

concept economics



REPORT

**BILL AND KEEP IS THE
MOBILE TERMINATION
OPTION MOST IN THE LONG-
TERM INTERESTS OF END-
USERS**

FINAL

Prepared for:
New Zealand Commerce
Commission Pty Ltd

Prepared by:
Eric Ralph, Emma Lanigan
Date: 22 December 2008

Concept Economics:
27 Jardine Street,
PO Box 5430 Kingston
ACT 2604 Australia



Table of contents

1.	EXECUTIVE SUMMARY	1
2.	SETTING THE THEORETICALLY OPTIMAL MTR IS COSTLY	2
2.1.	IDENTIFYING THE THEORETICALLY OPTIMAL MTR	2
2.2.	DIRECT ADMINISTRATIVE COSTS OF REGULATION	2
2.3.	INDIRECT REGULATORY COSTS	3
3.	INTERNATIONAL BENCHMARKING PROVIDES LITTLE GUIDANCE	3
3.1.	MOBILE TERMINATION RATES VARY WIDELY	4
3.2.	REGULATORY APPROACHES VARY WIDELY	5
4.	BAK AS A LOW COST ALTERNATIVE	6
4.1.	BAK IS LIKELY EFFICIENT WHEN ALL COSTS ARE ACCOUNTED FOR	6
4.2.	LOW MTRS APPEAR EFFICIENT IN PRACTICE	7
4.3.	BAK IS RELATIVELY COMPETITIVELY NEUTRAL IN NEW ZEALAND	9
5.	CONCLUSION	9
6.	BIBLIOGRAPHY	10

1. EXECUTIVE SUMMARY

New Zealand Communications (NZC) has asked Concept Economics (Concept) to evaluate whether the application of bill and keep (BAK) in its Undertaking for mobile-to-mobile (MTM) termination is likely to promote competition for the long-term benefit of end-users and whether it will result in greater efficiencies compared with other alternatives.

We find that BAK is an extremely simple and low cost mechanism well suited to MTM calling in New Zealand. It requires no billing and related costs. It imposes minimal upfront and ongoing direct and indirect regulatory costs. It is pro-competitive, being unlikely to distort efficient entry or competitive expansion. Rather, it will promote efficient entry and competitive expansion, and hence competition. It is considered likely to result in outcomes that would be similar to those that would arise under more complex pricing approaches, but be substantially less costly and would be more efficient overall.

Three alternative approaches are:

- Estimation of a theoretical “optimal” mobile termination rate (MTR). This would initially require an expensive and time-consuming exercise and would involve ongoing direct and indirect regulatory costs that would be unjustifiable given the clear benefits of the low cost BAK option.
- Use of a benchmark MTR from international regulatory practice. However, international regulatory practice is too diverse, and too compromised by historical accident for benchmarking to allow determination of a “best practice” MTR. In many cases regulators have judged current MTRs to be excessive and are requiring them to be adjusted downwards toward acceptable levels. For example, within the EU alone MTRs vary from ~~2€¢~~/minute up to ~~22€¢~~/minute, with the recent trend being for regulators to conclude that significant reductions to existing MTRs are required.¹
- No regulation. However, unregulated MTRs typically result in extremely inefficient rates that would almost certainly stymie efficient entry (because they impose significant financial burdens on new entrants to the benefit of incumbent mobile operators)² and its resultant benefits. As a result, regulators have almost universally sought lower MTRs than those desired by incumbent terminating carriers (see section 3.2 below).

In this paper:

- Section 2 discusses the costs of seeking to set “optimal” MTRs.
- Section 3 demonstrates that international benchmarking is unlikely to provide effective guidance in MTR setting.
- Section 4 outlines the benefits of BAK to mobile termination in New Zealand.

1 In the last month, the French regulator concluded that the long-term MTR should be **70-85% below current charges**. The Italian regulator has found that MTRs **should fall by more than half** over the next three years. These recent decisions follow public statements made by the European Commission (EC) that MTRs in the EU are unacceptably high and should be **reduced by around 70%**.

2 For example, high termination rates in the UK have cost 3UK over £190 million in net outpayments to incumbents since 3UK's launch (April 2003 to March 2008) (Source: 3UK presentation to the Competition Commission, Friday 11 July 2008, Kevin Russell - Chief Executive Officer, 3UK).

As a result, we find that BAK is the approach most likely to promote efficient competition for the long-term benefit of end-users in New Zealand.

