

Mobile Termination Charges: Calling Party Pays *vs* Receiving Party Pays

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Abstract

In many countries there is widespread concern at the level of mobile termination charges. This is attributable to the bottleneck monopoly created by the Calling Party Pays (CPP) principle. It has led to increasingly severe price controls on termination charges. Regulatory experience in the three foremost such countries (UK, Australia and New Zealand) suggests that price controls are of limited effectiveness in aligning termination charges with costs, that net welfare gains from controls are small and that costs of setting controls are high.

The Receiving Party Pays (RPP) principle, which applies in North America and several Asian countries, avoids the bottleneck monopoly problem. After allowing for various economic and technical, average revenue (price) per call is significantly lower with RPP, average minutes of usage per subscriber are significantly higher, and mobile penetration rate is not significantly different. Handset subsidies seem to be lower in the US (with RPP) than in the UK (with CPP). Surprisingly, CPP regulators have either ignored RPP or rejected it for various alleged disadvantages. These do not withstand investigation. However, in CPP countries there is still concern about the idea of paying to receive calls.

There is a way to get the benefits associated with RPP without this disadvantage. RPP is based on a 'bill and keep' regime. Some mobile operators in RPP countries are now offering customers the option of calling plans with free incoming calls. Changing to a 'bill and keep' regime would avoid the bottleneck monopoly and associated distortions of conventional CPP regimes, yet enable operators and customers themselves to choose how to pay for calls - in effect, to choose between CPP and RPP.

JEL classification: L51, L96

Key words: mobile termination charges, calling party pays, receiving party pays, mobile party pays, bill and keep

Abbreviated running title: Mobile Termination Charges

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Introduction

Mobile telecommunications appears to be a successful and competitive high-growth sector of the modern economy. Yet mobile termination charges – the charges that mobile operators levy on each other and on fixed network operators for terminating calls on their networks - have become a concern in most countries throughout the world. These charges are perceived to be too high and to inhibit the growth of telecommunications services generally. Companies and government authorities in the US, where mobile networks are not characterised by high mobile termination rates, have complained about European rates. The FCC has acknowledged this concern and begun to investigate.¹

Regulatory focus on mobile telephony has shifted from stimulating growth and competition to scrutinising and limiting termination charges.² The UK began to apply price controls in 1998.³ The European Commission set up a regulatory framework in 2001 and required National Regulatory Authorities (NRAs) to review the relevant markets.⁴ At least 14 of these authorities have now committed to price control or at least cost orientation.⁵ The remainder are expected to follow suit. Formal or informal regulatory pressures have been applied to mobile termination rates in many other countries including Japan,⁶ Australia⁷ and New Zealand.⁸ These controls and pressures are generally severe – reductions in termination charges in the range 35 to 50 per cent over two to four years are not unusual; UK reductions amount to about 65 per cent over seven years.

¹ *Annual Report and Analysis of Competitive Market Conditions With Respect to Commercial Mobile Services, 8th Report*, WT Docket No 02-379, FCC 03-150, 14 July 2003 (henceforth FCC 8th *Mobile Report*), para 203, p. 89 and fn 654, p. 91. The FCC subsequently issued a Notice of Inquiry to develop a record on The Effect of Foreign Mobile Termination Rates on US Customers, FCC Press release 11 March 2004, Notice of Inquiry FCC 04-247 Docket 04-398, 26 October 2004. See also *TeleGeography 2004*, p. 52; Crandall and Sidak 2004 pp. 19-22.

² E.g. *TeleGeography 2004*, pp. 48, 51; Feldmann 2003.

³ *Cellnet and Vodafone*, Monopolies and Mergers Commission, Report to the Director General of Telecommunications, December 1998 (henceforth MMC 1998).

⁴ European Communities *Framework Directive* (2002/21/EC) of 7 March 2002; *Relevant Markets Recommendation* (2003/311/EC) of 11 February 2003 and *Explanatory Memorandum* thereto. The European regulators have agreed to take this forward: *Principles of implementation and best practice on the application of remedies in the mobile voice call termination market*, Independent Regulators Group, 20 November 2003.

⁵ Valletti and Houpis 2005, Table 1 p. 240.

⁶ Crandall and Sidak, 2004, pp. 8-15.

⁷ *Mobile Services Review, Mobile Termination Access Service, Final Decision*, Australian Competition and Consumer Commission, June 2004 (henceforth ACCC 2004).

⁸ *Telecommunications Act 2003: Schedule 3 Investigation into regulation of mobile termination*, Draft report 18 October 2004, New Zealand Commerce Commission (henceforth NZCC 2004), Final report 9 June 2005 (henceforth NZCC 2005).

Why is widespread and severe regulation needed in what otherwise seems to be a flourishing and competitive industry? It is increasingly recognised that the high termination charges reflect monopoly power created by the Calling Party Pays (CPP) principle, which is used throughout Europe and most other countries. Armstrong (1997, 1998, 2002) showed that the ‘bottleneck monopoly’ created by CPP, coupled with regulation of fixed networks, provided the ability and incentive to increase termination (or access) charges.

The main alternative to CPP is the Receiving Party Pays (RPP) principle.⁹ Here the receiving party pays part (but not all) of the cost of a call. This principle is used in North America and several Asian countries. It is typically (although there are exceptions) adopted by operators in a ‘bill and keep’ regime, whereby each mobile network operator bills its own customers and keeps the revenues to cover the costs of terminating as well as originating calls in its own network. Doyle and Smith (1998) showed that RPP would remove the incentive to increase termination charges, thereby harnessing competition rather than regulation to achieve cost-related charges.

Economists have extended these analyses in recent years.¹⁰ There are good surveys of the growing theoretical literature.¹¹ Most theoretical models imply that RPP would lead to lower termination charges or be more efficient than CPP.¹² Increasingly, too, economists and others who have compared RPP with CPP in practice have favoured RPP and/or a ‘bill and keep’ regime.¹³ Other possible remedies to the call termination problem are not without merit, but do not seem adequate to solve the problem alone.¹⁴

Regulatory bodies (for the purpose of this paper including competition authorities) are coming to accept that CPP is an important cause of the present problem. However, despite the theoretical and empirical evidence in favour of RPP, regulators have either dismissed it rather cursorily (in the case of the UK) or ignored it entirely.

The purpose of this paper is to assess the problem of mobile termination charges and to consider the best way forward – and in particular to do so from a regulatory rather than a theoretical perspective. Part One examines what regulatory authorities have

⁹ In the US the terms Mobile Party Pays (MPP) and Wireless Party Pays (WPP) are often used instead of Receiving Party Pays (RPP).

¹⁰ E.g. Laffont et al 1998a,b, Laffont and Tirole 1998. Some models assume that receiving parties as well as calling parties derive benefits from calls, and examine other positive externalities, e.g. Kim and Lim 2000, Jeon et al 2004, Wright 2002, DeGraba 2003, Berger 2004, 2005, Valletti and Houpis 2005. (Less attention seems to have been paid to potential negative externalities associated with the use of mobile telephones.) It has been suggested that size of network and consumer ignorance may be important e.g. Gans and King 2000, Dewenter and Haucap 2005.

¹¹ E.g. de Bijl et al 2004 ch. 5, Gans et al 2005, Thompson et al 2005.

¹² Some do not, but it is not clear how realistic are the assumptions that lead to different answers. For example, Gans and King (2001) argue that operators will want to set interconnection charges below cost to soften competition, so that RPP could be a means of achieving higher profit. This would be a more convincing argument if mobile operators chose RPP when they had a choice: in practice they have generally argued for CPP. For another example, see the reply by DeGraba (2002) to Wright (2002b).

¹³ E.g. Valletti 2003, Crandall and Sidak 2004, de Bijl 2004, Marcus 2004, Valetti and Houpis 2005, Dewenter and Kruse 2005. DeGraba (2000) and Atkinson and Barnekov (2000, 2004) make the case for ‘bill and keep’, though Gabel (2005) opposes it.

¹⁴ Valletti (2003) and de Bijl (2004) include useful surveys of alternative remedies, including multiple SIM cards, arbitrage using gateways, price transparency and carrier identification, voice mail, call termination by-pass, etc. Non-discrimination and ‘bill and keep’ are discussed further below.

found, said and done in their investigations of termination charges under CPP regimes, and summarises their calculations of the benefits and costs of their price controls. Part Two examines how RPP regimes operate in practice, including the role of ‘bill and keep’, compares their performance with that of CPP regimes, and summarises and assesses the concerns about RPP expressed by (UK) regulators and market participants. Part Three summarises the above findings, considers the options for future policy, notes that some operators in RPP countries have now begun to offer CPP options, and suggests that the adoption of ‘bill and keep’ would be the most sensible way forward.

PART ONE: THE CALLING PARTY PAYS PRINCIPLE

1.1 Explaining high call termination charges with CPP

At first sight, mobile termination charges present a paradox. High prices may suggest monopoly or collusion. Yet the mobile sector in most countries has been characterised by outstanding performance over the last few years. This includes rapid growth in number of mobile phones and subscriber penetration.¹⁵ There have also been price reductions and quality improvements, new entry and significant innovation, all of which are normally associated with competition.

It might be thought that the reason is that the mobile market is not yet fully competitive.¹⁶ However, a critical role is played by the “calling party pays” principle. Each network operator has a ‘bottleneck monopoly’ of the termination of calls made to subscribers on its own network. It can name its own price and the calling network operator – and in turn the calling party – have to pay to make the call. This is true regardless of the number of competing mobile operators and the competitiveness of that market.

However, if only mobile operators were involved, and (as is generally the case) the subscribers of any two mobile networks made roughly the same number of calls to each other, it is not clear that the mobile operators would find it worthwhile to charge each other for termination. Doing so would at best simply circulate revenues between them to no good effect, and would be costly in terms of administration and collection. At worst, increasing call prices to subscribers of other networks could reduce the use and profitability of the mobile networks as a whole. It would be more sensible for mobile operators not to charge each other, and instead to operate on a ‘bill and keep’ basis. A further key element is therefore needed in order to explain high termination charges.

¹⁵ “In the European Union, the number of mobile subscribers increased from 69 million in 1998 to 306 million in 2003, and the average penetration rate increased from 18% in 1998 to 81% in 2003.” De Bijl et al 2004, p. 1, citing European Commission, *Ninth report on the implementation of the Telecommunications Regulatory Package*, COM(2003) 715 final.

¹⁶ Regulators have typically argued, as Oftel in the UK has done, that while competition in the mobile sector is developing, the market is not yet fully or effectively competitive, only ‘prospectively competitive’. E.g. *Effective Competition Review: Mobile*, Oftel, February 2001 para S.5. See also FCC *8th Mobile Report* para 203, p. 89. Laffont et al (1998a,b) discuss the possibility of imperfections in competition, although they explain that their results are sensitive to the possibility of price differentiation.

In practice, the telecommunications market comprises fixed network operators (FNOs) as well as mobile network operators (MNOs). In most countries the majority of the calls for which termination charges are levied have hitherto come from fixed operators rather than from other mobile operators¹⁷. In most countries, too, the termination charges levied by the fixed operators are regulated at a relatively low level. If the mobile operators are able to set their termination charges above those of the fixed operators, there is a net flow of revenue from the fixed networks and their customers to the mobile networks and their customers. Typically this additional revenue will more than compensate mobile operators for any loss of business from higher mobile charges.

Thus, with CPP and regulated termination charges for the fixed networks, mobile operators have both the ability and the incentive to set high termination charges for the mobile networks. This may have been an inadvertent consequence of regulation, though some suggest it may reflect a deliberate public policy.¹⁸ In any event, there is now concern about the level of these charges.

1.2 The ‘waterbed effect’

Mobile operators are not necessarily able to keep all the increased revenues from higher termination charges, especially if the mobile sector is competitive. Each additional subscriber to a mobile network is likely to be called by subscribers on other mobile and fixed networks, so will bring to the network a flow of termination charge revenues. The higher are the termination charges and associated revenues, the more each mobile operator will use a variety of means, including discounts and subsidies, to secure more subscribers.¹⁹ This tends to increase the mobile penetration rate.²⁰

In the limit, mobile operators would find it worthwhile to spend up to the expected value of the net revenue from termination charges in order to attract new subscribers. The more competitive the market, the more likely this is to happen.²¹ Conversely, the less competitive the retail market, the more likely it is that the surpluses would remain with the mobile operators.

