Domestic mobile terminating access service (MTAS)

A report for Optus

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1. Introduction

1. This report provides an economic assessment of certain issues raised in the ACCC's Discussion Paper on Domestic Mobile Terminating Access Service (MTAS) of June 2011 ('the Discussion Paper"). The report particularly examines the issues in determining what pricing approach should be applied to MTAS.

2. The Discussion Paper identifies a number of different pricing approaches, particularly the ACCC's traditional TSLRIC+ approach (i.e. incremental costs plus a contribution to common costs) as well as potential novel approaches of pure LRIC (i.e. incremental costs only) and Bill and Keep (BAK) where termination charges are eliminated altogether. The Discussion Paper also examines different ways in which costs could be estimated including by use of a model of a hypothetical operator (such as has been used previously), international benchmarking and using the data on actual costs from operators.

3. Optus has requested that we provide an economic analysis of the following three issues:

   - What would be the implications for efficiency of a move to pure LRIC or BAK;
   - What would be the likely impact on end-users of cutting MTAS charges; and
   - To what extent are other issues relevant to determining the appropriate pricing approach particularly in terms of potential competition effects and the regulatory costs of implementing specific approaches.

4. We find that established economic theory shows that allocative efficiency is best promoted by setting charges to cover incremental costs as well as an efficient contribution to common costs. By spreading the recovery of common costs across all services, the efficiency or dead weight loss of recovering those costs can be minimised. Pure LRIC and, even more so, BAK would result in MTAS charges being reduced well below the efficient level at a potentially large cost to overall consumer welfare.

5. While the ACCC has raised a concern about the risk of over-recovery of common costs, we find that over-recovery is unlikely to be a significant problem in practice. In any event, it would be better for prices to be roughly right than to adopt an alternative pricing approach that would clearly be inefficient such as by preventing termination charges from making any contribution to common costs. The ACCC has also raised the question of whether efficient pricing should take into account call externalities. However, in line with the finding of the UK

regulator, Ofcom, we have not found any robust empirical evidence that would support making an adjustment for uninternalised call externalities.

6. We have also examined the likely impact on end users of cuts in termination charges, particularly with regard to international evidence of how mobile market outcomes have been affected by differences in termination charges in practice. This evidence shows that cutting termination charges can be expected to lead to significantly higher retail mobile prices. Consistent with this evidence, Canada and the US (which have very low mobile termination charges) have amongst the highest mobile retail prices in the OECD. Cutting termination charges is likely to reduce mobile subscriber numbers and potentially reduce mobile usage. It is difficult to draw strong inferences from the international evidence on mobile usage as it is affected by distortions such as the double-counting of on-net calls in BAK markets (because both the calling party and the call recipient are billed for the call) and by the exclusion of low usage customers from such markets.

7. Given the evidence of likely significant harm to mobile customers including higher retail prices, cutting termination charges would only be justified where there were expected to be offsetting benefits to fixed-to-mobile customers. However, as the Discussion Paper finds, there is little evidence of any benefits to fixed-to-mobile customers to date and certainly not of sufficient benefits to outweigh the costs to mobile customers.

8. Lower termination charges can also be expected to dampen competition for subscribers as customers would be less attractive to operators. While there are some academic papers suggesting the potential for higher termination charges to competitively disadvantage smaller operators, these tend to rely on assumptions that are not empirically supported.

9. The Discussion Paper raises the concern with the costs and accuracy of the traditional approach to measuring TSLRIC+ by the use of models of a hypothetical new entrant. We share the ACCC's concerns that bottom-up models of hypothetical entrants can require significant regulatory resources to develop and their hypothetical nature can lead to significant inaccuracies. We also do not see much potential for international benchmarking given the requirement previously imposed by the ACCC that such benchmarking make adjustments for all factors that could give rise to cost differences between countries. While actual cost data can avoid some of the problems with models of hypothetical entrants, there are nevertheless a range of issues that would still need to be addressed.

10. In summary, we believe that there is the risk of substantial harm to efficiency and end-users if termination charges were to be set in line with pure LRIC or on a BAK basis. Before implementing any reductions in termination charges, the ACCC should ensure that the level of reduction would generate benefits that outweigh the costs so as to promote the overall interests of end-users.

2. Efficiency implications of potential new MTAS pricing approaches

11. The ACCC is tasked with determining access prices that are reasonable including by encouraging the economically efficient use of, and investment in, telecommunications infrastructure in order to promote the long term interests of end users. In this section, we review the efficiency implications of setting mobile termination charges in line with pure LRIC or BAK on the basis of general economic theory. In the following sections, we consider the impact of different pricing approaches in practice as well as other potential effects and considerations.

12. The ACCC's *Access Pricing Principles – Telecommunications: A Guide* found that "*TSLRIC encourages economically efficient investment in infrastructure*", "*TSLRIC provides for the efficient use of existing infrastructur*e" and "*TSLRIC provides incentives for access providers to minimise the costs of providing access*".[1] In addition, the ACCC's Guide noted that "*TSLRIC also includes common costs that are causally related to the access service*."[2]

13. The ACCC's Discussion Paper raises the possibility of setting prices below TSLRIC+, particularly in line with pure LRIC or BAK. Two specific conceptual issues relating to allocative efficiency are raised as potentially justifying the change from TSLRIC+:

    - First, the Discussion Paper states that "*The inclusion of common costs as a mark-up to TSLRIC may also be problematic as it could lock in over-recovery in an environment where voice termination is becoming a small fraction of overall network capacity*".[3]
    - Second, the Discussion Paper argues that "*BAK recognises that theoretically both the caller and the recipient derive utility from a call in most cases, and imposes some of the cost of a call on each of the calling and receiving networks, thereby improving allocative efficiency*".[4]

14. We use these issues as a basis for exploring the efficiency implications of the potential new pricing approaches. We then also consider the implications of different approaches for dynamic efficiency.

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1 ACCC's Access Pricing Principles – Telecommunications: A Guide, 1997, p.29-30.

2 ACCC's Access Pricing Principles – Telecommunications: A Guide, 1997, p.28.

3 The Discussion Paper, p. 15.

4 The Discussion Paper, p. 19.

2.1. Efficient contribution to common costs and pure LRIC

15. In this section, we provide a short overview of aspects of the economic theory of efficient pricing relevant to determining the efficient contribution that a service's price should make to the recovery of common costs. The points raised in this section are not considered to be economically controversial. The aim of the section is to provide a clear conceptual framework against which to judge the efficiency implication of a potential move to pure LRIC pricing.

16. Allocative efficiency is generally promoted when customers face prices that reflect the value of society's resources used in the supply of each good or service. Such cost-reflective pricing will lead customers to purchase goods and services so long as they expect to obtain at least as much benefit from those products as the value of the resources used in their supply, i.e. the benefit that could be generated by an alternative use of those resources. The implication of this is that prices should be set equal to marginal cost.