2. SETTING THE THEORETICALLY OPTIMAL MTR IS COSTLY

2.1. IDENTIFYING THE THEORETICALLY OPTIMAL MTR

The theory and practice of identifying theoretically optimal MTRs is complex. The result is that any conclusions as to the nature and level of prices, even if arrived at with great care and at great cost, will be subject to substantive dispute (a matter confirmed in practice). Among other things there will be debate on: determining and allocating costs; identifying which costs are sensitive to traffic volumes (and by how much); the role of subscriber, calling and congestion externalities; and the extent to which differing services should contribute to shared costs (Kennet and Ralph, 2007). Even the most basic implementation exercises, such as what must necessarily be forward-looking demand estimation, unavoidably require controversial modelling assumptions, and in any case are subject to large errors.³

It is thus immediately obvious that the process of attempting to identify and implement regulatory prices is likely to be expensive and controversial. This section outlines the direct and indirect costs of estimating cost-based MTRs.

2.2. DIRECT ADMINISTRATIVE COSTS OF REGULATION

The direct regulatory costs of setting MTRs (which are avoided under BAK) include: costs incurred in identifying theoretically optimal MTRs; ongoing regulatory monitoring costs, since the optimal MTR is likely to change over time; and the ongoing costs of reconciliation and billing. All of these costs are essentially fixed in nature: they do not change significantly with the size of the market being regulated. These direct costs are therefore likely to be high relative to the size of the New Zealand mobile markets.

Experience from other jurisdictions suggests identifying theoretically optimal MTRs is an expensive and lengthy process. For example:

- In the US, the Federal Communications Commission (FCC) has spent some seven years trying to reform call termination rates (FCC, 2008a, paragraph 3), and more than two decades struggling with the issue since long distance competition was introduced (FCC, 2008a, paragraph A-76ff).
- In Australia, the modelling process took over 15 months and the ACCC's consultants direct costs were significant (approx NZ\$750,000).⁴ Of course, the actual costs are much larger than this, as the ACCC would have itself incurred substantial costs in bringing the model to fruition, and then there are the costs of the regulatory hearings and data collection, which include costs incurred by stakeholders.

3 The tortured process that produced the present interconnection regime in the US (Nuercherterlein and Weiser, 2007, 293-306), and the variety of EU approaches (see section 3 below) illustrate this.

4 The Australian Competition and Consumer Corporation (ACCC) issued a request for tender in March 2006 (ACCC, 2007a, 5-6). An initial model was released for public review eight months later (ACCC, 2007a), and a "final" version in June 2007 (WIK-Consult, 2007). The ACCC paid WIK over the period AUD625,000 – approximately NZD750,000 at current exchange rates (ACCC list of consultancy contracts for 04/05, 05/06 and 06/07, available at <http://www.accc.gov.au/content/index.php/ml/itemId/402496>).

- In the UK, Ofcom started preparing a new model in April 2005 and commissioned Analysys to assist it. In preparing the new model, Ofcom built on its existing 2G model. Ofcom's final statement on MTRs, which used the output of the model, was published in March 2007, two years after construction of the model began.

Similarly, “cost-based” access pricing in New Zealand would require a substantive modelling and estimation exercise that would be costly in its scale and would delay or prevent the benefits of efficient competition. We have estimated that **the lack of effective MTR regulation could cost New Zealand between \$1.75 million and \$3.17 million per month** in delayed price cuts alone (due to delayed entry for mobile voice services) (Concept Economics, 2008). **The true cost would be well above this**, due to allocative efficiency losses on other services, and dynamic efficiency losses.

Moreover, costs change with time, as will the nature of different service demands. Thus, a commitment to setting optimal MTRs would require periodic re-evaluation of what were optimal MTRs. In contrast, with BAK such costs are avoided.

In addition, non-zero MTRs require ongoing reconciliation, billing, dispute settlement and payment enforcement processes. No such processes are necessary for BAK.