¹⁷ E.g. “Calls to mobiles from FNOs accounted for a much larger proportion (70 per cent) of termination minutes than off-net calls (about 30 per cent) in 2001/02 (mobile-to-mobile, or on-net calls, do not attract termination charges), and provided nearly all the MNOs’ net revenue from call termination charges in that year.” *Vodafone, O2, Orange and T-Mobile, [UK] Competition Commission report presented to Oftel, December 2002, published 2003 (henceforth UKCC 2003), vol.1, p. 3.*

¹⁸ “In effect, high termination rates on fixed-to-mobile calls have served to promote the development of the mobile telephone industry in Europe by directing subsidies from established fixed-line services to mobile services.” FCC, *8th Mobile Report* para 210, p. 91.

¹⁹ “There is vigorous competition among the Mobile Network Operators (MNOs) to attract and sign up subscribers to their networks, for example through the payment of incentives and discounts to retailers, and handset subsidies to customers, but this is funded by excess returns from termination charges.” UKCC 2003 vol.1, p. 4.

²⁰ Although Hausman (2004) points out that, even in a fully competitive market without CPP (such as the US), it may be economic for operators to offer discounted subscription prices and handset subsidies in order to attract more subscribers into the system.

²¹ “Vodafone said there was nothing ‘discretionary’ about its marketing expenditure: it was a sign of how effective competition was that each MNO was forced to incur ever greater costs to win and retain subscribers, up to the point at which any excess profits were competed away.” UKCC (2003 p. 50)

This leads to what has become known as ‘the waterbed effect’. If high termination charges give mobile operators an incentive to offer discounts and subsidies to their subscribers, then regulation to reduce termination charges will reduce this incentive. A reduction in termination charges and call prices could therefore lead to an increase in subscription charges and the prices of handsets. This in turn could reduce the mobile penetration rate. Thus, in order to assess the full impact of regulating termination charges, it is necessary to assess the extent of the waterbed effect, which in turn necessitates assessing the extent of competition in the mobile sector.

An implication of this analysis is that increasing competition in the mobile sector, even new entry associated with the potential development of third generation technology, will not by itself solve the problem of high termination charges. As long as the level of termination charges of the fixed network is regulated, more competition in the mobile sector will not lead to lower termination charges, even though it may lead to more of the proceeds flowing back to subscribers via greater subsidies on handsets and discounts on subscription charges. In other words, if price controls are considered necessary to combat high mobile termination charges in a CPP regime, they are a permanent rather than a transitional phenomenon. And they apply to small as well as large competitors.

1.3 Regulatory investigations of termination charges

How have regulatory authorities, including competition authorities, analysed the problem of high mobile termination charges in CPP markets? To what extent have they recognised and quantified the concepts mentioned in the previous section? The following discussion focuses mainly on experience in the UK, Australia and New Zealand, where thinking and practice on this issue are the most advanced and well documented.

Despite differences in statutory duties and processes, regulatory and competition authorities have approached this issue in similar ways. They have interpreted their statutory objectives relatively broadly, so that in practice all authorities have looked at income or wealth transfers, economic efficiency and the allocation of resources, and effects on competition and innovation. They have typically begun by asking whether there is adequate competition in the mobile market. They invariably find inadequate competition. They have then tried to estimate what termination charges would be in a fully competitive market, considered the pros and cons of imposing such charges by regulation, and proceeded to implement the results of their deliberations.

No doubt assisted by the emerging economic literature, and the arguments of operators, these regulators and competition authorities have gradually come to recognise the role of CPP in their discussions of competition. This has taken about five years. In the UK, Oftel and the Monopolies and Mergers Commission (henceforth MMC) hardly mentioned it in 1998.²² However, by 2000 the OECD identified it clearly²³, Oftel discussed it in 2001²⁴, and the UK Competition Commission

²² One party identified CPP as a factor causing high charges (MMC 1998, para 9.207).

²³ *Cellular mobile pricing structures and trends*, OECD 19 May 2000 (henceforth OECD 2000).

²⁴ *Review of the Price Control on Calls to Mobiles: A Consultative Document*, Oftel February 2001, ch. 3.

(henceforth UKCC, successor to the MMC) acknowledged it in 2002.²⁵ The European Commission also mentioned it in 2002.²⁶ Authorities in other countries were noting it by 2004.²⁷

Interestingly, as discussed in Part Two, only UK authorities have explored the possibility of solving the termination charge problem by changing from CPP to RPP. Other authorities have either been unaware of RPP or have chosen to ignore it, and have opted for price controls.

1.4 CPP termination charges in relation to cost

Economic analysis predicts that, with regulated fixed networks, CPP will lead to termination charges above cost. Regulatory authorities and others have found this. The reductions in charges proposed by the regulators are presumably a minimum indication of the extent to which these charges exceeded cost.

The UK led the way in reducing termination charges. In 1998 the MMC estimated that charges were 22 per cent above the 1998/9 benchmark and 30 per cent above the 1999/2000 benchmark.²⁸ It recommended charge reductions of 21 per cent followed by RPI-9 for two years. (The latter term means a reduction of 9 per cent a year in real terms, relative to the Retail Price Index RPI, which measures the rate of inflation.) Despite these reductions being implemented, the UKCC found in 2002 that the charges were still 30 to 40 per cent above its estimation of “the fair charge”.²⁹ It recommended further real reductions of 15 per cent a year for four years.

In November 2001 the French telecommunications regulator required a reduction in termination charges of 40 per cent by January 2004.³⁰ In December 2003 the mobile operators in the Netherlands volunteered reductions in access tariffs amounting to 50 per cent over two years rather than face action from the competition authority.³¹ By June 2004 ComReg noted that Irish termination rates had reduced by nearly 30 per cent from January 1999 to October 2003 with regulatory pressure the dominant explanatory factor, and was consulting on remedies for still-excessive termination rates.³² In June 2004 too the ACCC found that Australian termination charges were at

²⁵ UKCC 2003 para 2.46 vol.1, p. 22 and elsewhere.

²⁶ European Commission, *Guidelines on market analysis and the assessment of significant market power under the Community regulatory framework for electronic communications networks and services* (2002/C 165/03) (the SMP guidelines) para 69; European Commission, *Explanatory Memorandum*, p. 33; European Commission, Directorate-General for Competition, *Regulatory framework for electronic communications in the European Union: situation in September 2003*, pp. 101 and 169, respectively). A possibly disconcerting consequence of recognizing the significance of CPP is that all mobile networks, however small, have Significant Market Power (SMP).

²⁷ E.g. ACCC 2004 p. vi; NZCC 2004 paras 84 and 107; *Response to Consultation and Notification to European Commission – Wholesale voice termination on individual mobile networks*, Commission for Communications Regulation, Ireland, 04/62a, 8 June 2004 (henceforth Comreg 2004), para 1.4.

²⁸ MMC 1998, para 1.11 p. 4.

²⁹ UKCC 2003 para 2.448, vol.1, p. 102.

³⁰ ‘Decrease of the Price of Fixed-to-mobile Calls’, Autorité de Regulation des Telecommunications, Press Release, 6 November 2002. Cited in ACCC 2004, p. 200. Also Bomsel et al 2003 pp. 41-2.

³¹ De Bijl et al, 2004 p. 3.

³² ComReg 2004, para 4.21 p. 39. Its subsequent draft decision 5/51 6 July 2005 and decision 5/78 13 October 2005 began to implement a price control.

least double the level of cost, and proposed a 50% reduction by January 2007.³³ In October 2004 the NZCC found that charges in New Zealand were 75 per cent higher than its estimate of cost, and proposed to regulate them.³⁴ As part of its investigation, NZCC cited a comparative study of mobile termination rates internationally, which found that in the study countries as a whole termination rates were about 70 per cent above cost and in Europe more than 100 per cent above cost.³⁵

Table 1 summarises these explicit or implied findings. The estimated markup of termination charges over cost ranges from 22 per cent to over 100 per cent, with a median of 70 per cent.

Country	Year	Markup over cost %
UK	1998	22-30
UK	2002	30-40
France	2001	66
Ireland	1999-2003	>43
Netherlands	2003	100
Australia	2004	>100
New Zealand	2004	75
International (Ovum study)	2004	70
Europe (Ovum study)	2004	>100

The regulators all devoted considerable time and space to estimating termination costs. NZCC provides a table of costs adopted by other regulators or reported in other studies. Table 2 reproduces this table, and converts the cost figures to US cents at present exchange rate. The costs reported lie in a wide range (3.5 to 10.6 US cents per minute), although the higher ones are not obviously so comparable.³⁶ The UK, Australian and NZ regulators have chosen to base their price controls on costs at the top end of this range (9.6-11.0 US cents), NZCC consciously so.

Table 2 Regulatory estimates of termination costs³⁷

Country or source	Termination cost	Termination cost
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³³ ACCC 2004. The ACCC does not set charges but is able to arbitrate charging disputes between operators, and its report is an indication to the market.

³⁴ NZCC 2004, 2005. On 9 August 2005 the Minister announced that he was requiring the NZCC to reconsider his recommendation.

³⁵ "... although the results of these models have been hotly contested, and although no two operators will have the same costs, available cost models do provide a clear picture of excessive pricing for mobile termination. ... Overall [the results] suggest that mobile termination costs around 8 euro cents per minute. This is 42% below the average wholesale price of 13.74 euro cents per minute in our study countries, and less than half the average price in Europe." Rogerson 2004, cited in NZCC 2004 p. 69.

³⁶ Atkinson and Barnekov 2004 (paras 83-4) note that Sprint's costs, which cover the top part of this range, were provided as part of an application for cost-related access charges. The authors suggest that traffic-sensitive costs do not actually vary much with usage. See later for evidence on actual US costs. (In the event, the pattern of incoming and outgoing traffic apparently made it advantageous for Sprint to accept bill and keep.)

³⁷ Source: NZCC 2005, Table 16, p. 104. Exchange rate NZ\$1 = 0.687 US\$ as at 12 November 2005. See also ACCC 2004 Table 8 and Annexure: Determination of the appropriate price target, pp. 229 – 238.

	NZ cents per minute	US cents per minute
Reported costs		
South Korea	5.10	3.5
Malaysia	6.11	4.2
Israel	8.45	5.8
New York (Sprint)	9.13	6.3
Sweden	11.16	7.7
California (Sprint)	11.72	8.1
Florida (Sprint)	15.46	10.6
Regulatory decisions		
Australia (ACCC)	13.95	9.6
NZ (NZCC)	15	10.3
UK (Ofcom)	15.95	11.0

1.5 Subsidies and the waterbed effect

Regulatory acknowledgement of discounts, subsidies and the waterbed effect has again evolved over about five years. These issues were not explicitly raised in the MMC report of 1998. In contrast, they featured heavily in the UKCC's 2003 report and in the subsequent reports of regulators in other countries. Broadly speaking, the operators argue for a high waterbed effect (implying that there would be significant disadvantages from reducing termination charges) whereas the regulators are sceptical of the extent or even existence of such an effect (implying that there is minimal downside to reducing termination charges).

Regulatory authorities in the UK and Australia have noted the existence of free or subsidised handsets, free access plans, discounted subscription charges or rentals, etc.³⁸ They have also acknowledged that there would be a waterbed effect. However, they would not expect a full 100 per cent effect if they reduced termination charges because the mobile market is not fully competitive, and in particular they would not expect a significant reduction in number of subscribers.³⁹

Initially, NZCC was not persuaded of the existence of the waterbed effect. It accepted the statements of the operators that there were no cross-subsidies in the mobile sector. It could therefore assert that regulation of termination charges would have no effect on other charges.⁴⁰ This denial of the waterbed effect was roundly criticised by

³⁸ UKCC 2003 vol.1, p. 4 (cited above); ACCC 2004 p. vii.