17. Efficient pricing becomes more complicated where firms supply multiple products and where some costs are common to two or more of the products being supplied. Formally, a common cost is a cost incurred in the supply of multiple products and where the level of the cost does not vary with the amount of any one service supplied. Where there are common costs, marginal cost pricing will generally not allow firms to recover the common costs.

18. The economic theory on the efficient approach to the recovery of common costs[5] where these costs must be recovered from the firm's prices (rather than, say, through a subsidy from the Government) is well-established. The theory is known as Ramsey pricing (or Ramsey-Boiteux pricing). There are several aspects of Ramsey pricing that are of relevance to the efficient pricing of mobile services. We discuss these under the following headings.

- Efficient cost recovery depends on relative elasticities;
- The recovery of common costs when non-linear pricing is possible; and
- The ACCC's concern about potential over-recovery.

[5] The economic theory can also be applied to the recovery of fixed costs, i.e. costs that do not vary with the level of output supplied. However, for ease of exposition, I have expressed this section by specific reference to common costs.

Efficient cost recovery depends on relative elasticities

19. If all services have the same elasticity of demand, Ramsey pricing requires that the services should make the same proportionate contribution to the recovery of common costs. This follows from the fact that the efficiency loss of raising a price above marginal cost increases exponentially the greater the divergence between prices and marginal costs.

20. Consider the simple case of a demand curve of slope of -1 (i.e. where a particular percentage price increase causes exactly the same percentage reduction in demand). It can be shown that the efficiency deadweight loss is equal to 0.5*(Mark-up)^2.[6] The deadweight loss as the mark-up increases is shown in Table 1. Doubling the mark-up from 2 to 4 causes the efficiency loss to increase from 2 to 8, and doubling the mark-up a second time from 4 to 8 causes the efficiency loss to increase from 8 to 32. Thus in this simple example, it will be more efficient to have a mark-up of 4 on two products (with a total efficiency loss of 16) than a mark-up of 2 on one product and a mark-up of 6 on the other product (resulting in a larger total efficiency loss of 20).

Table 1: Deadweight loss for product with demand curve of slope -1

	Price increase above marginal cost									
	1	2	3	4	5	6	7	8	9	10
Deadweight loss	0.5	2	4.5	8	12.5	18	24.5	32	40.5	50

21. The exponential relationship between the level of mark-up and the efficiency loss implies that efficiency will generally be promoted by spreading the recovery of common costs across as many services as possible so as to limit the mark-up over marginal costs required from any one service. Where the elasticities are the same, different mark-ups are inefficient. The gain in one market from a lower mark-up is outweighed by the loss in the other market from a higher mark-up.[7]

22. If services have different elasticities of demand the mark-ups should vary in inverse proportion with the relative price sensitivity of demand for each service (so called Ramsey-Boiteux pricing). The reason for this is that if a greater proportion of common costs are recovered from services with less elastic

[6] Formally, this assumes that the arc elasticity is -1, not the point elasticity.

[7] Similar economic theory underlies the general principle of efficient taxation of adopting broad-based, low rate taxes. For instance, see OECD Tax Policies Study No. 19, Choosing a broad base – low rate approach to taxation, 2010 (summary at http://www.oecd.org/dataoecd/26/33/46605624.pdf).

demand, then this will minimise the negative effect on demand of prices above marginal cost, which in turn will minimise the overall efficiency loss.

23. Elasticity differences tilt the balance of efficient cost recovery towards the less elastic services. Note, however, that provided that no product or service has perfectly inelastic demand or perfectly elastic demand, then all services should still make some contribution to common cost recovery. If a product or service has perfectly elastic demand, then there should be no mark-up over marginal cost. This is because demand will fall to zero for that product and so it will provide no contribution to common cost recovery. If a product or service has perfectly inelastic demand, then all common costs should be recovered from this product. This is because marking up over marginal cost for such a product has no effect on demand for the product and so there is no deadweight loss.

24. A complication to determining the efficient structure of prices arises where the demands for different services are interrelated. In particular, the demand for a particular service may be affected by the pricing and demand for a related service. As a result, the efficient structure of cost recovery will also need to take into account the extent to which higher mark-ups for particular services affect demand for other services as well as demand for that particular service. In relation to mobile services, the main demand interrelationship that is generally identified is that between the demand for mobile subscriptions and the price of calls from mobiles (i.e. increase in retail mobile prices have the effect of reducing the demand for mobile subscriptions). The UK Competition Commission has reported that:

> "As noted above, Oftel identified one cross-price elasticity that should be modelled. Oftel told us that this captured the effect on the demand for subscription resulting from changes in the prices of calls from mobiles … Oftel said that the existence of the cross-price elasticity with respect to the price of calls from mobiles meant that the mark-up over cost in this price would be smaller than the mark-up on termination. Oftel said this was because increasing the price of calls from mobiles created a larger welfare loss than an increase in the price of fixed-to-mobile calls, since the former also resulted in a reduction in the number of subscribers (via the cross-price elasticity)."[8]

25. The implication of this discussion is that all mobile services should make some contribution to the recovery of common costs, except in the highly unlikely case that one service has perfectly elastic or inelastic demand. Efficient pricing theory thus supports a TSLRIC+ approach in which the precise contribution to common

[8] Competition Commission, Calls to mobiles report, 2003, para. 8.54.

costs is determined taking into account relative demand elasticities for the different mobile services.

26. In practice, regulators have tended to regulate telecommunications services on the basis of a TSLRIC+ approach in which the contribution is set relatively uniformly across services such as using the Equi Proportionate Mark-Ups (EPMU) approach (i.e. in which the same percentage mark-up over incremental costs is applied so as to recover total common costs). This has reflected uncertainty over the precise differences in relative demand elasticities. For example, the ACCC has previously concluded:

> "More generally, however, the Commission notes that it does not necessarily accept the proposition that a properly-constructed R-B configuration of prices must lead to a mark-up above TSLRIC greater than that which would arise using the alternative EPMU rule to allocate relevant common costs between services. This depends, critically, on the inclusion of all of the relevant services that give rise to these costs; accurate estimation of the relevant 'super-elasticities' of each of the modelled services, including a comprehensive consideration of all the relevant cross-price effects and the incorporation of multi-part pricing into the model."[9]

27. The previous UK telecoms regulator made a similar finding when it supported a TSLRIC+ approach as striking "*a balance between relevant principles of efficient pricing and practicality*."[10] Whether or not the regulator's traditional approach to TSLRIC+ comes at a significant efficiency loss compared with a more exact Ramsey pricing approach clearly depends on the extent to which there are significant differences in elasticities for the different services. However, we do not consider this issue further in this report as our focus is on considering the impact of reducing prices further to pure LRIC or BAK.