2.3. INDIRECT REGULATORY COSTS

In contrast to BAK, an approach that is based on identifying the theoretically optimal MTR, opens the door to ongoing dispute both about the correct approach, as the many different regulatory approaches to this question highlight (see section 3 below) and about whether circumstances have changed that MTR. The effect will not merely be the direct regulatory costs of ongoing regulatory oversight (discussed above) but also indirect costs associated with affected parties seeking to obtain better or protect existing terms and conditions (called rent seeking in the economic literature —Tullock, 1967). Worse, the costs of rent seeking can be very high. Fully informed and rational parties seeking rents **where one party's gain is another's loss can fully dissipate the available rent** (Holt, 2007, 205ff), while more than the available rent can be wasted if parties overestimate their prospects of winning, or repeatedly interact in competitions for the rents (eg, at points of regulatory review or when an undertaking must be resubmitted).⁵

3. INTERNATIONAL BENCHMARKING PROVIDES LITTLE GUIDANCE

This section makes two points. Section 3.1 shows that international regulation of MTRs ranges widely. **As a result, international benchmarking provides little guidance in identifying best practice. Moreover, regulated MTRs are in a significant state of flux in most locations. In virtually all such cases, they are subject to substantial and ongoing regulatory reductions.** Consequently, benchmarking against present MTRs would not result in MTRs that reflect most regulators' desired price levels, but would significantly exceed them.

⁵ The present 7-year long FCC (2008a) termination rate proceedings provide an example of how rent seeking can prolong, at great expense, regulatory reviews (Nuercherterlein and Weiser, 2007, xxvi, 330-331).

Section 3.2 demonstrates that the underlying methodologies undertaken by overseas regulatory agencies vary greatly, making benchmarking against overseas regulators' approaches no more possible than benchmarking against the varying MTRs adopted by overseas regulators.

3.1. MOBILE TERMINATION RATES VARY WIDELY

In the US, mobile carriers must accept each other's traffic and offer terms that are "no less favourable than those offered to the cellular systems of affiliated entities or independent telephone companies", but mobile-to-mobile (MTM) termination is otherwise unregulated,⁶ leading to BAK between mobile carriers. Other countries that use BAK include Canada,⁷ Singapore⁸ and Hong Kong. These countries feature in various studies showing them to have usage rates significantly higher than in New Zealand (eg, US usage is more than four times greater than New Zealand usage—Habord and Pagnozzi, 2008, 32).⁹

In contrast, many regulators cap MTRs at relatively high prices. For example, in Australia the present MTR is 9AUD¢/minute (ACCC, 2007b, 1). EU MTRs vary dramatically (ERG, 2008),¹⁰ from 2€¢/minute in Cyprus (EC, 2008b), to 22€¢/minute in Estonia (EC, 2008f). Even within individual countries, different MTRs are set: twenty-five countries still allowed asymmetric MTRs as of January 2007 (ERG, 2008, 74).

More importantly, many current international MTRs are to be substantially reduced. For example, in the past month the French regulator, ARCEP, has published a decision requiring **significant reductions**: Orange France and SFR face a glide path down to 3€¢/minute by mid-end 2010 from a current MTR of 6.5€¢/minute; and in the same time-frame Bouygues Telecom is required to reduce its MTRs to a maximum of 4€¢/minute. ARCEP has published a longer-term target MTR of 1-2€¢/minute. The Italian regulator, AGCOM, has also recently concluded that significant MTR cuts are required. It has set a cap of 5.3€¢/minute for 2011 for the three main operators (compared with current MTRs in the range of 8.85-9.51€¢/minute) and 4.5€¢/minute for 2012 (Telecompaper, 2008; Agcom, 2008). The French and Italian decisions follow the EC (2008b) view that EU MTRs needed to fall by around 70% (EC, 2008e).

Finally, a number of countries use international benchmarking as input to determining their MTR, yet the process appears deeply flawed as it does not lead to consistent outcomes (ERG, 2008, 72).

6 Nuechterlein and Weiser, 2007, 275. Quote is from FCC and is found in endnote 38, page 593.

7 Since 2004, the Canadian Radio-television and Telecommunications Commission (CRTC) has mandated BAK as the default payment mechanism for the termination of traffic that is both interchanged and terminated within a local interconnection region (a consolidation of exchanges) (CRTC, 2004).

8 The Infocomm Development Authority of Singapore (IDA) requires BAK for MTM calls (IDA, 2008, 8).

9 The ratio of New Zealand to US minutes of usage could greatly exceed 4. Habord and Pagnozzi suggest average New Zealand monthly subscriber usage of approximately 190 minutes. In fact, billed originating minutes are less than 100 and likely closer to 60 (Commerce Commission, 2008). Moreover, any time over the next whole minute is counted as a billed minute, and most calls are on only a few minutes long, so the billed minutes likely overstate actual originating minutes by 20-50%. Thus, average New Zealand outbound minutes per user, using a conservative 20% discount factor, lie between 52 and something less than 80. Doubling this to allow for inbound calls gives average overall usage of between 104 and less than 160, implying a New Zealand to US usage ratio of 5 to 8.