³⁹ Thus, the UKCC expected that "most of the reductions in revenue from termination charges being capped will be recovered from the retail market", not least by the operators delaying retail price cuts. However, it did not expect that there would be any significant reduction in the number of subscribers, even if handset subsidies were reduced or removed. UKCC 2003, vol.1, pp. 129-131. The ACCC noted that "mobile subscribers are often offered free handsets, or subsidised subscription charges", and accepted that lower termination charges could lead to some increase in subscription charges, but did not believe that this would lead to a significant (if any) reduction in mobile subscription levels (i.e. mobile penetration). ACCC 2004, pp vii, xiii. The ACCC and parties also debated other related questions such as the 'zero profit constraint' and the 'fixed line externality argument'. ACCC 2004 pp. 141 et seq.

⁴⁰ NZCC 2004 para 337, p. 62, and paras 11,12, p. 3.

operators and their consultants as inconsistent with economic analysis and emerging empirical evidence.⁴¹ NZCC reconsidered its position at considerable length.⁴²

Thus, regulators are not convinced that excess profits in the termination market would be fully competed away at the retail level.⁴³ Their findings of a limited or even zero waterbed effect have enabled them to take a more robust line on regulating termination charges than they otherwise might have done. (Or, more cynically, in order to justify regulating termination charges they have needed a sceptical line on the waterbed effect.)

1.6 Potential adverse consequences of high termination charges

The long-standing popular concern about monopoly is that prices are ‘too high’: producers thereby extract wealth or income from consumers. One argument for price control is to redress the balance by stopping or reducing this transfer. Because of the waterbed effect, regulatory authorities have been additionally concerned that high termination charges involve subsidies and cross-subsidies, effectively transferring wealth from some consumers to other consumers⁴⁴, and from some producers to other producers⁴⁵. So another aim is to reduce such inappropriate transfers.

Regulators have also been concerned about the misallocation of resources resulting from excessive or distorted prices. This is because misallocation represents a ‘real’ or net loss to society, not just to a transfer between members of society.⁴⁶ The UKCC said that, as a result of the high termination charges, too few fixed-to-mobile calls are made, which increased cost.⁴⁷ The ACCC concurred⁴⁸, and commented that the price

⁴¹ E.g. Hausman 2004 pointed out that there would be a waterbed effect even if the market were not fully competitive. He said (fn 17) that the previous UK growth of penetration of 2.5% a year had stopped, and calculated that, after the regulated reduction in July 2003, UK mobile average revenue per minute increased by about 6.4% from Q1 2003 to Q2 2004 while a US wireless telephone services price index decreased by about 2% over the same period. There is evidently scope for continuing analysis here: later UK data suggest a continuing growth in mobile connections and penetration since 2000. Ofcom, *The Communications Market 2005*, Figs 3.12, 3.33, 3.42. There appear to be increasing subscription charges but falling call prices and falling total UK revenue per minute since 2000 (Fig 3.37).

⁴² NZCC 2005 pp. 107-133.

⁴³ See also ComReg 2004, para 4.67 p. 49.

⁴⁴ “Some callers to mobiles from fixed-line telephones or from payphones do not themselves own a mobile phone, and so subsidize mobile customers through high call termination charges, with almost no reciprocal benefit. Moreover, to the extent that callers with both fixed and mobile phones use their fixed lines to call mobiles more than they use their mobile phone, they suffer a detriment due to the high termination charges of the MNOs.” UKCC 2003 vol.1, p. 4.

⁴⁵ “The main effect and purpose of our remedy is to remove an unjustified subsidy currently paid by Fixed Network Operators (FNOs) or their customers to the benefit of the MNOs or their customers.” UKCC 2003 para 2.577, vol.1, p. 133.

⁴⁶ Some regulators indeed make two sets of calculations, one of gains to customers including transfers and the other of net gains to consumers plus producers. E.g. NZCC 2005 Table 21, p. 133.

⁴⁷ “The high prices of fixed-to-mobile, and low prices of on-net, calls also tend to skew usage from the lower-cost (that is, fixed) technology to the higher-cost (that is mobile) technology.” UKCC 2003 vol.1, p. 4.

⁴⁸ The pricing structure was “likely to generate direct efficiency losses in the markets within which Fixed-To-Mobile and retail mobile services are provided. ... This is likely to be in the form of less than efficient consumption of retail FTM services ... and greater than efficient consumption of retail mobile subscription services, and a consequent efficiency loss in the market for retail mobile services.” ACCC 2004, p. xv. The comment on investment is at p. xvi.

distortion was likely to distort investment decisions as well as consumption decisions, causing under-investment in the infrastructure needed to terminate calls and over-investment in the development of new handsets.

The 'excessive' or 'misallocated' resources are not entirely wasted: they produce goods and services that customers value.⁴⁹ And higher customer acquisition costs are not an unambiguous disadvantage.⁵⁰ However, the economic assumption is that customers do not value the basket of goods and services resulting from the resource misallocation as highly as the basket of goods and services that would otherwise be produced.

Regulators have looked at the impact on competition. The UKCC said that excessive termination charges encouraged or facilitated significant distortions in competition.⁵¹ The ACCC identified four main ways in which the ability of vertically integrated carriers to increase termination charges above cost increased the costs of fixed-to-mobile operators, thereby distorting competition.⁵²

Finally, the impact on innovation and investment in new technologies such as 3G has also received attention. The regulators have not been convinced that lower termination charges would present a problem here.⁵³

⁴⁹ The benefits are essentially the inverse of the detriments identified by UKCC. That is, as a result of higher termination charges, consumers pay less than they otherwise would for on-net mobile calls so more on-net mobile calls are made; handsets are less costly to customers than they otherwise would be; changing networks is easier and less costly, and mobile operators devote more resources to acquiring and keeping customers than they otherwise would; mobile calls are less expensive than they otherwise would be, relative to fixed calls, so that mobile networks offer more effective competition to the incumbent fixed networks than they otherwise would do.

⁵⁰ Based on what is said in UKCC 2003 (vol.1, pp. 50-54), higher termination charges and the consequent greater attractiveness of customers mean that there is more frequent upgrading of handsets, mobile operators pay greater attention to designing and offering packages including tariffs that will appeal to customers, greater attention is paid to informing customers about the alternatives available, there is greater choice including of payment arrangements, retailers have greater incentive to be more attractive to customers, and customer care costs are higher than they otherwise would be. Thus customer acquisition costs are higher because the quality of customer service is higher.

⁵¹ This included 'undervaluation of mobile phone handsets by customers' and consequent greater turnover ('churn') of customers between networks, leading to greater expenditure in mobile customer acquisition. UKCC 2003 para 1.8 (d), vol.1, p. 5. Others have remarked on the greater emphasis on texting (SMS) in the UK relative to the US. A correspondent refers to the adverse effect on entry into fixed networks as a result of the transfer (from potential fixed entrants as well as fixed incumbents) of revenues or resources from fixed to mobile.

⁵² Relating termination charges more closely to cost would therefore improve competition in these respects. Increased competition from existing providers, and possibly new entrants, could manifest itself in many ways, including reduced prices and improvements in the quality and range of product offerings made available by providers of fixed-line services. In the absence of regulation (more precisely, declaration), incumbents could refuse to interconnect with new entrants, so declaration would improve connectivity between networks. ACCC 2004 p. viii.

⁵³ The UK operators said that high termination charges were needed to finance 3G. Oftel, BT and the UKCC said that 3G should not be subsidized but should stand or fall on its own merits. UKCC 2003, paras 2.417-422, vol.1, pp. 96-7. The ACCC observed that regulation of termination charges had not discouraged innovation in new 3G services, either in the UK or Australia. The NZCC did not accept any dynamic efficiency detriment arising from the regulation of termination on existing non-3G networks, although it believed that "regulation of future 3G networks is likely to increase the risk of delay, or restrict investment in 3G networks and cause a significant dynamic efficiency detriment." NZCC 2004, paras 17-20.

1.7 Quantification of benefits of price control

In 1998 the MMC made no calculation of the benefits of introducing a price control to reduce termination charges. It mentioned only in an annex the reductions in the incoming calls revenue and cash flow of the two operators, without making any further detail publicly available.

More recently, however, regulatory authorities have sought to quantify the costs and benefits involved, or have been obliged to do so.⁵⁴ This requires a prediction of what prices and the allocation of resources would be, both with and without the proposed price control. It is then necessary to assess what the costs and values of the resulting inputs and outputs would be. This is by no means a straightforward task, and for the most part not one that regulators of other utility sectors have attempted. Nor have the telecom regulators attempted to quantify the so-called ‘dynamic’ efficiencies associated with competition and innovation, as opposed to the income transfers and the ‘static’ efficiencies associated with improved resource misallocation.

In 2003, the UKCC made some brief estimates of the impacts on MNOs and consumers, and of the implications for welfare. It estimated that, with no waterbed effect, the combined reductions in revenues of the four MNOs would be between £1.5 and £2 billion NPV over the three years of the price control.⁵⁵ It further estimated that “Regulating termination charges from current levels produces welfare gains (in net present value NPV terms) of around £700 million (with an immediate reduction in charges) and around £325 million (with a progressive reduction in charges) over the three year control period.”⁵⁶ These estimates were provided only after the UKCC had calculated and recommended a price cap, rather than as an input to that decision.

In 2004, Australian and New Zealand regulators made the calculation of efficiency benefits more central to the evaluation of price control. The ACCC discussed at great length the nature and implications of a simple model. It calculated starting quantities, prices and costs and made what it regarded as plausible assumptions relating to the elasticity of demand for Fixed to Mobile calls. It then estimated that, if the average termination charge were reduced from A38.5 cents per minute to the estimated (upper

⁵⁴ Article 8(4) of the European Framework Directive requires that remedies should be proportionate. Oftel has to meet its own Regulatory Option Appraisal (ROA) guidelines (*Regulatory option appraisal guidelines: assessing the impact of policy*, Oftel, 28 June 2002) and the Government’s Regulatory Impact Assessment (RIA) guide (*Better policy making: a guide to regulatory impact assessment*, Cabinet Office, 2003 and subsequent revision 2005). Section 7 of the Communications Act 2003 imposes obligations on Ofcom to carry out and publish an assessment of the likely impact of implementing significant proposals.

⁵⁵ UKCC 2003 para 2.562, vol.1, p. 130. This was an acknowledged over-estimate because it did not allow for increasing turnover and the waterbed effect. Indeed, there might not be much if any net reduction in revenue for the mobile operators. “We estimate that it would be possible for the MNOs to recover much, or perhaps all of, the lost revenue which arises from capping termination charges by delaying price cuts at the retail level.” UKCC 2003 para 2.563, vol.1, p. 130.

⁵⁶ In simple terms, net welfare gains from any change in arrangements are defined as the value of the increased output(s) to consumers less the cost of this to producers. This is equivalent to the increase in consumer plus producer surplus. The waterbed effect adds complexity because any reduction in number of subscribers has to be offset against any increase in number of calls. Whether the models are wholly consistent across regulatory bodies is unclear, but this is not particularly critical for the points being made here.

bound) cost of A14 cents per minute, the direct efficiency gain could be A\$282 million per annum in 2002/3.⁵⁷ From the same data it may be calculated that the transfer from mobile operators to customers would be A\$1479m.⁵⁸

Calculations were a little more complex in New Zealand and substantially revised over time. Eventually the transfer from mobile operators to consumers seems to have been in the range NZ\$120m to NZ\$142m over the five year study period, while the net efficiency gains were NZ\$37m to \$49m.⁵⁹

Table 3 summarises these calculations and expresses them on an annual basis, converts them to a common currency, then expresses them on a per capita basis. It is not surprising that net welfare gains are up to an order of magnitude less than wealth transfers.⁶⁰ More surprising, perhaps, is the rather small size of all these magnitudes, particularly on a per capita basis. For example, the (static) welfare gain per head per year is at most US\$11 in Australia and as little as US\$1.50 or so in New Zealand.

Table 3 Wealth transfers & welfare gains from termination charge price controls

	UK	Australia	New Zealand
In own currencies:			
Transfer from operators	<£1.5 bn - 2 bn	A\$ 1479m	NZ\$ 120m – 142m
Welfare gain	£325m - 700m	A\$ 282m	NZ\$ 37 – 49m
Duration of price control	3 years	1 year	5 years
Annual transfer	<£500m - 667m	A\$ 1479m	NZ\$ 24 – 28m
Annual welfare gain	£108m - 233m	A\$ 282m	NZ\$ 7 – 10m
In US currency:			
Annual transfer	<US\$950m–1267m	US\$ 1154m	US\$ 16m – 19m
Annual welfare gain	US\$ 205m - 443m	US\$ 220m	US\$ 5 - 7m
Population	60.4m	20.1m	4.0m
Annual transfer/head	<US\$ 16-21	US\$ 57	US\$ 4 – 5
Annual welfare gain/head	US\$ 3 - 7	US\$ 11	US\$ 1 - 2

Sources: UKCC (2003), CC (2004), NZCC (2005)

The mobile operators, who challenged almost all the calculations in the price control reviews, heavily disputed even the low figures on welfare gain. The regulators sometimes seemed vulnerable on their counterfactual assumptions.⁶¹ Their

⁵⁷ ACCC 2004 pp. 153-4.