Relevance of non-linear pricing

28. It is the case that mobile operators offer a range of pricing plans, including tariffs that feature monthly charges (generally providing for an allowance of calls minutes and other services) as well as prices for calls and other services beyond those included in the monthly allowance. Thus, it is relevant to ask whether such non-linear pricing affects the conclusion that common costs should be spread across services and whether it could justify pure LRIC pricing.

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[9] ACCC, Optus' undertaking with respect to the supply of its Domestic GSM Terminating Access Service – Final decision, February 2006, p.88.

[10] Oftel, Ramsey pricing and the incentives of mobile operators, 2002, para. 34.

29. Economic theory shows that the existence of non-linear pricing can be readily incorporated into the standard Ramsey pricing framework. As Laffont and Tirole have stated:

> "The basic Ramsey-Boiteux model assumes linear prices. However, it generalizes to nonlinear pricing as well…the treatment of nonlinear pricing involves a mere reinterpretation of the one for linear pricing…A two-part tariff should economically be analyzed as the provision by the firm of two services: the fixed fee entitles the consumer to connect to the service, and the variable charge covers the actual use of the service. These two services ("connection" and "consumption") are complements: the more consumers are connected to the service, the higher the variable consumption; similarly, a reduction in the variable charge raises the number of consumers who are willing to pay the fixed fee to connect. These two prices should therefore be coordinated."[11]

30. Similarly, Brown and Sipley in their textbook on regulatory pricing conclude that "*the Ramsey Inverse Elasticity is a concept which unifies optimal uniform pricing with optimal non-uniform pricing*."[12] The book by Brown and Sipley sets out the derivation of the formal algebraic solutions for the welfare maximising set of prices under two-part and multi-part tariffs which take into account the elasticities for entry (or subscription) and for usage.[13] The intuition is that if all common costs are recovered in fixed charges, this will reduce the demand for mobile subscriptions.

31. In line with the theory set out by Laffont and Tirole and by Brown and Sipley, fixed charges provide an additional means to help recover common costs. However, there is still a need to determine how much each price should contribute to the recovery of common costs taking into account the extent to which demand for the different services would be impacted by recovering relatively more of the costs through some charges than others. It is not the case that the existence of non-linear pricing implies that fixed fees should recover all common costs.

32. If charges for calls were set at their marginal cost level then all common costs would have to be recovered from subscription charges (i.e. fixed charges to post-pay customers). This would force subscription charges well above the marginal cost of subscription and further away from the allocatively efficient level of subscription charges. Such pricing would only be efficient in the unlikely case in

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11 Laffont, J. and J. Tirole, Competition in Telecommunications, 2000, p. 68-69.

12 Brown, S. and D. Sibley, The theory of public utility pricing, 1986, p. 127.

13 Note that I explain below why an added problem with Ofcom's approach is the fact that the fixed element of post-pay tariffs is partly a usage-based charge and so Ofcom cannot draw the simple distinction between usage fees and fixed fees that it wishes to draw.

which demand for subscription was perfectly inelastic and so there was no effect on demand of increasing subscription prices.

ACCC's concern regarding potential over-recovery

33. As noted above, a key reason put forward by the ACCC as to why TSLRIC+ may no longer be appropriate is that "*The inclusion of common costs as a mark-up to TSLRIC may also be problematic as it could lock in over-recovery in an environment where voice termination is becoming a small fraction of overall network capacity*".[14]

34. There are a number of reasons as to why the ACCC's concern is misplaced. First, as the Discussion Paper itself reports, voice revenues still account for over 60% of the mobile industry's revenues.[15] Further, the rate of growth in data traffic and revenues can be expected to slow as traffic is increasingly offloaded to WiFi and as demand for dongles decreases.[16]

35. Second, the existence of a strong waterbed effect in mobile markets implies that there is little chance of any significant over-recovery. The waterbed effect describes how changes in termination charges alter the profit-maximising level of mobile retail prices so as to leave overall profits largely unchanged. While there was initially some doubts about the strength of the waterbed effect among some regulators, there is now empirical evidence on the waterbed effect. Andersson and Hansen found evidence of a full waterbed effect in mobile markets and Genakos and Valletti found evidence that the waterbed effect in mobile markets is strong.[17] A paper by Schiff sets out the theoretical foundation for the waterbed effect and shows its applicability to mobile markets.[18]

36. Third, even if the ACCC's concern relates to termination charges being significantly above their efficient level, this would only arise if too great a share of common costs were allocated to termination and too few to data services because the ACCC significantly underestimates future data traffic growth relative to future voice growth. While there is always the potential for some forecasting error in forward-looking cost models (which may over- or underestimate future traffic), there is no reason to believe that forecasting data traffic for several years

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[14] The Discussion Paper, p. 15.

[15] Calculated from the data presented in the Discussion Paper, footnote 23.

[16] For instance, Juniper Research forecasts that 63% of mobile data traffic will move onto fixed networks via WiFi and femtocells by 2015 (Juniper Research press release, 19 April 2011).

[17] Andersson, K. and B. Hansen (2007) "Network Competition: Empirical Evidence on Termination Rates and Profitability," *Mimeo*, Telenor and Genakos, C. and T. Valletti (2007) "Testing the "Waterbed" Effect in Mobile Telephony," Centre for Economic Performance Discussion Paper, Number 827.

[18] Schiff, A (2008) "The 'waterbed effect and price regulation", *Review of Network Economics*, Vol. 7, Issue 3, pp.392-414.

in advance is particularly uncertain, at least no more uncertain than other parameters such as the cost of capital that the ACCC routinely estimates for regulation across various industries.

37. Finally, even if a traffic forecast were adopted that turns out to be inaccurate, it is unlikely to lead to termination charges being significantly different to their efficient levels because of too large a share of common costs being allocated to termination. In particular, the ACCC has previously found that only a minor share of mobile network costs are common costs:

> "Based on this approach, the Commission's expectation is that those coverage costs defined as FCCs [fixed and common costs] would be relatively small and somewhere in the order of Optus's original estimate. Notably, this is also consistent with the approach adopted by Ofcom in the UK which estimated that 'coverage driven costs' would represent around 3.3 per cent of overall coverage costs in 2005-06."[19]

38. Oftel found that "*there are relatively small common costs, comprising only about 3-5% of total network costs*".[20] Thus, even a large forecasting error would still only be altering the precise fraction of this small percentage of costs that is allocated to termination with minimal impact on the final termination charge level.