10 The ERG applied a weighted average formula using traffic data where possible and operator market shares to determine the average MTR.



3.2. REGULATORY APPROACHES VARY WIDELY

The preceding makes it clear that the wide variance of internationally set MTRs makes it essentially impossible to take a meaningful international benchmark approach to MTRs. But this is also true of the underlying methodologies. Some countries seek to estimate efficient MTRs, while others combine estimation process with benchmarking, and still others solely rely on benchmarking. In addition, those countries that seek to estimate efficient MTRs often take substantially different approaches, and even where the approaches appear similar, their modelling results vary dramatically. As a result, one cannot even look to international approaches, rather than MTRs, for benchmarking purposes.

A few examples make the point:

- In the US, beyond BAK for MTM calls, the predominant current approach is to set (non-mobile) termination rates to recover total element long run incremental costs *that are traffic sensitive* (see FCC, 2008a, page A-76-78, paragraph 172; and FCC, 1996, paragraphs 1056-1057). However, the FCC (2001a, Section III.B; 2005, paragraph 88), in the ongoing non-mobile termination rate proceedings, has granted BAK considerable attention. BAK is specifically addressed in Telecommunications Act of 1996 (Nuechterlein and Weiser, 2007, 326-327).
- Australian MTR caps are based on total service long run incremental costs allowing for a mark-up for common organisational level costs; ACCC, 2007b). In contrast, the FCC does not typically allow recovery of common organisational level costs even in non-mobile termination rates.
- Ofcom's model, which is under review, accounts for the subscriber externality and shared costs, in addition to the network costs of a mobile operator.
- In the EU more generally, "price control is multiform"¹¹ (ERG, 2008, 67).

The EC (2008a) set out new (draft) common principles for determining termination rates, including the use of bottom-up forward-looking long run incremental costs (EC, 2008a, 18). It expressed the view that in general included costs must be traffic-sensitive.¹² However, the EC also saw a role for BAK:

"...a significant reduction of termination rates from current levels might create appropriate incentives for voluntary inter-operator agreements and consequently [BAK] could evolve naturally" (EC, 2008a, 25)

11 Price caps were imposed in 13 of the EU25 countries, but in 5 the cap was not applicable to all operators; most but not all EU countries apply a single average MTR for both 2G and 3G networks; countries impose different price controls on different tariffs, eg, the peak tariff, off peak tariff or setup charges, (ERG, 2008, 68); different EU countries use different tools in estimating costs—11 countries use top-down modelling, 2 use bottom-up modelling, 7 use a hybrid model, and 8 use benchmarking (ERG, 2008, 69); and, where cost estimation is undertaken, different cost references are relied upon—8 EU countries reference an efficient operator, one country uses the least cost operators, 3 use an average or weighted average of operators costs, 2 use the highest costs of operators, 2 use the actual costs of each operator, and 4 use benchmarks (ERG, 2008, 72).

12 The EC stated that "given that wholesale call termination is a traffic-related service, non-traffic-related costs should not be taken into account when calculating wholesale termination rates" (EC, 2008a, 20).

In respect of cost recovery under BAK, the EC explained that:

“Given the two-sided nature of call termination, not all related termination costs must necessarily be recovered from the wholesale charge levied on the originating operator. Even if wholesale termination rates were set at zero, terminating operators would still have the ability to recover their costs from non-regulated retail services. Rather it is a question of how these financial transfers are distributed across operators in a way that best promotes economic efficiency to the benefit of consumers.”

The EC also summarised the advantages often associated with BAK, in particular that:

“it is argued that Bill and Keep obviates the need for regulatory intervention and resolves the termination bottleneck. Moreover, it is further argued that Bill and Keep leads to lower retail prices for call origination and appears to increase usage due to the price elasticity of demand. Furthermore, proponents of Bill and Keep consider that it facilitates development of innovative offers, e.g. flat-rate offers promoting increased usage. It also brings immediate benefits by decreasing transaction and measurement costs. Finally, Bill and Keep takes account of the call externality” (EC, 2008a, 24).