⁵⁸ $P_o = 38.5$ cents, $C_o = 14$ cents, $Q_o = 6.037$ m minutes, elasticity = -0.6, $\Delta P = (P_o - C_o) = 24.5$ cents, hence $\Delta P \times Q = 24.5 \times 6.037$ m = \$1479m.

⁵⁹ NZCC (2005) revising NZCC (2004).

⁶⁰ Wealth transfer is the change in price times initial output whereas the welfare gain is proportional to the change in price times the change in output. For example, suppose P and Q are initial price and output, and a reduction ΔP in price leads to an increase ΔQ in output. Then the transfer in income from producers to consumers is $\Delta P \times Q$, whereas the increase in welfare (the 'welfare triangle') is $\frac{1}{2} \times \Delta P \times \Delta Q$. If output increases by, say, one tenth, then $\Delta Q = Q/10$, so the welfare gain is $\frac{1}{2}$ times one tenth the size of the transfer in income.

⁶¹ "[Of tel's] CBA compares Of tel's proposals with a wholly implausible unregulated scenario in which termination charges are assumed to rocket to *three times* their current levels (and substantially higher than the levels that rates were set prior to regulation in 1998). [fn: Of tel's welfare analysis assumes termination charges would rise to 24.6ppm absent regulation compared with around 8.2ppm currently (in 2000/01 prices) and around 13.42ppm in 1998.] (By comparison, during the Competition

calculations were also often sensitive to the parameters and the models used. Submissions generally argued that the regulators had failed to give adequate weight to the waterbed effect, with its implied increase in subscription charges and reduction in number of subscribers. One estimated that the welfare gain would be roughly one tenth of the level estimated by the UKCC.⁶² Another argued that the ACCC's claimed efficiency gain of A\$282m would be only A\$1m and there would be an additional loss (ignored by the ACCC) of A\$985m.⁶³ Yet another argued that regulation in New Zealand would yield a net annual loss of NZ\$10.5 to 45.2m.⁶⁴

1.8 Modelling and the costs of price control

Independent studies have begun to analyse quantitatively the interactions within telecommunications networks.⁶⁵ They have suggested that there is now no modeling difficulty in setting cost-based mobile termination charges.⁶⁶

However, setting price controls on termination charges has not been simply a matter of estimating or calculating an observable cost. Regulators have discussed and pronounced upon many other economic parameters.⁶⁷ They have had to adjudicate between competing economic theories and evidence. Some have felt it necessary to

Commission Inquiry, one of the four MNOs offered to continue to reduce its termination charges gradually over time and another indicated that it would not raise its termination charges from current levels.)” Oftel’s December 2003 Mobile Termination Proposals - T-Mobile’s response, para 9 p. 4. The reference is to Oftel *Explanatory Note*, 1 July 2003. *Wholesale mobile voice call termination consultation*, Oftel, 19 December 2003, at annex L.

⁶² Crandall and Sidak 2004, p. 4. According to the judgement in the judicial review of the UKCC decision, “Professor Mirrlees, the highly respected professor of political economy [and Nobel Laureate] ... concluded that if it [the Frontier Economics model] had been properly used the welfare gain would not have been £54.4 million a quarter but rather £4.7million per quarter. This equates to a gain of approximately £13,000 a day.” Mr Justice Moses, [2003] EWHC 1555 (Admin), 27 June 2003, para 146.

⁶³ ACCC 2004 p. xv, 154-163. The ACCC argued that these assumptions would be unreasonable and had overestimated the size of this loss, and asserted that there would likely be a net efficiency gain. However, the ACCC did not make any calculations based on more reasonable estimates of the effect on subscription rates.

⁶⁴ Hausman 2004 and NZCC 2005, Table 21.

⁶⁵ For example, Bomsel et al 2003 estimate that in the UK, Germany and France the cross-subsidy from fixed to mobile amounted in aggregate to some 19 billion euros over the five years 1998-2002, or nearly 1 bn euros (about US\$1bn) per year in the UK. None of the regulatory reviews seems to have calculated this cross-subsidy explicitly, or the extent of reduction that the price control would bring, even though this was said to be a critical factor in their judgements. The calculated cross-subsidy is of the same order of magnitude as the revenue transfer from mobile operators, assumed to go to consumers, although the study finds that not all the profits are competed away via retail competition.

⁶⁶ “UK experience has demonstrated the feasibility of carrying out equivalent cost-modelling exercises on mobile networks, leading to the setting of cost-oriented charges (see section 4 above). Similar models exist or are being developed for mobile operators in many jurisdictions, including several countries in Europe – Austria, Greece and Sweden – Australia, the Caribbean and South Korea. There is no insuperable practical modeling difficulty in setting mobile termination rates on a cost-oriented basis.” Bomsel et al 2003 p. 50.

⁶⁷ In addition to the waterbed effect, these include, for example, LRIC, TELRIC, TSLRIC and other cost concepts; own-, cross- and super-elasticities of demand; network-, option-, call-, fixed-line-, subscription- and negative-externalities; the Rohlfs-Griffin factor; Ramsey pricing (which one regulator informs us “should more properly be called the ‘Ramsey-Boiteux rule’ when used with reference to utility pricing” ACCC 2004 fn. 386 p. 145), two-sided markets and the Coase theorem.

correct other regulators on rather abstruse details.⁶⁸ Less explicitly, perhaps, they have also had to balance the interests of different types of customers, and determine financial settlements between mobile and fixed operators. As the controls become tighter, such judgements may become increasingly delicate, and political factors may increasingly assert themselves, if they have not done so already in some countries.

Attention to detail has led to lengthy reports. The NZCC output so far is over 400 pages including consultants' report (plus another 400 pages of conference proceedings), but the process is not yet complete. The ACCC's review, draft and final decisions total over 500 pages. In the UK, the MMC's 1998 report was over 400 pages. The UKCC's three volume 2003 report came in at over 1000 pages, plus Oftel's preceding and subsequent reports at about 400 and 800 pages respectively, a total of over 2000 official regulatory pages for one determination. Company and interested party submissions to regulators – typically hundreds in number - might exceed the lengths of the regulatory reports by an order of magnitude.

The costs involved can naturally be substantial. The UKCC spent about £2.5m to handle the mobile termination appeal.⁶⁹ It would be surprising if Oftel and Ofcom spent less than that on the whole process of proposing and implementing mobile price controls.⁷⁰ The parties themselves probably incurred even more substantial costs, since it is worthwhile for a company to participate actively in the consultation and modeling process if it can impact even to a small extent on the level of allowed revenues under the price control. One mobile operator has informally estimated (personal communication) that its costs of consultants for the whole UK process amounted to about £3 million and its internal costs nearly half that again. If that were true of the other three mobile operators, the aggregate costs of the four operators would be about £18m. Adding a conservative £2m for evidence from BT and other parties, plus the aforementioned £5m for the regulatory authorities, suggests that the aggregate cost of the UK price control process might have been of the order of £25m (nearly US \$50m). For every page of regulatory output, regulatory costs were about £2500 (nearly US\$5000) and other parties spent about £10,000 (nearly US\$20,000).

Such a cost represents only a fraction of the estimated wealth transfer involved in the UK price control process, but is more significant compared to the efficiency gain. If there is any substance to the criticism that the welfare gain was overestimated by as

⁶⁸ “The Commission does not agree with either the CRA [formerly Charles Rivers Associates]’s rule (equating total efficiency loss with total efficiency gain) or the Commerce [sic] Commission’s rule (equating total efficiency loss with total efficiency gain plus subsidy amount). Both are incorrect (because they equate total effects rather than marginal effects) but the Competition Commission is more incorrect because it is relating the efficiency loss to the wrong thing. In summary, the optimum subsidy and surcharge is found by equating the marginal efficiency gain (MEG) from applying the subscription subsidy with the marginal deadweight loss (MDWL) from applying the mobile termination surcharge. This must result in a subsidy of less than that from equating the total benefit from the subsidy with the total deadweight loss from the mobile termination surcharge, and less than the full amount of the marginal external effect.” ACCC 2004, p. 168.

⁶⁹ £2.371m + £0.158m for the subsequent judicial review = £2.529m, UKCC, *Annual Review and Accounts, 2002/3, 2003/4*.

⁷⁰ Oftel and Ofcom are not required to allocate their annual costs to particular workstreams but they are required to separately identify costs associated with Competition Commission references. Oftel estimated that the cost of giving evidence to the UKCC in 2002/3 would be £0.25 - £0.5m, Oftel *Annual Report 2002/3*.

much as an order of magnitude, then the total cost of setting the UK price control may even have exceeded the annual welfare gain.

PART TWO THE RECEIVING PARTY PAYS PRINCIPLE

2.1 The regulatory basis for RPP

Under CPP, the caller pays for the whole costs of each telephone call, and in particular pays a termination charge to the receiving network for the termination leg of the call. Under the “receiving party pays” principle, or RPP, the receiving network typically makes no charge on the caller, or not a significant one, for receiving and terminating calls from other networks. Instead, the receiving network charges its own subscriber for this cost, so the called party pays its own network for the termination leg of the call. RPP thus means that the cost of a call is shared between the caller and receiver.⁷¹

Why do network operators in RPP systems agree to charge a zero or low wholesale termination rate? What stops them charging and becoming CPP systems? The answer seems to be: a greater or lesser degree of regulatory constraint.

The regulatory framework for implementing RPP varies from one country to another and has evolved over time.⁷² The Appendix explains how the system evolved and operates in the US. In brief, a mixture of regulation and mutual agreement means that wholesale termination charges are in practice constrained to zero or a low level and US mobile operators effectively work on a ‘bill and keep’ basis. Network operators are thus precluded from exercising monopoly power when setting wholesale termination charges to other operators. It is up to the mobile operators themselves how they seek to recover from their own subscribers the costs of terminating calls on their own network. Operators have typically (with some recent exceptions) responded by charging for time spent receiving incoming calls at the same rate as time spent making outgoing calls - that is, by adopting RPP.⁷³

2.2 Comparison of RPP and CPP wholesale termination charges

⁷¹ Thus RPP does not mean that the receiver pays the entire cost of the call, although in either system it is possible for the receiver to make provision to do so, for example via 800 numbers.

⁷² In one version (e.g. Doyle and Smith 1998), the originating network sets an origination charge that is paid by the originator of the call, the receiving network sets the price of the call, and the receiving subscriber pays the difference between the call price and the origination charge. According to Bomsel et al (2003 p. 18), this method was adopted in some European countries but is now superseded. As another example, at one time in France the three mobile operators worked on a ‘bill and keep’ basis between themselves but were able to charge a substantial termination fee to the fixed network. This arrangement ceased in 2004 because it was inconsistent with the technological neutrality required by the new European regulatory framework, rather than because ‘bill and keep’ had been unsatisfactory.

⁷³ It has therefore been suggested that “it may be better to think of receiver pays as the outcome rather than cause of low termination charges”. Thompson et al. 2005 p. 9.

RPP applies in several countries, notably in the US and Canada (where it is known as “mobile party pays” or MPP), in Hong Kong, Singapore and China. CPP applies in most other countries including in Europe, Australia and New Zealand.⁷⁴

Table 4 shows that in 1999 the termination rates charged by one operator to another (the wholesale termination rates) were systematically high in CPP countries and low or zero in RPP countries. For example, the median rate was 20 US cents per minute in CPP Europe (including 16 cents in the UK) compared to 1 cent in RPP North America. Outside of Europe and North America, the median was nearly 8 cents in CPP countries but essentially zero in RPP countries.

