
9. In other words, Professor Hausman has made both of the two crucial assumptions needed to generate his result, without commenting on their relevance and what would happen in their absence.
10. Although Professor Katz expresses it in different words he makes a similar point when he says that fixed-to-mobile revenues reduce the marginal cost of providing services to end-users (para. 79). Once again, this statement is true only on the assumptions noted in para. 7 above. Professor Katz is assuming that

there is a growing market and network externalities are also relevant, without commenting on their relevance or on what would happen in their absence.

11. As far as non-monopoly market structures are concerned, we note the views of Professor Hausman (at paragraph 5) and of Covec³ that if the market structure is not competitive (as the Commission has shown it to be) then the waterbed effect will be weaker.
12. But how much weaker? Here we note that neither Telecom nor Vodafone has made any quantitative proposal as to how large a waterbed effect the Commission should incorporate. The same reticence applies to the work of their respective consultants in their proposed amendments to the Commission's CBA model: almost every variable has been changed, save the zero waterbed effect.
13. In these circumstances, we consider that on the strength of its analysis of competitive conditions the Commission is justified in assuming a zero waterbed effect. But we now show that if, for the sake of argument, we were to assume that mobile firms were perfectly competitive and the waterbed effect were complete, then there would be no reason to suppose that unregulated termination charges would be set at the efficient level.

Even in the presence of a waterbed effect, the regulation of termination is beneficial

14. The presence of a waterbed effect does not constrain the ability of mobile operators to set their mobile termination rates. It is quite revealing that Professor Hausman writes, (para. 7), that “profit maximizing behaviour by mobile firms in setting mobile termination prices *constrains* the prices charged by firms in setting *their mobile subscription prices*.”⁴ This would surely happen

³ *Modelling Regulation of Mobile Termination Rates*, p. 32.

⁴ Italics added.

in the presence of a waterbed effect. However, nothing is said here about what kind of constraint would operate on the other key mobile price that affects consumer welfare, namely *mobile termination charges*. In the presence of a waterbed effect, mobile operators are under no competitive constraint in respect of the way they can set their mobile termination charges, which are therefore set at the monopoly level. The stronger the waterbed effect is, the more they are forced to extract every cent of monopoly profit from fixed to mobile callers.

15. As we wrote in our early submission, TSLRIC is the most efficient price even in the presence of a waterbed effect when:

- there is high market penetration in the mobile market, such that a small increase in subscription charges would not discourage mobile subscribers from keeping their mobile phones, and/or
- the “marginal” mobile subscribers that could be attracted to the mobile network do not bring material network externalities.

16. A more complex problem arises when the scenario involves: a) a waterbed effect, b) a growing mobile subscriber base, and c) fixed-to-mobile network externalities.

17. There is very little empirical data to quantify the relevance of these three factors. However, in general models, the economics literature has already found some results that can inform the policy-maker. Professor Armstrong has dealt with this case in Armstrong (2002).⁵ The results from the economics literature basically say that when the three factors mentioned above in paragraph 16 are present (and sufficiently strong) then:

- the regulator should set a mark-up above TSLRIC,
- unregulated firms would choose an even higher mark-up.

⁵ M. Armstrong (2002), “The theory of access pricing and interconnection”, in: M. Cave, S. Majumdar and I. Vogelsang (eds.), *Handbook of Telecommunications Economics*, North Holland, Amsterdam.

18. The latter point that unregulated firms choose mark-ups that are higher than the socially efficient ones is the main rationale for intervention in this market. Even under perfect competition for mobile subscribers, the benefits to fixed users are not taken into account by mobile operators. As a result, termination rates will always be set too high from a social point of view even in the most favourable scenario for the mobile operators (full waterbed effect, growing mobile subscriber base, fixed-to-mobile externalities).
19. The underlying principle for allowing, under some circumstances, a mark-up above TSLRIC is also easy to understand. A mark-up over termination can induce mobile operators to lower their subscription rates, thus attracting more mobile users. This can then confer a benefit on fixed users as they can engage in more fixed-to-mobile calls. It is clear from the description of this chain of events that in order to quantify the magnitude of the appropriate mark-up (if any) one has to quantify the following elements:
- the extent of the waterbed effect, and
 - the elasticity of mobile subscription, and
 - the uninternalized network externality conferred by the “marginal” mobile subscribers on fixed users.
20. If any one of these factors were negligible, then the appropriate mark-up above TSLRIC would be negligible. As we wrote in our earlier submission, it is only the combined presence of all these three factors (using an appropriate empirical estimate of each of them) that can lead to an efficient mark-up above TSLRIC.
21. For instance, even in the presence of a waterbed effect, in order for TSLRIC to be efficient it is sufficient that:

- mobile subscription is inelastic (for instance, because the mobile service has become essential, so that even if mobile subscription charges went up there would be no drop in mobile users), or
- the mobile subscribers who may drop off if subscription fees go up do not confer material network externalities on fixed users.

22. Alternatively (and at the risk of labouring the point) we may amend Tables 1a) and b) in our previous submission to incorporate a partial waterbed effect. Those tables showed the effect on consumer surplus (A) and producer surplus (B) of cutting termination rates under a zero or full waterbed effect. We suppose now that a proportion x of the reduction in termination charges is added to outgoing mobile prices. Then the impact of cutting termination rates and the effect of regulation are as shown in Tables 1(a) and (b);

Table 1a Impact of cutting termination rates

	Effect on:			
Case:	Fixed-line subscribers	Mobile subscribers	Mobile operators	Overall effect
Partial waterbed (x%)	$A > 0$	$xB < 0$	$(1 - x)B$	$A + B > 0$

Table 1b Overall effect of regulation

	Test:	
Case:	Public benefits	Consumer surplus
Partial waterbed (x%)	$A + B > 0$	$A + xB > 0$

23. The previous results show clearly that the presence of the waterbed effect does not affect the overall effect of regulation if one adopts a public benefits test.

Alternatively, if one adopts a consumer surplus test, the case for regulation of mobile termination rates is also always strong, and it is stronger the smaller the magnitude of the waterbed effect.

24. For the avoidance of doubt we are not in any way disputing the Commission's conclusion that there is no waterbed effect in place in New Zealand.

25. The single clear conclusion which shines through all of this analysis is that the mobile termination charge set by an unregulated mobile operator is always excessive, so that welfare can be enhanced by regulation.

A remark on market definition

26. The paper by Professor Hausman and the Vodafone and Telecom submissions revert to the question of market definition in two sided markets, arguing that the two-sided nature of telecommunications markets suggests a market definition that includes mobile termination and outgoing services on the same (fixed or mobile) network.

27. In certain two-sided markets, such as the frequently cited provision of dating services, there may be symmetry in competitive conditions on both sides of the market.

28. In telecommunications, by contrast, while subscribers can choose among multiple networks, their callers do not have that freedom. As we have noted above, the operation of the waterbed, which transmits excess profits made from sales to one group of (fixed) subscribers to another group of (mobile) subscribers, depends on the nature of competitive interactions in the mobile

market. In these circumstances, we believe it is right for the Commerce Commission to stick with its original single-operator definition of mobile termination.