4. BAK AS A LOW COST ALTERNATIVE

4.1. BAK IS LIKELY EFFICIENT WHEN ALL COSTS ARE ACCOUNTED FOR

In contrast to identifying efficient MTRs, the administration and direct and indirect regulatory costs of settling on zero MTRs are low, and hence BAK may well be the most efficient approach (proponents of BAK include Berger, 2005; Cambini and Valletti, 2003; deGraba, 2003; Harbord & Pagnozzi, 2008; and Littlechild, 2006). This is especially likely for a small market like that for mobile services in New Zealand. Here fixed administration and regulatory costs are likely to be large relative to the benefits that would be gained if there were no transactions costs associated with identifying and setting theoretically optimal MTRs.

Settling on BAK avoids the need to engage in any modelling, which saves resources directly, as well as indirectly by avoiding lengthy disputes from interested parties as to the underlying modelling assumptions. This is also likely to reduce rent seeking. BAK also avoids the need for reconciliation, billing and payment collection.

Significantly, a zero interconnection price cannot be dismissed as being materially different from theoretically optimal MTRs, which may well be close to zero:

- The marginal private cost of a call (or a call minute) in general is virtually zero. The marginal social cost of a call minute may well be less than this and may be negative.
- It is unlikely that, on a mature network, such as that for mobile telecommunications in New Zealand, the subscriber externality requires a subsidy.¹³
- It is not obvious that substantial funding for shared costs is efficiently raised from termination, even if theoretically optimal prices would allow for some contribution.¹⁴

¹³ Moreover, if any subsidy is called for, it is likely one targeted at a very narrow group of low income individuals, and so may not call for substantial funds. In any case, such funds are probably best raised broadly (including from general taxation revenues). In short, first best MTRs would be unlikely to include a material contribution toward subsidising the subscriber externality.

Further, if traffic between NZC and other mobile networks is essentially balanced, then the revenue flows between carriers generated by a theoretically optimal and a zero MTR will be effectively the same (since approximately zero net transfers would occur between carriers even if a MTR were levied). Thus, the costs of billing need not be incurred.

Traffic balance can be expected if MTRs and retail prices, notably the relative on- and off-net prices, are approximately set to theoretically optimal levels. This is because individuals' propensity to call each other, **if undistorted by artificial price differentials**, would be unlikely to vary between networks in a way that would lead to traffic imbalance. As the Commerce Commission (2006, paragraph 98) put it in a slightly different context:

there is no reason to believe that local voice traffic between Vodafone and Telecom customers would intrinsically be materially out of balance...[but] the pricing method can itself influence whether or not traffic is in balance

Indeed, Vodafone (2008, paragraph 41) notes it is a "commonly recognised" principle that traffic flows between interconnecting networks are invariant to market share (though it is worth repeating traffic imbalance is likely given Vodafone's retail on- and off-net retail price differentials, especially when MTRs are set well above marginal cost).

In summary, theoretically optimal MTRs may well be very small and so not significantly different to zero charges. This suggests that any distortion created by zero (rather than theoretically optimal) prices is likely to be small. Consequently, this distortion could easily be outweighed by the costs of identifying theoretically optimal prices and the errors of setting the wrong prices (since merely knowing the optimal MTR may not be zero does not imply the estimated MTR will be closer to the optimal MTR than zero is). This is especially so in a small market like that for New Zealand mobile services. As a consequence, BAK, with its lower implementation costs, may be more efficient than theoretically optimal MTRs, even if they were assessed correctly, but BAK's superiority is all the more likely given assessment error is inevitable.

4.2. LOW MTRS APPEAR EFFICIENT IN PRACTICE

Theory aside, it is notable that BAK in the US, arguably the world's most competitive mobile market appears to be consistent with efficient outcomes. US usage prices are generally lower than most other places in the world, and voice usage (Cellular Telephone Industry Association (CTIA), 2008; Frontier, 2008, 27; Habord and Pagnozzi, 2008, 31-32) and Internet access penetration are higher (Nielson, 2008a).

The key claim of proponents of positive (especially significantly positive) MTRs is that the very high mobile penetration rates (eg, like in the EU) result in significantly greater welfare as compared with the lower penetration rates of the US (Frontier, 2008, 27). Even if that were correct (and it is probably not), penetration rates are already high in New Zealand; the problem is low usage. In fact:

14 The FCC appears to take this view in the US, where competition in mobile telephony is thriving (Nuercherterlein and Weiser, 2007, 29, 261-262) despite the widespread use of BAK for MTM termination, and where the bulk of non-mobile termination charges include no contribution to shared costs.