39. In summary, we find that to implement pure LRIC and thereby prevent termination charges from making any contribution to common costs would conflict with established economic theory that shows that efficiency is best promoted by recovering common costs across all services. Our conclusion is not altered by the presence of non-linear pricing as mobile subscription is not perfectly inelastic. We also find that the ACCC's concern that its traditional approach may lead to over-recovery of common costs is misplaced because there is little risk of any significant over-recovery in practice. In any event, to prevent any contribution to common costs from termination charges would imply certain under-recovery of common costs from termination relative to the efficient level. The ACCC should aim to implement prices in line with efficient costs. Requiring certain under-recovery of common costs would not be consistent with this aim.

2.2. Do call externalities justify Bill and Keep pricing?

40. The Discussion Paper argues that:

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[19] ACCC, *Optus' undertaking with respect to the supply of its Domestic GSM Terminating Access Service – Final decision,* February 2006, p.61.

[20] Oftel, Network Common Costs, 2002, p.1.

> "A growing body of academic literature suggests that BAK is more efficient than CPNP and has the potential to send signals on on-net/off-net price discrimination whereas cost-based pricing incentivises MNOs to set off-net prices higher than on-net prices. BAK recognises that theoretically both the caller and the recipient derive utility from a call in most cases, and imposes some of the cost of a call on each of the calling and receiving networks, thereby improving allocative efficiency."[21]

41. In this section, we assess the arguments for BAK and whether they warrant a departure from efficiency pricing based on incremental costs as well as a contribution to common costs.

42. The first academic paper that the Discussion Paper refers to in support of the contention that BAK is more efficient is the paper by Gans and King from 2000. While the Discussion Paper does not provide a full reference, we presume that this is the paper 'Using Bill and Keep Interconnect Arrangements to Soften Network Competition'. If so, this paper hardly supports the view that BAK is desirable. In fact, the paper finds:

> "An immediate implication of our analysis is that bill and keep termination charging, with the resulting low price of inter-network calls, may be undesirable from a consumers' perspective. While some call prices are low compared with, say, the non-cooperative equilibrium, this is offset by increased fixed charges. In particular, total value created is lower under bill and keep than if termination charges were set at cost, and network profits are higher."
>
> And
>
> "Here we demonstrate that in an important class of network competition – namely, with two-part tariffs and price discrimination – that low, rather than high, interconnect charges can be used to soften price competition among networks."[22]

43. The ACCC also cite a 2003 paper by Vogelsang. We have found a 2003 paper on Bill and Keep by Vogelsang and Quigley which may or may not be the paper that the ACCC is referring to, but should be expected to be consistent with it. This paper states:

> "We conclude that bill and keep has overwhelming advantages as a pricing regime for interconnection of local voice and data calls. The efficiency of bill and keep is that it: 1. Approximates a pricing regime in which there is a lump-

[21] The Discussion Paper, p. 19.

[22] Gans and King (2000), 'Using Bill and Keep Interconnect Arrangements to Soften Network Competition', p.11.

> sum payment for interconnection, and the payment for individual terminations is set at zero. In this sense the prices that are set under bill and keep approximate the costs incurred by carriers – large fixed costs and close to zero marginal costs;…".[23]

44. Thus the main argument for Bill and Keep put forward in this paper is that it would bring the level of interconnection charges close to the almost zero level of marginal costs of fixed interconnection. This conclusion is not applicable to mobile networks. In particular, the costs of the local loops that comprise the fixed access network do not vary with the traffic carried over those loops and hence such costs are efficiently recovered in line rental charges. As such, marginal costs of fixed termination are relatively low. For mobile networks, however, the radio access network, including the spectrum and cell sites, are shared by multiple users. The amount of spectrum required depends on the amount of traffic to be carried and hence the costs of the radio access network are predominantly traffic-related. As such, these costs should be efficiently recovered in termination charges. Bill and Keep would instead set termination charges below the cost of termination.

45. The next paper cited by the ACCC is a paper by Cave from 2006. We were unable to identify the paper. However, a 2003 paper by Martin Cave and other authors concluded that mobile termination charges should be regulated at LRIC with equiproportionate mark-ups.[24]

46. The ACCC also cites a paper by Littlechild from 2006. One of the main arguments of the Littlechild paper is that BAK would avoid contentious debates over the precise level of termination costs. However, setting termination charges at zero when the efficient level of termination charges is significantly above zero can lead to large welfare losses in the overall national mobile market. Such losses could readily dwarf the cost to regulators of undertaking cost modelling. The other main argument of Littlechild relates to international evidence of the performance of Calling Party Pays markets and BAK markets. We address this evidence in section 3 and show it to be seriously flawed.

47. The ACCC also cites a paper by Harbord and Pagnozzi. The conclusions of this paper rest on the assumption that there are significant call externalities that are not internalised. A call externality is the benefit that a call recipient may obtain when they are called even though it is the calling party who pays for the call in Australia. A nuisance call on the other hand would represent a negative call externality. Ofcom in the UK has considered arguments that positive call externalities justify setting charges below costs, potentially down to BAK. Ofcom

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[23] Quigley and Vogelsang (2003), 'Interconnection pricing: bill and keep compared to TSLRIC", p.2.

[24] Cave et al (2003), 'How mobile termination charges shape the dynamics of the telecom sector', p.48 and p.70.

noted that positive call externalities can be internalised because most calls are made between individuals who regularly call each other so that the costs of the calls are effectively shared between them over time.[25] Ofcom concluded that the arguments based on significant uninternalised call externalities should not be taken into account in its analysis because there was no robust evidence on the extent to which call externalities were not internalised.[26] The literature on call externalities also raises issues relating to the impact of termination charges on competition. We address those arguments in section 4.

48. While the Discussion Paper refers to a number of papers which it purports support BAK, it should also be pointed out that the conclusions of the recent literature are much more varied than suggested by the Discussion Paper. For example, recent papers by Jullien, Rey and Sand-Zantman and Sauer find that termination charges above pure LRIC increase consumer welfare.[27] Jullien, et al. shows that on-net pricing together with a mark-up in termination over marginal cost results in lower prices for heavy and light users compared with the outcomes when termination rates are set at marginal costs. Sauer shows that with termination charges above marginal cost then on-net/off-net price differentials lead to lower on-net prices and fixed fees so that consumer welfare increases.[28]

49. BAK can also give rise to a range of harmful effects. For instance, if operators are forced to carry traffic that they receive without being compensated for the cost of that traffic then there may be an increase in nuisance calls. While a form of BAK applies for email traffic, it is noteworthy that SPAM still accounts for more than 70% of emails sent across the internet.[29] The European Commission also noted a range of other problems with BAK in deciding to reject it for use in current regulation:

> "Nevertheless, one should note that setting the price of any service at zero may cause distortionary behaviour, bring arbitrage opportunities, lead to inefficient traffic routing and inefficient network utilisation. For instance, a potentially problematic issue might be inefficient routing of traffic from operators not participating in the Bill and Keep scheme."[30]

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[25] Ofcom, Wholesale mobile voice call termination, 1 April 2010, A12.72.