Table 4 Comparison of wholesale termination rates in CPP and RPP countries⁷⁵
(US cents per minute, 1999)

CPP countries	RPP countries
13 EU countries Range 15.6 – 30.0 Mean 20.6, median 20.0	2 North American countries Range 0 – 2.0 Mean 1.0, median 1.0
9 non-EU countries Range 1.7 – 29.3 Mean 12.8, median 7.8	4 Asian countries Range 0 – 0.8 Mean 0.2, median 0.06
All 22 CPP countries: mean 10.5	All 6 RPP countries: mean 0.5

CPP termination rates have come down since 1999, but the gap is still large. In 2003 the FCC cited an average of just over 16 cents for Europe versus 0.5 cents for US.⁷⁶ In July 2004 the weighted average for the EU 25 countries was 14.7 euro cents, or nearly 19 US cents at present exchange rates. For RPP countries generally, the wholesale termination charge is now practically zero.

2.3 Predicted effects of CPP versus RPP

What differential impacts will RPP and CPP have on mobile charges, calling rates and numbers of subscribers to the mobile system?

Other things being equal, a charge for receiving calls under RPP may discourage the receipt of some calls and in some circumstances may lead subscribers to turn off their phones or not to join in the first place. This could reduce both calling rates and mobile

⁷⁴ The choice of RPP or CPP seems to have reflected arrangements previously obtaining in the fixed telephone market (rather than a conscious desire to constrain market power or pursuant to any cost-benefit analysis or welfare economic assessment). Bill and keep, and hence RPP, has generally been adopted where there were unmeasured (free) local calls, CPP where there were charges for local calls. Other features, such as the numbering system, followed from this. OECD 2000, p. 36.

⁷⁵ This is a summary of data from Samarajiva and Melody 2000 Figs 5, 6 pp. 11-13, source ITU 2000 *Regulatory Survey*. Feldmann (2003) reprints their Figure 6 as Fig 9, p. 25. See also Petrazzini 2000.

⁷⁶ FCC 8th *Mobile Report* citing Mutschler, *Nextgen VII*. C.f. also “Even though the average EU15 fixed-to-mobile termination charge has reduced from 20.54 euro cents per minute in July 2001 to 13.68 in July 2004, it remains more than 8 times higher than average fixed-to-fixed interconnection charge.” *European Electronic Communications Regulation and Markets 2004* (10th Report), COM(2004) 759 final, Annex 3 Market Overview, p. 36.

penetration. On the other hand, if there is no charge for receiving calls under CPP but a higher charge for making calls, this will presumably discourage the making of some calls and could again lead some subscribers not to join. This too could reduce both calling rates and mobile penetration. The net effect of CPP and RPP will thus depend, amongst other things, on the prices charged and on the relative levels and elasticities of demand for making and receiving calls.

There seem to be two main approaches to this issue. One emphasises consumer psychology and preferences; the other reflects the theory of ‘bottleneck monopoly’ and the waterbed effect. The two approaches are not necessarily mutually inconsistent.

The first approach suggests, in effect, that many people are keen to make mobile calls but are sceptical about the value of receiving them and are therefore reluctant to pay to receive them. On this basis, RPP is likely to restrict mobile traffic, particularly inbound calls from fixed networks, and also to discourage subscriber penetration and growth of the market. In contrast, CPP would encourage mobile traffic, particularly inbound calls, encourage more people to subscribe, and facilitate growth of the mobile sector. This approach seems to have been influential in encouraging several RPP countries to switch to CPP.

According to the second approach, CPP enables mobile operators to increase termination charges, which would have an adverse effect on the calling rate, although discounted subscriptions and subsidised handsets as a result of the waterbed effect could encourage greater subscriber penetration. In contrast, RPP means that each network’s charges to its own customers (for termination as well as its origination) are subject to competition from other operators. In choosing a network operator a potential subscriber will take into account the price of receiving as well as of making calls. The operator now has an incentive to set low termination charges in order to attract more customers. (Both parties will of course look at the whole picture, including fixed monthly charges or subscriptions, handset prices and so on, as well as origination and termination charges.) Because RPP makes termination charges subject to competition, it is predicted to avoid the excessive termination charges, cross-subsidies and misallocation of resources associated with CPP. This in turn means lower average revenues per call-minute, more call minutes per subscriber, and lower penetration in RPP systems than in CPP systems.

We now look in turn at evidence from three kinds of comparisons of international experience: time series comparisons within those countries that have changed from one system to another; cross-section comparisons of countries with different systems at any point in time; and a comparison of the rate plans of leading mobile companies operating in both RPP and CPP countries (the US and UK).

2.4 Observed effects of RPP and CPP: time series studies

At least 27 countries have changed from RPP to CPP since 1991.⁷⁷ This was argued to facilitate mobile sector growth and the evidence is said to be consistent with the

⁷⁷ Zehle 2003, Figure 1, p. 2. 21 of these countries are from Central and South America and the Caribbean; the remaining six in chronological order are Czech Republic, Mongolia, Cambodia,

predictions.⁷⁸ There is particularly tangible and quantitative evidence from Mexico.⁷⁹ A study of other countries is also in no doubt about the significant positive impact that the change has had.⁸⁰

The above evidence is primarily from developing countries. It has also been argued that RPP reduced the number of incoming calls in the US.⁸¹ A market trial by one US operator suggested that switching to CPP would lead to more inbound calls.⁸²

In all these countries, other factors as well as the change from CPP to RPP played a part in the development of the mobile sector.⁸³ The introduction of prepaid services has been particularly influential.⁸⁴ Economic development, competition and regulation are also said to be relevant.⁸⁵ In several countries mobile penetration and usage were increasing under RPP, even before CPP. Technology seems to have been critical. Table 5 shows that the countries that changed from RPP to CPP have on average about three different mobile technologies, while those that stay with RPP have about two and those with CPP have little over one.⁸⁶

Romania, Pakistan and India. Dewenter and Kruse (2005) identify 31 countries changing. Since then Merrill Lynch now classifies Russia as CPP too. Ponder and Markova (2005) discuss this case.

⁷⁸ “All evidence available to me suggests that when a change from RPP to CPP is made, inbound and outbound call volumes increase substantially. This suggests that RPP system substantially inhibits inbound call volumes and also outbound call volumes.” Stefan Zehle, personal communication, 24 October 2003. Presumably outbound traffic (to the fixed sector) increases as a result of an increase in number of mobile subscribers.

⁷⁹ After Mexico switched from RPP to CPP on 16 April 1999, “there was a significant increase in incoming mobile traffic (+ 28.7 per cent), despite the fact that the effective fixed-to-mobile tariff went up from US\$0.115 to US\$0.403 per minute (i.e. 250 per cent).” Samarajiva and Melody, 2000, Box 1, p. 4; attributed source Mexico Case Study i.e. Briceño 2000. An associated Figure shows that incoming mobile traffic increased from 73 to 94 minutes of use per subscriber, while outgoing mobile traffic reduced from 89 to 83 minutes per subscriber. Also “cellular-phone subscriptions soared in Mexico after it introduced caller pays in May, 1999 (subscriber growth peaked at a 130.8% annual growth rate in 1999)”. Wright 2002a, fn 13 p. 308.

⁸⁰ “The introduction of CPP in Central and South America and the Caribbean between 1995 and 2002 more or less showed the same pattern [as in Pakistan and Mexico]. CPP was a contributing factor in accelerating the growth in mobile subscribers. Average monthly mobile terminated minutes per customer increased. The introduction of CPP led to an increase in gross margins for fixed and mobile operators.” Zehle 2003, p. 10.

⁸¹ “Typically in the USA with wireless party pays [RPP] tariffing inbound call minutes account for 26%-30% of total call minutes. In calling party pays [CPP] environments traffic is initially 40% inbound, but as numbers are circulated widely in some networks inbound minutes account for nearly 50% of inter-network traffic.” Zehle 1998, p.10.

⁸² “In 1994 AT&T Wireless conducted extensive calling party pays market trials. These trials showed that over time inbound calls minutes for customers who converted to CPP increased from 26% of total minutes to 32% within approximately half a year. Over time the increase is likely to be substantially higher.” Zehle 1998, p. 11

⁸³ Briceño (2000) identifies the adoption of CPP as only one of at least four reasons for the rapid increase in mobile penetration in Mexico, the others being the system of prepayment, the entrance of more mobile providers and the improvement in the overall economic situation.

⁸⁴ “The available evidence suggests that the advent of pre-paid cards has been the most important factor in countries with RPP forfeiting their historical lead, in terms of subscriber growth, over countries with CPP.” OECD 2000 p. 11.

⁸⁵ Gans et al 2005.

⁸⁶ The final column of Table 5 shows the extent of concentration among mobile technologies used by subscribers, as measured by the Herfindahl-Hirshmann Index (HHI) expressed as a percentage. This variable may partly reflect other issues related to standards (e.g. Ponder and Markova 2005) or competition (e.g. Dewenter and Kruse 2005). Further analysis of 16 lower income countries in the same data set shows that, on average, the 9 that changed from RPP to CPP now have the same

Table 5 Number of different mobile technologies

System	No of countries	Number of mobile technologies				Average	Average concentration
		1	2	3	4		
RPP to CPP	10	1	2	4	3	2.9	46.3
RPP	5	2	1	1	1	2.2	71.4
CPP	32	26	3	4	0	1.4	95.9
Total	47	29	6	9	4	1.8	84.0

Source: *Global Wireless Matrix 4Q04*, Merrill Lynch, 13 April 2005.

2.5 Observed effects of RPP and CPP: cross section comparisons

The next source of evidence is international cross-section comparisons. Table 6 contains data from 13 countries with comparably high incomes in last quarter 2004, as selected by the FCC's annual report on competition in mobiles.

If CPP creates monopoly power, leading to higher termination charges than RPP operators charge their own subscribers, this will translate into higher average prices for making telephone calls in CPP countries. The evidence is consistent with this. The first column shows that median revenue per call-minute in four RPP countries was 9 US cents, less than half the median of 22 cents in 9 CPP countries.⁸⁷

Table 6 Mobile Market Structure and Performance in Selected Countries⁸⁸

Country	Revenue per Minute (US cents)	Minutes of Use (per month)	Mobile Penetration %
RPP (MPP) countries			
USA	8	630	61
Canada	11	359	47
Hong Kong	6	387	106
Singapore	10	282	90
Median RPP	9	373	76
Mean RPP	9	415	76
CPP countries			
UK	22	151	104

performance indicators and per capita income as the 7 that remained RPP or CPP, but they have about half the level of concentration of technology types.

⁸⁷ Part of this difference in pricing "is widely attributed to a less aggressive competitive environment in Western European mobile markets". FCC *Annual Report and Analysis of Competitive Market Conditions With Respect to Commercial Mobile Services, 10th Report*, WT Docket No 05-71, FCC 05-173, adopted September 26 2005, released September 30 2005 (henceforth *FCC 10th Mobile Report*), para 191, p. 70.

⁸⁸ Source: FCC *10th Mobile Report*, Appendix A, Table 10, page 90, citing Glen Campbell et al, *Global Wireless Matrix 4Q04*, Global Securities Research & Economics Group, Merrill Lynch, April 13, 2005.

Germany	35	76	87
Italy	26	120	110
France	17	225	74
Spain	27	135	99
Finland	16	258	95
Japan	32	154	71
S Korea	10	316	76
Australia	21	168	89
Median CPP	22	154	89
Mean CPP	23	178	89

Higher average call costs will mean fewer calls per subscriber. The second column of Table 6 shows that the median level of use in CPP countries (154 minutes) was less than half the median level in RPP countries (373 minutes).⁸⁹

Higher (above cost) termination charges under CPP should lead to reduced or discounted subscription charges or rental fees and subsidised handsets. Table 6 does not contain data on this. However, UK and Australian regulatory bodies indeed reported these phenomena. They in turn are likely to attract more subscribers into the system. This again is consistent with the evidence in Table 6. The median penetration rate is 89 per cent in CPP countries versus 76 per cent in RPP countries.

The data providers Merrill Lynch and FCC note certain limitations of these data. The minutes of use figures may be overstated in RPP systems, and the total revenue figures (not shown here) overstated in CPP systems. Consequently, the revenue per minute figures (total revenues divided by minutes of use) probably differ by less than the figures shown.⁹⁰ Conversely, the penetration figures may be overstated in CPP systems that have traditionally made more use of prepaid schemes and multiple SIM cards.⁹¹ In addition, some of the higher penetration figures cited may refer to penetration rates per household rather than per head of population.⁹² So in these

⁸⁹ Marcus (2004) shows graphically the inverse relationship between average call price and number of call minutes made.