- There are good reasons for expecting US mobile penetration to be less than elsewhere. US fixed line subscription charges and calling prices are among the lowest in the world (ie, compared with most other places, US mobile carriers face relatively tough competition, at least for those who consider fixed and mobile telephones to be substitutes).¹⁵
- The US perhaps suffered from poor regulatory decisions.¹⁶ This placed US mobile carriers behind their foreign counterparts.
- The difference in consumer benefits between the US and countries with much higher mobile penetration rates is unlikely to be large, and may even favour the US. For example, US mobile services appear to effectively meet consumer demand in the US. In particular, they seem highly competitive among low-income, ie, the commercially least attractive, customers when compared with fixed line services. For example, in the US, lower income customers constitute more than half of mobile only households (Nielsen, 2008b).

All this is not consistent with mobile subscriptions in the US being overpriced or failing to adequately internalise the subscriber externality.

Further, while there is no doubt a benefit associated with the option to make and receive calls, even if no calls actually transpire, this is probably small compared with the benefits of usage. As noted, usage is relatively high in the US. Thus, to the extent that lower subscription levels in the US imply lower consumer benefits there, the benefits of high usage volumes offset this.

In addition, to some extent inefficient pricing drives inefficiently high penetration rates and thus these are contra-indicators of consumer well being. For example, where calling charges between different networks are exorbitant, then it may pay to have a second phone. However, with more efficient prices, as would likely emerge under BAK, the subscriber could both avoid the cost of a second handset and have the convenience of using one phone for all her or his calls. As a result, phones purchased to avoid inefficiently high calling charges indicate a **negative** rather than positive benefit of the system.

In summary, theory provides no grounds for thinking that MTRs should be significantly positive in New Zealand. More importantly, practice suggests that the efficiency costs of setting very low or zero MTRs are, at worst, minimal, and in fact may be positive relative to a situation with high MTRs.

15 This could be as many as 25% of households with telephones. In the US, 17.5% of households with telephones rely on a mobile only (Dixon, 2008). In addition, 10% of households with telephones switched back to a fixed line after trying to use a mobile phone only, suggesting as much as 27% of all households with telephones are prepared to switch providers including to mobile carriers (Neilson, 2008b). However, the main reason taking back a fixed line is to obtain a service that the mobile line cannot provide.

16 In terms of (1) its late auctioning of spectrum for 2G services, (2) the choice of spectrum inconsistent with existing 2G markets elsewhere, (3) auctioning spectrum in highly disaggregated geographical units which delayed the marketing of national services, and (4) an unwillingness to specify mobile standards that were developed outside of the US (Garrard, 1998, Chapter 9).



4.3. BAK IS RELATIVELY COMPETITIVELY NEUTRAL IN NEW ZEALAND

The application of BAK in the present case is also relatively competitively neutral. BAK is consistent with New Zealand precedent, and widely used. For example, the Commerce Commission (2006, paragraph 6) has mandated BAK for certain calls:

Local voice calls between the Parties shall be exchanged at a price of zero in accordance with the pure bill and keep pricing method. This pricing method should enhance the efficiency and promote competition for the long-term benefit of end users.

Similarly, BAK has been used in other instances, such as for MTM calls and MMS traffic between Vodafone and Telecom, and between Vodafone and another fixed carrier (Commerce Commission, 2006, paragraphs 83-84).

5. CONCLUSION

There are substantial costs of attempting to identify, set and maintain theoretically optimal MTRs. These costs are particularly high in a small market like that for mobile telecommunications in New Zealand. Further, identifying MTRs by international benchmarking, given the wide variation in approaches, prices and the use of glide paths, is essentially a meaningless exercise. At the same time, the costs of BAK are minimal, both in terms of direct and indirect costs, including efficiency losses, and BAK is pro-competitive (Concept Economics, 2008). Consequently, BAK, as compared with seeking to identify and set an "optimal" MTR, will promote competition for the long-term benefit of end-users.

6. BIBLIOGRAPHY

ACCC (2007a) Discussion Paper on the WIK Mobile Network and Cost Model to inform the MTAS Pricing Principles Determination: 1 July 2007 to 30 June 2009, February 2007

ACCC (2007b) MTAS Pricing Principles Determination: 1 July 2007 to 31 December 2008, November 2007

Agcom (2008) Mercato della terminazione di chiamate vocali su singole reti mobili (mercato n. 7 fra quelli identificati dalla raccomandazione della Commissione europea n. 2007/879/CE), Delibera n. 667/08/CONS, http://www.agcom.it/provv/d_667_08_CONS/d_667_08_CONS.htm