[26] Ofcom, Wholesale mobile voice call termination, 1 April 2010, A12.75.

[27] Jullien, B., P. Rey and W. Sand-Zantman, "Mobile call termination revisited", IDEI Working Paper Series, No. 551, August 2010, Propositions 5 and 6 and Sauer, D., "Welfare implications of on-net/off-net price discrimination", November 2010.

[28] Sauer, D., "Welfare implications of on-net/off-net price discrimination", November 2010, Proposition 2.

[29] http://www.symantec.com/about/news/release/article.jsp?prid=20110628_01

[30] European Commission, Commission Recommendation on the Regulatory Treatment of Fixed and Mobile Termination Rates in the EU, p.30.

50. In summary, we find that a number of recent academic papers do not support BAK and even some of the papers referred to in the Discussion Paper as supporting BAK do not do so. The papers that do support BAK are generally based on empirical evidence that is flawed or on an assumption about significant uninternalised call externalities that lacks empirical support. As such, the literature does not provide a reliable basis for altering the conclusion of the earlier section that termination charges should efficiently contribute to common costs.

2.3. Dynamic efficiency

51. The previous sections showed why a pure LRIC approach or BAK would harm allocative efficiency. In this section, we comment on the implications of these pricing approaches for dynamic efficiency. Dynamic efficiency is promoted where firms have the right incentives to invest and innovate so as to increase welfare over time. Dynamic efficiency will be harmed if investment and/or competition is harmed. The impact of termination regulation on investment returns depends on the strength of the waterbed effect, i.e. the extent to which operators are able to recover their lost contribution margins from termination by raising their retail prices. As noted above, empirical evidence indicates that the waterbed effect is likely to be strong, although it may not be complete. If this is the case, then cutting termination charges to some extent should not substantially harm investment. However, the more substantial the cut in termination charge that is implemented and the more rapidly such a cut is implemented, the more likely it is that returns and hence investment will be harmed. In this regard, BAK may carry significant risks to investment. Pure LRIC could also harm investment, particularly if the estimated level of pure LRIC was substantially below current MTAS charge levels.

52. We will address the likely effect on competition in Section 4. We show that the arguments for setting lower termination charges so as to address perceived competition effects are flawed. Rather, pure LRIC and BAK carry significant risks to the extent that termination charges impact on efficient competition.

2.4. Overall conclusions on efficiency

53. Established economic theory shows that efficient termination charges should cover the incremental cost of termination as well as make an efficient contribution to common costs. Pure LRIC and BAK are likely to result in MTAS charges being set well below the efficient level. The arguments raised in the Discussion Paper for setting termination charges at lower levels relating to over-recovery of common costs and call externalities lack empirical support.

3. Likely impact on end-users of reducing the level of MTAS charges

54. In this section, we assess the impact of reducing termination charges on end-users particularly in terms of changes in retail price and usage levels. We first examine the likely impact on mobile retail prices and then consider the implications for mobile subscriber numbers and usage. We assess international evidence in light of these findings. Next, we turn to consider the potential impact on fixed services. We proceed to consider the potential effects on vulnerable customers before finally bringing together the analysis to summarise the likely overall impact on end users.

3.1. Impact of mobile retail prices

55. It is generally accepted in the literature and by international regulators such as Ofcom and the New Zealand Commerce Commission that reducing the amount of costs that operators can recover in termination charges will force more of those costs to be recovered in mobile retail prices. This is the phenomenon known as the waterbed effect which we have discussed above.

56. As to which mobile retail prices will be impacted, it is useful to note first that operators can be expected to be currently optimising the structure of their retail prices so as to maximise returns to their shareholders. As such, it is likely that operators would respond to a cut in termination charges by seeking to spread the increase in retail prices across their different services. In this way, they can best preserve the existing structure of their prices. This means that both monthly charges as well as call prices can be expected to increase if termination charges were cut. Further, price increases can be expected to be spread across the customer base. If an operator sought to recover all the lost termination revenues from only one type of customer, such pricing would be readily undercut by another operator. Focusing a price rise on only one type of tariff (e.g. post-pay) would also be undermined by customers on that tariff switching to be on the cheaper tariffs (e.g. pre-pay).

57. The specific impact of cuts on termination on off-net mobile-to-mobile prices is harder to predict. This is because such prices are subject to two effects which operate in opposite directions. Cuts in termination charges reduce the marginal cost of providing an off-net call as operators pay less to rival operators to terminate those calls. On the other hand, retail off-net call prices will also be subject to the waterbed effect as each operator seek to recover some of the lost revenues from their own termination services. Thus, the impact on off-net prices will depend on which effect is strongest, which is ultimately an empirical matter.

58. Genakos and Valletti have studied the impact of previous termination cuts in European markets (cuts averaging around 11%). They found an immediate increase in post-pay prices of 18% just after the regulation was introduced which rose to an increase of around 45% three quarters after the introduction of the regulation.[31] They also found a long run increase in pre-pay prices of 17%.[32] In addition, they noted that the price increases for post-pay customers tended to be more on monthly charges rather than the price for additional calls outside the bundle. As post-pay monthly charges generally provided for a bundle of inclusive services, an increase in monthly charges would effectively increase the price for these inclusive services. As pre-pay customers do not pay any ongoing subscription charge (and as the study did not examine the handset prices), the increase in pre-pay prices would imply higher prices for pre-pay calls and other services.

3.2. Impact on mobile subscriber numbers and usage

59. Higher monthly charges and higher general call prices would be expected to reduce mobile subscriber numbers and mobile usage. Econometric studies of the price elasticity of mobile subscription find that it is sensitive to price changes. For example, Ofcom reports an average of econometric studies of the elasticity of mobile subscription demand of -0.44.[33]

60. Studies of the price elasticity of demand for mobile calls also show that mobile calls are relatively sensitive to call prices. One survey of studies shows an average elasticity of around -0.61.[34] Thus higher general prices for retail mobile calls would be expected to reduce usage. The specific impact on off-net mobile-to-mobile calls would however depend on how off-net call prices change.

61. The empirical evidence thus suggests that increases in mobile retail prices can be expected to materially reduce the number of mobile subscriptions and the number of general mobile calls.

62. We next examine further evidence of the impact of termination charges on mobile subscriber numbers and usage in section 4.

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[31] Genakos and Valletti, "Seesaw in the Air: Interconnection Regulation and the Structure of Mobile Tariffs", August 2010, p.19 and Figure 1. Note that the long-run effects include the impact of the introduction of regulation as well as progressive tightening of the regulation.