⁹⁰ “MOUs figures are potentially somewhat overstated in the United States, and more generally in countries that do not employ calling party pays, relative to countries that do employ calling party pays, as a result of the double-counting of same-network (“on-net”) mobile-to-mobile minutes. The double counting occurs because under the “mobile party pays” system used in the United States the same minute of an on-net call is billed to both the caller and the receiver.” *Annual Report and Analysis of Competitive Market Conditions With Respect to Commercial Mobile Services, 9th Report*, WT Docket No 04-111, FCC 04-216, adopted 9 September 2004 released 28 September 2004 (henceforth FCC 9th *Mobile Report*), fn 526. Also Merrill Lynch pp. 144-145. Arguably CPP understates mobile minutes per subscriber rather than RPP overstates it, but Merrill Lynch here take CPP practice as the benchmark.

⁹¹ “[R]eported mobile subscriber figures and penetration may tend to be significantly overstated in countries with a high percentage of prepaid subscribers due to double counting of subscribers with more than one handset and lags by some carriers in removing inactive prepaid subscribers from their subscriber base.” FCC 9th *Mobile Report* fn 520. In addition this calculation double counts some CPP revenues by including charging between mobile operators.

⁹² For example, recent UK figures indicate a subscriber penetration rate of rather less than 91%. “Of tel’s survey in November 2003 found adult mobile penetration to have leveled off at around 75 per cent.” *Strategic Review of Telecommunications*, Ofcom, Phase 1 consultation document, 28 April 2004, Research Annex H (The performance of the UK telecoms sector), para H.31, p. 46. The associated Figure 16 shows household penetration at 85 per cent. ‘Adult penetration’ is defined as “own or use

respects the differences between CPP and RPP are probably not as great as suggested by Table 6. On the other hand, two of the CPP countries (France and Finland) have slightly unusual systems, in some respects closer to RPP. Without those two countries, the distinction between the CPP and RPP systems is slightly accentuated.⁹³ Other factors may be at work as well. For example, the size and nature of the calling areas may vary. And just as prices for fixed local calls (zero or charged) may have led to the choice of RPP or CPP, such prices continue to influence the competitive context in which mobile operators set prices. Nonetheless, with these qualifications Table 6 seems consistent with the bottleneck monopoly and waterbed theory.

2.6 Further consideration of subscriber penetration

The possible impact of RPP or CPP on subscriber penetration has been the subject of considerable debate. One view is that CPP is likely to increase growth and penetration in the longer term, even though many factors are involved, and penetration is presently higher in some RPP countries than in some CPP countries.⁹⁴ A related view is that a change from CPP to RPP would reduce penetration albeit not by as much as might at first be expected.⁹⁵

In contrast, regulators (as noted above) have typically rejected the notion that reducing termination charges would lead to any significant decrease in penetration.⁹⁶ It has also been suggested that several other factors besides CPP and RPP impeded previous developments in the US, such as competing and incompatible digital standards, numbering and fixed line competition.⁹⁷ These may not apply in future. Penetration rates in the US and Canada have in fact been increasing rapidly, and may

(adults 15+)”, which seems to imply that per capita penetration (dividing the number of phones by the total population) could be even lower than 75 per cent. C.f. also ACCC 2004, p. 166.

⁹³ France is exceptional insofar as it used ‘bill and keep’ between mobile operators until the end of 2004. Samarajiva and Melody (2000, Box 4, p. 10) explain that Finland is also an exceptional system in that it uses CPP but in most cases termination rates are not used there. See Wirzenius 2004 for more detail. Without these two countries the medians and means for the remaining 7 CPP countries are 26 and 25 cents/minute, 151 and 160 mins/month and 89% and 91% penetration.

⁹⁴ “Currently there is no quantifiable correlation between penetration and whether CPP or wireless party pays (WPP) [RPP] tariffing is applied. Other factors such as incomes, tariff levels, competition, promotion and cultural factors impact significantly more on differences in penetration. However, in the longer term CPP is likely to lead to more rapid market growth and higher penetration levels.” Zehle, 1998. “While MPP certainly has held back growth in the US and Canada, some countries such as Hong Kong and Singapore have achieved very high penetration rates without moving to CPP.” Zehle 2003, p. 11.

⁹⁵ A study done at a time when the UK penetration rate was 70 per cent suggested that a change to RPP might reduce the UK rate to 64 per cent rather than to just over 40 per cent as then obtaining in the US. Frontier Economics, *Modelling the UK mobile market: The potential impact of a switch to receiving party pays*, Unpublished report prepared for Vodafone, October 2002/November 2003, p. 30 (henceforth *Frontier Modelling*).

⁹⁶ “If handset subsidies were reduced or removed, we believe that, in the first instance, most marginal subscribers would not replace their handsets so often. We also believe that the acquired habit of using mobile phones means that such subscribers are now less marginal than they were when they first signed on to the network and that people already owning mobile phones are unlikely to leave the network unless their handset is lost, stolen or broken. The MNOs have the option to offer marginal subscribers cheaper packages to induce them to stay on the network once that happens. Thus, even if handset subsidies were reduced, we do not expect a large reduction in the number of subscribers on the four networks.” UKCC 2003, para 2.567, vol. 1, p. 131.

⁹⁷ Chris Doyle, personal communication.

come to equal the penetration rates of CPP countries.⁹⁸ Also, as many countries including some RPP ones tend towards 100% penetration or more, there seems correspondingly less scope for CPP systems to outdistance RPP ones.

Table 6 shows that, for the 13 countries listed, although the median penetration rate is higher in CPP countries than in RPP countries, the highest penetration countries do indeed include some RPP countries: Hong Kong has the second highest penetration rate of all and Singapore's penetration rate is slightly above the median CPP rate. This leaves it somewhat unclear as to how far RPP and CPP are responsible for the level of penetration rates. Multiple regression models can shed further light on this.

2.7 Regression analysis of cross-section data

A recent analysis of mobile growth rates in 84 countries using pooled cross-section and time series data finds rather mixed results as to the effect of RPP, CPP and the change from one regime to the other.⁹⁹ The availability of prepaid cards and the introduction of competition are both conducive to growth. But the change from RPP to CPP and the introduction of competition may be seen as endogenous consequences of political and institutional variables such as mobile growth rates in neighbouring countries and the durability of political regimes. After allowing for these factors neither CPP nor a change to CPP has an additional effect on growth rates.

The Merrill Lynch report underlying Table 6 contains data for 44 countries.¹⁰⁰ The three main performance indicators examined here are average revenue per minute, average minutes of use per month, and mobile penetration. Potentially relevant economic and technical variables in that report are national income (GDP US\$000/capita), high national income (dummy variable for GDP exceeding US\$ 10,000/capita), penetration (%) of fixed telephones, proportion (%) of subscribers on GSM, concentration (%) of subscribers in mobile technologies, number (#) of mobile players, market share (%) of top two players, proportion (%) of prepaid subscribers, and whether or not there is mobile number portability. In addition, dummy variables are used for the policies RPP and a change from RPP to CPP.

Simple linear regressions were run for each performance indicator against all the potential explanatory variables.¹⁰¹ The results were sensitive to the variables included in the regressions. Table 7 reports the results after removing variables in order of insignificance until the remaining variables are significant at the 10 per cent level or

⁹⁸ "In the last three years alone, the total mobile telephone subscriber base has increased 30 percent." FCC *10th Mobile Report*, para 161, p. 61. The main drivers are prepaid and family plans and wireless substitution. See also "US Mobile Growth Defies Conventional Wisdom", Forrester Research Survey, 13 April 2005, at <http://home.businesswire.com>. Crandall and Sidak (2004, p. 18) predict that US penetration should equal penetration in most CPP countries between 2008 and 2014.

⁹⁹ Dewenter and Kruse 2005.

¹⁰⁰ Data source: Merrill Lynch Table 1. Three of the 47 countries listed there (Nigeria, Indonesia and the Philippines) have been omitted because of incomplete data. For two other countries (Pakistan and Israel), proportion of prepaid subscribers is not available but is entered at the average for their income groups. Russia is re-classified as RPP since it has only very recently changed to CPP.

¹⁰¹ Plotting performance indicators against income suggests the possibility of a different functional relationship for the 16 lower income countries (annual GDP/capita less than \$6,500) than for the 28 higher income countries (GDP over \$10,000). Preliminary regression analysis was consistent with this. However, given the limited number of observations this paper reports results for the combined data set.

better. These remaining variables explain between 50 and 80 per cent of the variation in the three performance indicators.

Table 7 Regression analysis of mobile performance indicators¹⁰²

Variable	Indicator	Rev per Min (US c/min)	Mins of Use (mins/month)	Mobile penetration (%)
Intercept		12.250***	429.006***	3.584
RPP		-12.324***	143.185***	
GDP		0.369***		
High Income				48.031***
Fixed penetration			-1.710**	0.387*
Technical Concentration			-1.146*	0.273***
Top 2 Players (mkt share)				-0.305*
Prepaid			-2.340***	0.377***
Portability			66.187**	
R squared		0.52	0.64	0.84
Adjusted R squared		0.50	0.59	0.82

Table 7 suggests that eight explanatory variables influence at least one of the performance indicators, and that the main explanatory variables differ by performance indicator. In general, the results are plausible, though not always obvious. Higher national income allows higher revenue per minute. Concentration is higher in high-income countries but otherwise does not increase proportionately to income. Higher fixed penetration reduces minutes of use (presumably because more consumers have an alternative, and perhaps because local calls are free in RPP countries) and for less obvious reasons tends to increase mobile penetration. Technical concentration increases mobile penetration but (perhaps as a result) tends to reduce minutes of use. Greater domination by two large operators tends to reduce penetration (presumably by reducing the effectiveness of competition). Prepayment schemes increase penetration by reaching additional (lower income?) users but these additional subscribers reduce the average minutes of use. Number portability increases usage (perhaps because other subscribers are more likely to remember the number to call, or because there are fewer inactive handsets). The proportion of users on GSM systems and the number of players have no significant additional explanatory power.

For present purposes, particular interest lies in the impact of alternative mobile termination charge regimes. After allowing for other explanatory variables, there is no evidence that those countries that changed from RPP to CPP perform any differently from other comparable CPP countries. In contrast, RPP significantly reduces average revenue per minute (by about 12 cents per minute compared to CPP) and significantly increases average usage (by about 143 minutes per month). There is no evidence that RPP lowers mobile penetration rate.¹⁰³

¹⁰² One, two and three asterisks denote significance at the 10%, 5% and 1% levels, respectively. The underlying t-statistics are robust (based on White heteroskedasticity-consistent standard errors).

¹⁰³ It was noted above that the data might be overstated or understated in certain respects. In correspondence with the FCC, Merrill Lynch suggests that, relative to CPP, its published data might understate RPP mobile penetration by up to 5%, overstate RPP MOU by up to 15% and understate RPP RPM by up to 15%. (These estimated impacts are a little less than the conservative 20% figures

2.8 Explaining US-UK differences in performance

To illustrate the implications of these regression equations, Table 8 shows how they can explain part of the difference in performance between the US and the UK.¹⁰⁴

Table 8 Components of differences in US and UK performance

Variable	Coefficient	US		UK		Difference
Average revenue per minute (US cents per minute)						
Intercept	12.2	1	12.2	1	12.2	0
GDP	0.369	39.991	14.8	35.505	13.1	1.7
RPP	-12.324	1	<u>-12.3</u>	0	<u>0</u>	<u>-12.3</u>
Predicted			14.7		25.3	-10.6
Actual			<u>8.0</u>		<u>22.0</u>	<u>-14.0</u>
Unexplained			6.7		3.3	3.4
Average use (minutes of use per month)						
Intercept	429.0	1	429.0	1	429.0	0
RPP	143.2	1	143.2	0	0	143.2
Fixed Penrttn	-1.710	65%	-111.2	23%	-39.3	-71.9
Tech Conctrtn	-1.146	31%	-35.5	100%	-114.6	79.1
Prepaid	-2.340	8%	-18.7	68%	-159.0	140.3
Portability	66.187	1	<u>66.2</u>	1	<u>66.2</u>	<u>0</u>
Predicted			473.0		182.3	290.7
Actual			<u>630.0</u>		<u>151.0</u>	<u>479.0</u>
Unexplained			-157.0		31.3	-188.3
Mobile penetration (%)						
Intercept	3.584	1	3.6	1	3.6	0
High Income	48.031	1	48.0	1	48.0	0
Fixed Penrttn	0.387	65%	25.2	23%	8.9	16.1
Tech Conctrtn	0.273	31%	8.5	100%	27.3	-18.8
Top 2 Players	-0.305	51%	-15.6	50%	-15.3	-0.3
Prepaid	0.377	8%	<u>3.0</u>	68%	<u>25.6</u>	<u>-22.6</u>
Predicted			72.7%		98.1%	-25.4%
Actual			<u>61.0%</u>		<u>104.0%</u>	<u>-43.0%</u>
Unexplained			11.7%		-5.9%	17.6%

The main findings are:

- US average revenue is 14 cents/minute less than UK: since income levels are similar, RPP explains almost all of this difference, although in both countries average revenue/minute is lower than predicted (hence unexplained).

mentioned in the FCC report itself.) A sensitivity analysis suggests that such adjustments to the data would not materially change the results reported in Table 7.