BELTUG (2008) Mobile Termination Rates – helping or hindering convergence?, 18 February 2008, http://www.beltug.be/news/936/Mobile_Termination_Rates_helping_or_hindering_convergence/

Berger, U. (2005) “Bill and Keep vs. Cost-Based Access Pricing Revisited” *Economic Letters* 86(1) 107-112

Bluhm, P. (2008) Fundamentals of Telecommunications Regulation: Markets, Jurisdiction and Challenges, National Regulatory Research Institute, 08-05 (7 May 2008)

Cambini, C. and T. Valletti “Network Competition with price discrimination: 'bill and keep' is not so bad after all” *Economic Letters* 81(2): 205-213

CTIA (2008) Re: Written Ex Parte Communication In re: Annual Report and Analysis of Competitive Market Conditions With Respect to Commercial Mobile Service, WT Docket No. 07-71; In re: CTIA Petition for Expedited Declaratory Ruling on Early Termination Fees, WT Docket No. 05-1948 January 2008, http://files.ctia.org/pdf/080108_US-OECD_10_Comparison_Ex_Parte.pdf

Commerce Commission (2006) Final Determination on the application for determination for 'Interconnection with Telecom's fixed PSTN', 28 September 2006

Commerce Commission (2008) Data <http://www.comcom.govt.nz/IndustryRegulation/Telecommunications/MonitoringandReporting/ContentFiles/Documents/Public%20version%20of%20results%20of%20Telecommunications%20Industry%20Questionnaire%20for%202005-06%20and%202006-070.XLS>

Concept Economics (2008) Assessing the Effects of M2M Termination Regulation on Mobile Entry and Economic Efficiency

Crew, M. A., C. S. Fernando, *et al.* (1995) “The Theory of Peak Load Pricing: A Survey” *Journal of Regulatory Economics*, 8: 215-248

CRTC (2004) Telecom Decision CRTC 2004-46: Trunking arrangements for the interchange of traffic and the point of interconnection between local exchange carriers, 14 July 2004

DeGraba, P. (2003) "Efficient Intercarrier Compensation for Competing Networks When Customers Share the Value of a Call" *Journal of Economics and Management Strategy* 12(2): 207-230

Dixon, K. (2008) U.S. cell-only households keep climbing, Reuters,
<http://www.reuters.com/article/technologyNews/idUSTRE4BG5GH20081217>

EC (2007) Commission welcomes political agreement to cap mobile roaming charges in Europe as from summer, IP/07/696, 23 May 2007,
<http://europa.eu/rapid/pressReleasesAction.do?reference=IP/07/696>

EC (2008a) Explanatory Note for the Draft Recommendation on the regulatory treatment of fixed and mobile termination rates, 26 June 2008,
http://ec.europa.eu/information_society/policy/ecommm/library/public_consult/termination_rates/index_en.htm

EC (2008b) Lower charges, greater consistency, more competition: Commission consults on bringing down mobile phone tariffs in Europe, IP/08/1016, 26 June 2008,
<http://europa.eu/rapid/pressReleasesAction.do?reference=IP/08/1016&format=HTML&aged=0&language=EN&guiLanguage=en>

EC (2008c) Telecoms: Commissioner Reding welcomes commitment of Italy's telecoms regulator AGCOM to further reduce mobile termination rates as an "important step in the right direction", MEMO/08/708, 13 November 2008,
<http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/08/708&format=HTML&aged=0&language=EN&guiLanguage=en>

EC (2008d) Telecoms: Commission welcomes French regulator's move to introduce competitive mobile termination tariffs, IP/08/1810, 27 November 2008,
<http://europa.eu/rapid/pressReleasesAction.do?reference=IP/08/1810&format=HTML&aged=0&language=EN&guiLanguage=en>

EC (2008e) Termination rates: Questions and Answers, MEMO/08/438, 26 June 2008,
<http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/08/438>

EC (2008f) The 13th Progress Report on the Single European Telecoms Market 2007: Frequently Asked Questions, MEMO/08/167, 19 March 2008,
<http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/08/167&format=HTML&aged=1&language=EN&guiLanguage=en>

ERG (2008) ERG's Common Position on symmetry of fixed call termination rates and symmetry of mobile call termination rates, ERG (07) 83 final 080312, 12 March 2008

FCC (1996) In the Matter of Implementation of the Local Competition Provisions in the Telecommunications Act of 1996 Interconnection between Local Exchange Carriers and Commercial Mobile Radio Service Providers (CC Docket No. 96-98, CC Docket No. 95-185), First Report and Order, 8 August 1996 (Local Competition First Report and Order)