[32] Genakos and Valletti, Seesaw in the Air: Interconnection Regulation and the Structure of Mobile Tariffs, August 2010, pages 19 to 20, footnote 24 and Figure 1.

[33] Ofcom, Mobile call termination Statement, 2011, para. 7.138.

[34] Frontier Economics, The importance of price elasticities in the regulation of mobile call termination, 2004, p.5.

3.3. International evidence of the impact of different termination pricing approaches

63. The Discussion Paper states "*The academic literature concludes that countries with BAK arrangements have low retail prices and very high mobile utilisation rates with little price discrimination between on-net and off-net calls.*"[35]

64. There are a number of problems with simplistic comparisons between Calling Party Pays and BAK countries. First, many of the studies (such as that by Littlechild) use average revenue per minute data as a proxy for price comparisons. Average revenue per minute data however will not provide a reliable basis for price comparisons where there are differences in the mix of services acquired in different countries. For example, two countries may have identical prices but if consumers in one country buy a disproportionate share of cheaper services (e.g. on-net calls, night-time and weekend calls) then that country will have a lower average revenue per minute that the country. A further problem in the use of average revenue per minute data from operators is that it generally includes termination revenues for calling party pays countries. In fact, such termination revenues are often effectively counted twice because they are counted by both the operator that receives the termination revenues as well as being effectively incorporated into the retail off-net call revenues of the operator whose customers are making the calls. Thus the use of average revenue per minute data as a proxy for retail prices can lead to prices in calling party pays countries appearing to be high.

65. The OECD has an established methodology for comparing telecommunications prices across countries. This is based on calculating the total retail prices that would be paid in each country for a standard basket of mobile services. The OECD comparisons show that the low MTR countries of Canada and the US have amongst the highest mobile retail prices in the OECD, while Australian and a number of European countries are below or around the average.[36] For example, the total price for a medium use basket of mobile services in the US is almost double the price for the same basket of services in Australia. A report by the Canadian regulator also found that while mobile prices for Canada and the US are relatively expensive, mobile prices in Australia are relatively cheap.[37] These international comparisons by official bodies thus confirm the expectation from the existence of the waterbed effect that cutting termination charges will lead to higher mobile retail prices.

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[35] The Discussion Paper, p. 19.

[36] http://www.oecd.org/document/5/0,3746,en_2649_37441_43877509_1_1_1_37441,00.html

[37] CRTC, Communications Monitoring Report, 2010, Table 6.1.1.

66. Comparisons of mobile usage across countries also need to be made with care. First, mobile penetration in Canada and the US still remains significantly below most Calling Party Pays countries.[38] In the US, a third of low income people do not have mobile phones.[39] The exclusion of low income, low usage customers from the North American markets has the effect of increasing the reported average minutes of use per customer. Second, in BAK countries, customers are charged for both making and receiving calls and hence data of usage from those countries effectively double counts on-net call volumes. While some studies are aware of the problem, they often apply an adjustment assuming that 20% of calls in those countries are on-net. This is significantly below the share for European operators that we are aware of, and the share in the US would be expected to be even higher because standard US tariffs tend to offer unlimited on-net calls as part of their monthly tariff. If on-net calls comprise significantly more than 20% of outgoing calls in the US then the usage comparisons in the studies are still likely to be distorted by only partly removing the effect of the double-counting of on-net calls in BAK countries. A CEG econometric study for Ofcom found that while Calling Party Pays markets have higher subscriptions than BAK countries, there was no robust statistical evidence on the relationship between the charging regime and usage.[40]

67. The third claim put forward in the statement from the Discussion Paper is that there is little price discrimination between on-net and off-net calls in BAK countries. We have examined the tariffs for the three largest US mobile operators: Verizon, AT&T and T-Mobile available on their websites.[41] Each of these operators offers unlimited on-net calls on their standard post-pay plans (as well as unlimited calls between 9pm and 6am and on the weekend), but limited off-net calls. Ofcom reports that 90% of the US market is post-pay[42] and, in any event, the largest operator Verizon's 'pre-pay' plans also include unlimited on-net calls but limited off-net calls.[43] Thus, differential treatment of on-net/off-net calls

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38 CRTC, Communications Monitoring Report, 2010, Figure 6.1.4.

39 http://www.newmillenniumresearch.org/news/NMRC_Sullivan_Lifeline_study_news_release_021011.pdf

40 CEG, Wholesale termination regime, termination charge levels and mobile industry performance, 2009, p. 4.

41 http://www.verizonwireless.com:80/b2c/store/controller?&item=planFirst&action=viewPlanList&sortOption=priceSort&typeId=1&catId=323&sel=ind

http://www.wireless.att.com/cell-phone-service/cell-phone-plans/individual-cell-phone-plans.jsp?_requestid=335504

http://www.t-mobile.com/shop/plans/cell-phone-plans.aspx?catgroup=individual

42 Ofcom International Communications Markets Report, 2010, p.105.

43 http://specialoffers.verizonwireless.com/prepay/nocache/ Note that the pre-pay plans generally require the payment of a daily or monthly charge.

appears pervasive in the US despite their low mobile termination. On-net/off-net price differentials may instead reflect other factors such as being used as a marketing device in that existing mobile customers may encourage their family and friends to join the same network so as to take advantage of cheaper on-net call prices.

68. In summary, international evidence suggests that cutting termination charges would increase mobile retail prices, harm mobile subscription numbers, while potentially having little impact on the presence of on-net/off-net price differentials.

3.4. The likely impact on the fixed sector

69. On the basis of a review of the Australian market experience to date, the Discussion Paper states that "*Despite multiple and substantial reductions in the MTAS rate, Telstra's average FTM prices remained relatively stable*."[44] The Analysys paper, the Regulatory Treatment of Fixed-to-Mobile pass-through finds that the lack of pass-through is a problem in international markets as well.

70. Given the evidence discussed above that cutting termination charges leads to higher mobile retail prices than otherwise, the lack of any reduction in fixed-to-mobile prices suggests that end-users have been left worse off overall as a result of the cuts.

71. Looking forward, any further reductions in termination charges would only be justified if the ACCC can be confident that there would be gains to end-users that would outweigh the harm of higher mobile retail prices. This would require first that cuts in mobile termination charges are actually passed through into lower retail fixed-to-mobile prices. However, there are questions over the effectiveness of any pass-through regulation given that fixed-to-mobile calls will increasing be offered as part of a bundle of services so that regulation of fixed-to-mobile call prices may be defeated by changes in other parts of the bundle. Even if pass-through could be achieved, the level of termination charges should not be reduced below the efficient level as this would reduce overall welfare. In accordance with Ramsey pricing, the efficient level will comprise the incremental cost of termination as well as a contribution to common costs.