¹⁰⁴ Regressions on higher income countries separately (not reported here) provide a rather better explanation of US-UK differences, but present results will suffice to illustrate the approach.

- US monthly usage is over four times UK usage: RPP and the lower proportion of prepaid customers in the US explain over half of this, in equal measure. The greater diversity of mobile technology (lower technical concentration) in the US is another factor but offset by the higher penetration of fixed telephones there. Actual US usage is about one third higher than predicted, and actual UK usage lower than predicted.
- Mobile penetration is 43 percentage points higher in the UK: the greater proportion of prepaid customers in the UK accounts for about 23 of these points and the greater technical concentration in the UK (all GSM) accounts for another 19 points, but the lower fixed penetration in the UK works in the opposite direction. US penetration is about 16 per cent lower than predicted, and UK penetration slightly higher. However, there is no suggestion that RPP accounts for any of the difference in penetration.

These regression results, and the implications for US-UK differences, should be regarded as indicative rather than definitive. There are relatively few observations, some of the variables are inter-related or correlated, and some of them may be regarded as endogenous. They suggest that several factors influence mobile performance indicators, in ways that are not yet fully understood. Further research is both possible and desirable. Nevertheless, the results are consistent with the view that, after taking account of numerous possible explanatory factors, RPP tends to reduce average revenue per minute and increase average usage without adversely affecting mobile penetration. In particular, RPP is the main reason why average revenue per call is lower in the US than in the UK, and an important part (though only a part) of the reason why monthly usage is higher, but is not a reason why mobile penetration is lower in the US.

2.9 Comparison of T-Mobile call charges in US and UK

A comparison of practice within the same company operating in the UK and US, two countries that epitomise the different mobile charging systems, provides another source of evidence on the bottleneck monopoly and waterbed predictions. In the UK, mobile operators charge their subscribers for outgoing minutes only. In the US, mobile operators typically charge their subscribers for incoming minutes at the same rate as for outgoing minutes. In both countries, the practice has developed of offering various different plans, with monthly charges related to specified maximum amounts (or ‘buckets’) of call-minutes in each month. Table 9 shows the calling plans offered by one mobile company (T-Mobile) that operates in both countries.

Table 9 Comparison of T-Mobile rate plans in UK and US¹⁰⁵

T-Mobile US				T-Mobile UK			
Monthly fee \$	Total minutes	Average price c/min	Incremental price c/min	Monthly fee £	Outgoing minutes	Average price p/min	Incremental price p/min
20	60	33.0	4.2	17	50	34.0	8.0

¹⁰⁵ Sources: www.t-mobile.com for US rates applicable to a subscriber in Washington DC, www.t-mobile.co.uk for UK rates applicable nationally. Both as at 30 April 2005. Minimum 12 months contract in both cases. Exchange rate \$1.90 to £1. Calculations of average and incremental price have been added. Incremental price is the additional cost of the next-size plan divided by the additional minutes allowed.

30	300	10.0	3.3	21	100	21.0	8.0
40	600	6.7	5.0	29	200	14.5	9.0
60	1000	6.0	4.0	47	400	11.75	6.3
80	1500	5.3	2.0	85	1000	8.5	
100	2500	4.0	1.2				
130	5000	2.6					

At the lower end of the scale, for \$30 a US subscriber could buy 300 call minutes per month, at an average price of 10 cents/minute. This would allow, say, 100 outgoing and 200 incoming minutes (to allow for the fact that more calls are made from fixed to mobile than the reverse). To buy 100 outgoing minutes per month in the UK would cost £21 or about \$40. The UK price is thus about one third higher than the US price.

Average price falls as the size of the plan increases. Towards the higher end of the scale, 2500 total minutes would cost \$100 in the US, whereas 1000 outgoing minutes (plus 1500 free incoming minutes) would cost £85 or \$162 in the UK. Here, the UK price is about two thirds higher than the US price. In fact the US scale goes beyond the end of the UK scale, and even lower average call prices can be obtained at higher volumes. There are also other advantages in the US plans.¹⁰⁶ Of course, subscribers may not use all their purchased call minutes, but this is true of both plans.¹⁰⁷

Average price is lower for larger plans. Put another way, at any size of plan the incremental price per minute is below the average price of that plan. This enables the operator to cover its fixed costs while offering a lower incremental price to reflect variable costs that are below average costs.

In the UK, T-Mobile's incremental price reduces to 6.3 p/min for an outgoing call (at 1000 outgoing minutes), which has to cover the cost of origination plus the termination charge on another network. A charge of 6.3p (about 12 cents) per outgoing minute might correspond to about 6 cents per incoming or outgoing minute in the US. In contrast, T-Mobile's incremental price in the US falls to 3 cents/min (by interpolation) at a similar level of usage (2000 total minutes), and to 1.2 cents/min at a higher level of usage. The incremental price in the UK is thus between two and four times the level obtaining in the US.

The level of the incremental price for the higher volume plans may provide some indication of the incremental cost of termination. The US incremental price is below the bottom end of the range of termination costs reported by NZCC (Table 2 above). The UK incremental price is about equal to the price-controlled level of the wholesale termination charge (scheduled for 6.31 p/minute during 2005/6). Since there is only a negligible contribution to the variable cost of outgoing calls, this suggests that the

¹⁰⁶ For example, most T-Mobile US plans (except the two smallest ones) include unlimited free call minutes at night and weekends, whereas the T-Mobile UK plans do not appear to do so (although another UK operator offers up to an hour per call for the price of 3 minutes at evening and weekends).

¹⁰⁷ Average costs would be somewhat higher to the extent that subscribers did not use up all their allowed minutes, or exceeded their limit, although in both cases some carryover is allowed from one month to the next. The charges for excess minutes are considerably higher than the average cost of within-plan minutes. In the UK, T-Mobile charges 10p per excess minute for local, national and on-net calls, 25p for off-net calls. In the US, T-Mobile's charges for excess minutes reduce from 45 cents on the smallest plan to 30 cents on the largest plan. If subscribers do not use all their allowed minutes, then the cost of making and receiving additional calls is effectively zero.

variable cost itself cannot be very high. Both cases suggest that the variable cost of making or terminating mobile calls is considerably lower than CPP regulators commonly assume.

The figures and comparisons cited inevitably vary over time. For example, six months later a change in the exchange rate reduced the differences between these sets of plans.¹⁰⁸

Also, one operator is not necessarily representative of the whole mobile sector in either country. T-Mobile is considered to have been a relatively aggressive entrant in the US. For comparison, in November 2005 the prices of US market leaders Cingular, Verizon and Sprint were higher than those of T-Mobile US. In contrast, Verizon's parent company Vodafone had lower UK prices than T-Mobile, to the extent that its US prices were only slightly, if at all, lower than its UK prices, but these were for 18 month contracts. Another UK competitor O2 offered 18 month plans that were half the price of its 12 month plans, but the latter were not lower than T-Mobile across the board. The fourth major competitor Orange had comparable 12 month prices to T-Mobile.

Comparison of prices is thus not straightforward in either country. Each competitor tries to offer the best deal for some chosen category of customer. T-Mobile's price plans may exaggerate the typical difference in prices between the two countries. Nevertheless, an inspection of other price plans as well as T-Mobile's suggests that call charges in the US under RPP are indeed less, and sometimes significantly less, than call charges in the UK under CPP. The difference is particularly marked for the largest plans. UK prices are presently of the order of 11 to 14 US cents per outgoing minute (8 to 11 cents per incremental minute) depending on length of contract. In contrast, US prices per incoming and outgoing minute (admittedly for somewhat larger plans) are in the range 2.5 to 5 cents (1 to 4 cents incremental). This is despite the UK charges reflecting regulatory reductions in termination charges totalling some 65 per cent over about 7 years.

2.10 Comparison of T-Mobile subscriptions and handset subsidies

Termination charges are not the whole of the story though. Economic analysis predicts that high termination charges under CPP will lead to reduced or discounted subscription charges or rental fees and subsidised handsets. UK and Australian regulatory bodies indeed reported this. As noted, there may also be reductions or subsidies in the US RPP system but the effect should presumably be greater with CPP. There seems to be no systematic international evidence on subscriptions and handset subsidies.¹⁰⁹ The terms offered by T-Mobile in the UK and US provide an interesting test of this proposition.

T-Mobile's rate plans do not provide a subscription charge separate from call charges in either country. In April 2005 the monthly fee for the smallest plan was higher in the UK than in the US (£17 or about \$32 compared to \$20), although the difference was

¹⁰⁸ By 15 November 2005 the exchange rate had fallen from \$1.90 to \$1.73 to £1. The same UK plans were about 10 per cent cheaper in US\$. In addition, T-Mobile UK now offered an 18-month plan that was at least 10 per cent cheaper than its 12-month plan.

¹⁰⁹ UKCC (2003 paras 6.122 et seq) examines these aspects for UK operators only.

smaller after allowing for the value of the included calls (\$25 compared to \$17.50).¹¹⁰ However, once again T-Mobile seems to have a relatively low price in the US, it subsequently introduced a cheaper 18 month plan in the UK, and the exchange rate later moved in favour of the dollar. In November 2005 the lowest price plans of the leading US operators were in the range \$20 to \$40, or \$17.50 to \$25 net of the value of the included calls. In the UK the comparable range was £15 to £25 gross, £10 to £17 net. This was now equivalent to \$26 to \$43 gross, \$17 to \$29 net. It is difficult to say that there was a significant difference between the two countries.

T-Mobile UK offered additional inducements to potential subscribers: double call minutes for the first 6 months and 50% off line rental for the first 3 months, if the subscriber signed up for 18 months rather than a year. Other UK operators variously offered half price rentals for the first 3 to 6 months, cashback offers up to £100, free weekend calls for 6 months, and other free products. Such offers were not apparent in the US.

In April 2005 T-Mobile offered a smaller choice of phones (handsets) in the US than in the UK: about 14 from 5 manufacturers compared to 26 from 9 manufacturers. A comparison with other operators in November 2005 suggested that T-Mobile offered a more limited range than other US and UK operators but the country differential remained. On average, the three leading US operators plus T-Mobile offered 21 phones from 6 ½ manufacturers while the four leading UK operators offered 35 ½ phones from 8 ¼ manufacturers.

T-Mobile offered free and discounted handsets in both countries:

- Of the 14 US handsets, 8 seemed to be free on all packages, with suggested retail prices generally ranging from \$50 to \$120 and in one case \$200; 4 handsets had recommended prices \$120 to \$300 with rebates of \$50 to \$150; and 2 had prices of \$300 and \$500 with no rebates.
- Of the 26 UK handsets, 3 seemed to be for pay-as-you-go customers only; 3 seemed to be free on all packages, though said to have retail prices £90 or £100 (\$172 or \$191); all the remaining handsets had charges ranging from zero up to £290 (\$554), typically being free on the more expensive packages and with higher charges on the less expensive packages.