FCC (2000) In the Matter of Access Charge Reform Price Cap Performance Review for Local Exchange Carriers Low-Volume Long-Distance Users Federal-State Joint Board On Universal Service (CC Docket No. 96-262, CC Docket No. 94-1, CC Docket No. 99-249, CC Docket No. 96-45), Sixth report and order in CC Docket No.s 96-262 and 94-1, report and

order in CC Docket No.99-249, Eleventh report and order in CC Docket No. 96-45, Washington, D.C., Federal Communications Commission, 31 May 2000 (CALLS report and order)

FCC (2001a) Developing a Unified Inter-carrier Compensation Regime (CC Docket No. 01-92), Notice Of Proposed Rulemaking, 27 April 2001

FCC (2001b) In the Matter of Implementation of the Local Competition Provisions in the Telecommunications Act of 1996 Inter-carrier Compensation for ISP-Bound Traffic (CC Docket No. 96-98, CC Docket No. 99-68), Order On Remand And Report And Order, 18 April 2001 (ISP Remand Order)

FCC (2005) In the Matter of Developing a Unified Inter-carrier Compensation Regime (CC Docket No. 01-92), Further Notice of Proposed Rulemaking, 3 March 2005

FCC (2008a) In the Matter of High-Cost Universal Service Support, Federal-State Joint Board on Universal Service, Lifeline and Link Up, Universal Service Contribution Methodology, Numbering Resource Optimization, Implementation of the Local Competition Provisions in the Telecommunications Act of 1996, Developing a Unified Inter-carrier Compensation Regime, Inter-carrier Compensation for ISP-Bound Traffic, IP-Enabled Services (WC Docket No. 05-337, CC Docket No. 96-45, WC Docket No. 03-109, WC Docket No. 06-122, CC Docket No. 99-200, CC Docket No. 96-98, CC Docket No. 01-92, CC Docket No. 99-68, WC Docket No. 04-36) FCC 08-262, 5 November 2008

FCC (2008b) Telephone subscribership in the United States, August

Frontier (2008) Assessing the impact of lowering mobile termination rates, A report prepared for Deutsche Telekom, Orange, Telecom Italia, Telefonica, and Vodafone, July, 2008

Garrard, G. (1998) *Cellular Communications: Worldwide Market Development*, Boston, MA, Artech House

Harbord, D. and M. Pagnozzi (2008) "On-Net/Off-Net Price Discrimination and 'Bill-and-Keep' vs. 'Cost-Based' Regulation of Mobile Termination Rates", http://www.market-analysis.co.uk/PDF/Topical/harbord_pagnozzi_b&k_22jan2008.pdf

Hoernig, S. (2007) "On-Net and Off-Net Pricing on Asymmetric Telecommunications Networks" *Information Economics and Policy* 19(2): 171-188.

Holt, Charles A. (2007) *Markets, Games and Strategic Behaviour*, Pearson Addison Wesley, Boston

IDA (2008) Decision and Explanatory Memorandum for the Proposed Regulatory Framework for Telephony Services Over Wireless Broadband Access Networks and Interconnection Framework for Telephony Services, 8 May 2008

Littlechild, S. C. (2006) "Mobile Termination Charges: Calling Party Pays versus Receiving Party Pays" *Telecommunications Policy* 30(5-6): 242-277

Kennet, M. D. and E. K. Ralph (2007) "Efficient Interconnection Charges and Capacity-Based Pricing" *Journal of International Economics and Economic Policy* 4(2): 135-158



Nielsen (2008a) Critical Mass, July,

<http://www.nielsenmobile.com/documents/CriticalMass.pdf>

Nielsen (2008b) News release: Twenty-million U.S. telephone households are wireless-only, Nielsen reports, 17 September 2008,

http://www.nielsen.com/media/2008/pr_080917_download.pdf

Nuechterlein, J. E. and P. J. Weiser (2007) *Digital Crossroads: American Telecommunications Policy in the Internet Age*, Cambridge, MA, MIT Press

Telecompaper (2008) "Agcom confirms mobile termination rate cuts" 27 November 2008,

<http://www.telecompaper.com/news/article.aspx?cid=647637>

Tullock, G. (1967) "The Welfare Costs of Tariffs, Monopolies and Theft" *Western Economic Journal* 5: 224-232

Vodafone (2008) *Submission re: Mobile to Mobile Termination*, 29 May 2008