3.5. Likely impact on vulnerable consumers

72. An additional risk of cutting mobile termination charges is the potential for low income customers to be adversely affected.

[44] The Discussion Paper, p.9.

73. The better affordability of mobile phones is key factor driving the growth of mobile-only households in Australia. For example, the ACMA noted that:

> "The expense of maintaining a fixed-line service is [...] a strong contributing factor for consumers choosing to go mobile-only."[45]

74. The ACMA noted in particular that 40 per cent of mobile only households indicated that the reason they did not have a landline was that either (i) a landline is not cost-effective/too costly or that (ii) it is too costly to have both a landline and a mobile.[46]

75. This suggests that if mobile call prices increase, it will reduce the affordability of the most cost effective means of communications access for many customers. Pre-pay plans, which do not require commitments to ongoing payments, are particularly attractive to customers trying to manage limited budgets. In the extreme, higher mobile retail prices may force some customers to give up on having any telecommunications in their houses. Higher mobile retail prices may also prevent some households from being able to afford a mobile phone for the first time. Research published by the Department of Broadband, Communications and the Digital Economy, showed that 19 per cent of persons with a personal income of under $10,000 did not have a mobile phone in 2006.[47]

3.6. Conclusions on the overall impact on end users

76. This section has examined the evidence on the likely impact on end users of cutting termination charges. Lower termination charges can be expected to:

- Increase mobile retail prices with the possible exception of off-net call prices which may either increase or decrease depending on the relative strength of the waterbed effect and the impact of lower marginal costs;
- Reduce mobile subscriber numbers;
- Potentially reduce mobile usage, although there is not robust international empirical evidence showing either significant a decrease or increase in usage;
- Potentially have little impact on fixed-to-mobile prices, if fixed operators do not pass-through lower termination charges into their retail prices; and

[45] ACMA (2011), Convergence and Communications: *Australian household consumers' take up and use of voice communications services*, p.21.

[46] ACMA (2011) Convergence and Communications: Australian household consumers' take-up and use of voice communication services

[47] Online Statistics Department of Broadband, Communications and the Digital Economy

- Potentially harm low income customers who are increasingly relying on mobile phones as their only form of telecommunications access.

77. The evidence of the likely overall impact on end users is consistent with the analysis in the previous section which concluded that cutting termination charges down to pure LRIC or BAK risks serious harm to overall efficiency.

4. Potential competition effects

78. The ACCC is also tasked with promoting competition in the markets for telecommunications services.

79. A number of academic papers conclude that higher termination charges promote competition. For instance, the recent paper by Jullien, Rey and Sand-Zantman that we have referred to above notes that:

> "Raising termination revenue intensifies competition for light users: This is a variant of the waterbed effect. Since light users generate a positive termination balance, they become more profitable when the termination markup increases, hence a reduction in the equilibrium price. This waterbed effect is however modified here, due to the fact that losing light users to the competing network generates a termination deficit, since light users are mainly receivers. This additional cost further intensifies competition for light users."[48]

80. Earlier analysis by Laffont and Tirole also concluded that:

> "Hence, high termination charges create strong incentives to increase their market share in order to reduce their average marginal cost of producing calls."[49]

81. It is the case that there are also studies that suggest that high termination charges lead to on-net/off-net differentials that harm smaller operators. The Discussion Paper refers to some of these studies. We have already noted some flaws with these studies including the lack of empirical evidence to show that uninternalised call externalities are significant and that on-net/off-net differentials exist even in the US with its very low termination rates.

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[48] Jullien, B., P. Rey and W. Sand-Zantman, "Mobile call termination revisited", IDEI Working Paper Series, No. 551, August 2010, p.5.

[49] Laffont and Tirole, (2001) Competition in Telecommunications, Munich Lectures in Economics, page 190.

82. There are some additional points to bear in mind in considering the potential impact of 'high' termination rates on the competitiveness of smaller operators. First, while smaller operators may make relatively high levels of termination outpayments (because more of their customers' calls are off-net), they also receive relatively high level of termination in-payments from other operators. This is because more of the calls received by their customers will also be off-net rather than on-net calls. For subscribers that make as many calls as they receive, the level of termination payments between mobile operators will exactly offset each other. Finally, there are not large differences in market shares between the Australian mobile operators so that any impact from differences in market shares would be expected to relatively small.

83. In summary, potential competition effects do not provide a sound justification for setting termination charges at pure LRIC or BAK levels. In fact, higher termination charges may better promote competition.

5. Estimating efficient prices

84. In this final section, we explore the ACCC's concerns relating to the reliability and cost of estimating efficient prices. For example, the Discussion Paper argues:

> "The efficiency gains from adopting TSLRIC pricing depend upon correctly modelling network costs of the best-in-use technology that is commercially available. For the mobile industry, which continues to be subject to rapid technological change, this means a very short regulatory horizon and the requirement for an unduly large number of subjective judgments about network design, patterns of demand and pricing paths that may be invalidated quickly by technological changes. Updating the inputs to or reworking an economic model frequently involves large costs, additional regulatory burden from the associated consultation processes, and more subjective judgments being made. Not updating the economic model will almost certainly lead to under- or over-recovery."[50]
>
> and
>
> "The ACCC notes, however, that pure LRIC cost modelling has a number of disadvantages similar to those of TSLRIC cost modelling outlined above. Modelling a hypothetical operator still requires a large number of subjective judgements and forecasts of voice traffic volumes over the FAD period."[51]

[50] The Discussion Paper, p.15.

[51] The Discussion Paper, p.17.

85. It is important for the ACCC to explore cost effective ways to estimate efficient prices. However, this does not imply that the ACCC should do away with estimating efficient prices altogether such as by adopting BAK. Even the administrative costs of developing a full bottom-up cost model would be only a fraction of the welfare loss that would result if prices in the national mobile market were set substantially different from their efficient level. For example, Ofcom in the UK has estimated that the welfare gain from its previous charge controls was £1.6 billion over the regulatory period.[52] This shows the potential large welfare losses that result where prices are different to their efficient levels. While Ofcom's estimate relates to bringing charges down to the TSLRIC+ level, to push charges down well below the TSLRIC+ level (such as with BAK) and thereby push up mobile retail prices would be expected to also result in large welfare losses.

5.1. Tribunal's 2010 Decision

86. The Discussion Paper specifically makes reference to the decision by the Australian Competition Tribunal, Application by Telstra Corporation Limited of 10 May 2010. The Tribunal's decision did raise concerns with the existing approach to measuring TSLRIC+. However, these concerns did not relate to the question of whether a contribution to common costs should be included or whether call externalities were relevant, i.e. issues relating to pure LRIC and BAK. Rather the Tribunal was concerned about the existing approach of estimating the costs of a hypothetical new entrant and whether that entrant should be assumed to be using a new technology different to the technology of existing networks. In particular, the Tribunal noted that estimates of the costs for a hypothetical network might bear little relationship to "*the true resource costs to the community*".[53] The Tribunal instead suggested an alternative approach based on the use of a regulatory asset base and depreciated optimised replacement costs.[54] The Tribunal also noted that the design of Telstra's local fixed network "*is a historical artefact of the period over which the network was built*" and reflected decisions of the Postmaster-General's Department which may not be commercially based.[55]

87. The Tribunal's findings are applicable to estimating mobile network costs. In particular, revaluing assets every few years on the basis of a hypothetical new entrant model seems to create unnecessary costs and risk significant inaccuracies. For example, when the UK Competition Commission reviewed

[52] Ofcom, Wholesale mobile voice call termination markets – a proposal to modify the charge controls conditions, 7 June 2005, para. 4.33.

[53] Australian Competition Tribunal, Application by Telstra Corporation Limited of 10 May 2010, para. 242.

[54] Australian Competition Tribunal, Application by Telstra Corporation Limited of 10 May 2010, paragraphs199 and 239.

[55] Australian Competition Tribunal, Application by Telstra Corporation Limited of 10 May 2010, paragraphs199 and 236.

Ofcom's hypothetical operator cost model they found that the model "underestimated cell site capacity by 20.1 per cent, transceivers by 24.0 per cent and number of cell sites by 12.4 per cent."[56] Maintaining a regulatory asset base is likely to be less costly and more accurate. For mobile networks, there is also less reason to apply efficient adjustments based on a hypothetical operator. Mobile networks are younger than the fixed network and have been constructed in competitive markets. Both competition and commercial shareholder pressure can be expected to discipline the level of mobile operators' costs so that they are at efficient levels. Termination is supplied with the same network as mobile retail services and hence the network costs used in the supply of termination can be expected to be efficient.

88. One aspect of the Tribunal's decision that is relevant to the choice of pricing principle is the use the importance of using a competitive price benchmark:

> "A long-established body of economic analysis supports the view that a competitive price sends the right signals for promoting competition in markets for services…and for the economically efficient use of, and investment in, the infrastructure by which listed services are supplied."

89. A competitive price benchmark would need to be sufficiently high so that operators are able to recover their costs overall. Pure LRIC as a general pricing principle is not consistent with a competitive price benchmark because if pure LRIC was applied to all services, it would leave operators unable to recover their common costs. BAK in general is also not consistent with a competitive price benchmark for the same reason. The exception is where traffic between two operators is reasonably balanced and those operators have similar costs. In such a case, operators may commercially decide not to exchange payments between each other as they would each owe each other a similar amount.

5.2. Other problems with measuring pure LRIC

90. Compared with TSLRIC+, pure LRIC does require significantly more analysis to be estimated accurately. For TSLRIC+, whether a particular asset is a common cost or is traffic-related is not critical as TSLRIC+ provides for each service to contribute to both traffic-related and common costs. For pure LRIC, on the other hand, only those costs that are labelled as traffic-sensitive are taken into account. Hence, the resulting pure LRIC cost estimate is highly sensitive to the correct identification of whether or not each cost category is traffic-related. This requires detailed technical information as well as economic analysis such as in relation to the correct treatment of opportunity costs of coverage and spectrum.

[56] The UK Competition Commission, *Calls to mobiles report,* 2003, para. 2.298.

91. In the few European countries that have sought to implement pure LRIC to date, pure LRIC has been estimated as the difference between the costs of a network carrying termination and a network that does not carry termination expressed on a per minute of termination basis. The appropriate identification of traffic related costs has been a key issue. In addition, there are disputes over to what extent the network would be designed differently if it did not carry termination services. There are also issues as to whether last increment of traffic would have higher costs than traffic in general such as may result from local congestion. In Belgium, the Netherlands and the UK, there are currently substantive appeals of whether pure LRIC is appropriate in principle and whether the regulator has accurately measured it.

5.3. International benchmarking

92. The Discussion Paper notes that international benchmarking could be used as an alternative approach to estimating costs. Optus previously submitted international benchmarking analysis as an additional check on the prices it proposed in its mobile termination undertaking. The ACCC's view at the time was:

> "However, as outlined in the MTAS Final Report, the Commission is of the view that any analysis that attempts to make adjustments for factors that drive cost differences between international jurisdictions should be conducted comprehensively, or not at all…the Commission believes that adjusting for all the possible factors that may lead to cost differences between international jurisdictions is an extremely complex task and that some of the more complex adjustments may not be possible at all due to a lack of data."[57]

93. The previous view of the ACCC thus leaves little room for the use of international benchmarking. We note that the list of required adjustments that the ACCC identified in its decision on the undertaking would apply equally to pure LRIC benchmarks. Moreover, pure LRIC raises additional considerations as the extent of the coverage network is likely to vary significantly between countries which would have a significant impact on estimating what costs beyond that coverage network are necessary to incur to supply termination services.

5.4. Actual costs supplied by MNOs

94. The Discussion Paper does identify the actual costs supplied by MNOs as a potential way of deriving prices. As discussed above, the use of actual costs could be relatively cost effective and a more accurate way of measuring the efficient costs of supply than a model of a hypothetical operator.

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[57] ACCC, *Optus' undertaking with respect to the supply of its Domestic GSM Terminating Access Service – Final decision,* February 2006, p.117.

95. The use of actual costs is also amenable to the measurement of TSLRIC+. Indeed, such top-down cost models are commonly employed even when bottom-up cost models are also developed. Top-down cost models are seen as a way to ensure that the estimated costs are actually achievable my operators. Given that, the additional value of a bottom-up model is questionable.

96. There are, however, a range of issues to be addressed in seeking to rely on actual costs. As the Discussion Paper notes there may be issues relating to the classification of costs, with operators potentially applying different definitions. There is also the need for engineering assumptions to be applied to the accounting data so as to determine the extent to which different services drive different types of costs. Depending on which depreciation approach is applied, there may also be a need to take into account forecasts of costs and traffic. Thus, the use of actual costs would still rely on significant analysis and assumptions.

97. Actual costs are not well suited to measuring pure LRIC. As discussed above, estimates of pure LRIC are particularly sensitive to assumptions about the extent to which costs change with termination volumes. This is likely to require a detailed economic cost modelling based on engineering assumptions as to how different types of assets are utilised by the different services supplied**.** This level of detail is generally not found in management accounts. The use of pure LRIC with actual costs would also give rise to similar issues discussed above about measuring pure LRIC, including whether network design changes should be assumed if the network was no longer supplying termination services.

98. In summary, we believe that the use of actual costs potentially has merit although there are a number of issues to be addressed in using actual costs of operators.