This implies that the most expensive handset given free was \$200 in the US and \$554 in the UK. It was not possible to compare the prices directly since there was almost no overlap of handset models, even though many of the manufacturers were the same. The only common handset (Nokia 3220) was available in the US at \$50 (a rebate of \$70 off the suggested retail price of \$120), but was available free on all packages in the UK.

Comparison is thus not straightforward, but these observations and calculations suggest two generalisations. First, (minimum) monthly subscription charges are roughly comparable in the two countries and there are significant handset subsidies in both systems. Second, there seem to be more initial discounts on the subscription charges and a greater and more subsidised range of handsets in the UK.

¹¹⁰ Evaluating the calls at the incremental price yields a balance of $\$20 - 60 @ 0.042 = \17.50 for the US plan and $\pounds 17 - 50 @ 0.08 = \pounds 13 = \25 for the UK plan.

2.11 Regulatory stances on RPP

Regulatory authorities have increasingly acknowledged that CPP is the cause of high termination charges, and of other distortions and subsidies via the waterbed effect. There is now clear evidence that RPP is not subject to these problems. However, with the exception of the UK, CPP regulators have shown a surprising failure to consider RPP as an alternative.¹¹¹

Perhaps the different statutory frameworks have contributed to this outcome. In the UK, the Competition Commission is required to ask: is present practice against the public interest? If so, what remedies are available? Price control is obviously one remedy, but RPP has been explored as one of many other possibilities. In contrast, competition authorities in Australia and New Zealand have posed the question: would price control (via declaration or designation) be better than present practice? The framing of their investigations appears to leave no scope for looking at other or better remedies than price control. Whatever the reason, the views of CPP regulators on RPP are essentially limited to the UK.

2.12 UK regulatory concerns about RPP

In 1997, Oftel declared that mobile termination rates were too high and initiated a consultation on its findings and the appropriate way forward. One of the mobile operators, Cellnet, had reportedly raised the possibility of the called party paying part of the costs. Oftel rather briefly dismissed this as unattractive to consumers because they would not be able to control the size of their bills.¹¹²

RPP was nonetheless raised before the MMC in 1998. One mobile operator repeated Oftel's argument and added that customers would switch off their phones, this would harm the growth of the industry, and it would not be conducive to resource efficiency.¹¹³ In contrast, one new entrant claimed that "RPP could solve the problems of MNO termination charges significantly exceeding costs" but continued "in practice this was not feasible".¹¹⁴ The summary of its views does not say why RPP was not feasible. The entrant also commented that "most concerns about RPP could be overcome by allowing the first minute of a call to be free and by providing caller line identification". It pointed out that "heavy handed regulation as proposed by the DGT was unnecessary and would be unduly costly". But this evidence did not weigh with

¹¹¹ Even UK analysis of RPP has been superficial compared to other available analyses, e.g. OECD 2000 and reports of regulators in India, Singapore and the US, as referenced below.

¹¹² "Oftel believes this would be a major change that would be unattractive to consumers, as mobile phone subscribers would have no control over the size of their bills for incoming calls." *Prices of calls to mobile phones: consultative document*, Oftel, March 1997, para 5.40.

¹¹³ "Mobile customers in the UK were not accustomed to such a regime and would find it unattractive, particularly as they could not control the cost of their phone bills. ... many mobile customers would change the use of their mobile phones to making only outgoing calls in order to remove the possibility of having to pay for incoming calls. This would reduce the utility of the mobile phone and could significantly affect future growth in the use of mobile phones." Views of third parties: Orange plc, MMC 1998, para 9.74, p. 291.

¹¹⁴ Views of Third Parties: Virtual Network Systems Ltd, MMC 1998, paras 9.210-211, pp. 314-315.

the MMC, mainly because phones would be switched off.¹¹⁵ It rejected RPP and recommended price controls until March 2002.

In February 2001 Oftel consulted on an extension to the price controls. Despite identifying CPP as ‘the key fact’¹¹⁶, Oftel failed to mention RPP as a possible remedy. In September 2001 Oftel proposed continuing and tighter price controls. It again dismissed RPP, this time with the remark that CPP was preferable because the cost of the call was borne by the person who makes the decision, and this was likely to be more efficient.¹¹⁷

The mobile operators refused to accept the new price controls. Oftel referred the matter to the UKCC, which in March 2002 “expressed an interest in understanding more about the merits of RPP compared to CPP”. Oftel responded with a brief paper. Perhaps reflecting economic analyses now becoming available, Oftel accepted that “RPP would be likely to remove the competition problems associated with CPP” and indeed “would probably remove the need for further regulatory intervention”.¹¹⁸ BT endorsed this view.¹¹⁹ The UKCC agreed on this point.¹²⁰

Oftel and BT nonetheless saw various disadvantages to RPP.¹²¹ The mobile operators objected to it.¹²² So did some user groups.¹²³ The UKCC again rejected it.¹²⁴ The

¹¹⁵ “... if a called-party-pays system were introduced, then this would be likely to lead to substantial switching off of mobiles as we understand has been a problem in the USA, with substantial detriment to the utility which consumers obtain from mobile telephony and possibly to subscriber growth. There was, in this connection, very little enthusiasm on the part of those who gave evidence for a move towards called-party-pays, and there appears little to commend it in terms of efficient resource allocation.” MMC 1998 para 2.425 p. 93.

¹¹⁶ *Review of the Price control on Calls to Mobiles, consultative document*, Oftel, February 2001, para S. 3.

¹¹⁷ “Oftel does not dispute that CPP is preferable to the alternative RPP ... This is because the costs imposed by the decision to make a call to a mobile are borne by the person who makes the decision. This is likely to lead to a more efficient outcome than if those costs were borne by the call recipient.” *Review of the Price control on Calls to Mobiles*, Oftel, 26 September 2001, para 2.6.

¹¹⁸ *Receiving Party Pays compared to Calling Party Pays*, Oftel, 19 April 2002 (henceforth Oftel 2002), para 4, p. 2. Also UKCC 2003 para 2.488, vol. 1 p. 113.

¹¹⁹ “BT considered that RPP would, if it could be introduced, make call termination charge control unnecessary, since it would remedy the underlying cause – CPP – of the problem.” UKCC 2003 vol.1, pp. 113-4.

¹²⁰ “Such a system [RPP] could be expected to bring about a greater concern on the part of mobile customers about call termination charges and encourage competition between the MNOs in the setting of termination charges in order to gain customers.” (pp. 113-4) RPP would go “to the root cause – CPP – of the lack of competitive constraints on termination charges”. UKCC 2003 para 2.492, vol.1, p. 114.

¹²¹ According to Oftel, “the benefits of RPP were likely to be outweighed by adverse effects on economic efficiency, and also in terms of consumer resistance, and the initial costs of implementation. The DGT’s view, therefore, was that the case for the introduction of RPP in the UK was weak.” (Oftel para 6) BT “accepted that RPP might be costly to implement and might lead to mobile phone users turning off their phones to avoid paying for unwanted incoming calls.” UKCC 2003 vol.1, pp. 113-4.

¹²² O₂ said that people would turn off their phones. Vodafone said there would be sub-optimal usage of mobile services contrary to the objectives of section 3 of the Act. Orange said that RPP would have distorting effects and would be disruptive for customers and MNOs. T-mobile also said that compulsory RPP would be disruptive. Orange and T-Mobile asked the Commission to recommend optional RPP packages (which T-Mobile itself already offered). UKCC 2003 vol.1, pp. 113-4.

¹²³ The International Telecommunications Users Group (INTUG) said that RPP would be disruptive, confusing and expensive. The Consumers Association (CA) said that “the benefits of RPP had to be balanced against the evidence from other markets, such as the USA, where RPP had constrained market growth through encouraging customers not to keep their phones on, severely undermining the network

recurrent claim that RPP would lead to subscribers turning their mobile phones off again weighed particularly heavily with the UKCC.¹²⁵

Shortly afterwards, as part of the EU Market Review, Oftel raised the possibility of alternative solutions including RPP. It now identified four ways of implementing RPP. However, all of these were options for an individual subscriber to pay to receive particular calls within a CPP system. Oftel took the view that this optional RPP “could not be relied upon to constrain termination charges”.¹²⁶ Oftel also reaffirmed some previously identified disadvantages.¹²⁷ Two operators supported the idea of optional RPP services.¹²⁸ Oftel (now Ofcom) remained unconvinced that this would be an effective remedy.¹²⁹ It went ahead with the implementation of price controls.

To summarise, the main objections to (non-optional) RPP, deemed so serious as to render it less suitable than price control despite removing the competition problem associated with CPP, may be grouped into four main categories:

- It would be costly and disruptive for the mobile operators to implement.
- It would be disruptive to customers and therefore meet with consumer resistance.
- It would or might lead to subscribers turning off their mobile phones.
- It would reduce economic efficiency.

The following sections deal in turn with these concerns. For concreteness, it is assumed that RPP takes the form of a ‘bill and keep’ policy. This requires mobile operators to connect calls to their own subscribers without levying a charge on the

benefits offered by all MNOs”. The NCC said that RPP would be disruptive to customers and operators. UKCC 2003 vol.1, pp. 113-4.

¹²⁴ “A mandatory system of RPP would entail too many significant disadvantages for consumers for us to recommend it as an appropriate and proportionate remedy for the adverse public interest effects that we have identified, not least because it might lead to significant numbers of users switching off their mobile phones”. UKCC 2003 vol. 1, pp. 113-4.

¹²⁵ This was surprising since Oftel had explicitly qualified its remark about US mobile customers not switching off their phones (see below) and the Commission had earlier noted that operators had an incentive to avoid this happening. “An additional incentive to the MNOs to keep termination charges low would be the desirability of encouraging customers to keep their mobiles switched on, so that the MNOs would not lose termination business.”(UKCC 2003 vol.1, pp. 113-4)

¹²⁶ “it is difficult to predict how called parties would react and whether they would be willing to absorb the cost of the call. ... If the called parties resisted, limited use would be made of these facilities and thus no competitive pressure would be placed on mobile termination charges. *Review of Mobile Wholesale voice call termination markets: consultation, EU Market Review*, Oftel, 15 May 2003, pp. 177-178.

¹²⁷ “the fixed and mobile operators are likely to have to incur some costs ... some form of regulatory intervention would probably be necessary ...in the US mobile market the level of penetration has remained lower and it is likely that this is in part a consequence of the RPP arrangement ... it seems economically more efficient that the cost of a consumption decision (i.e. the decision to make a call) should be borne by the person who takes that decision (i.e. the calling party).” (ibid.)

¹²⁸ Oftel consultation on *Review of mobile wholesale voice call termination markets*, 15 May 2003, Responses by Orange (July 2003) and T-Mobile (24 July 2003).

¹²⁹ *Statement on wholesale mobile voice call termination*, Ofcom, 19 December 2003, Annex D, paras D.7 – D.13, pp. 182-183. In addition to the previous concerns, Oftel/OfCom reiterated the claim that mobile subscribers could keep their phone switched off or not disclose their mobile number. It now said that “the cost of implementing an RPP solution, which would require a change of systems for all MNOs plus the allocation of significant blocks of numbers, could be very high” and “where RPP is currently available to consumers in the UK, take up is very limited”. It noted that “the MNOs can implement RPP services in parallel with existing ones and the Director will examine any evidence they may bring about the level of take-up.”

originating network, whether fixed or mobile. There would be no constraint on the charges that the mobile operators make to their own subscribers.

2.13 Cost and disruption to mobile operators

Would RPP be disruptive to mobile operators? In general, the operators have not claimed this, which is not surprising since many of them operate on that basis in the US and elsewhere. An industry commentator reports that ‘critics of RPP’ envisage “huge administrative costs”.¹³⁰ However, the same commentator also reports that ‘billing experts’ he contacted take precisely the opposite view: the change would be technically easy, the practical issues virtually nil, the cost not significant and the technical work straightforward.¹³¹ This ‘expert’ view is consistent with views reported by the UKCC.¹³²

Any change in regulation and any increase in competition necessitate some rethinking and some repackaging of each company’s calling plans, and a consequent need to explain and justify their proposals to customers. Mobile operators would obviously need to respond to zero (or at least lower) wholesale termination charges. However, they would have discretion how to rebalance their other mobile charges, subject only to the pressures of the competitive market. The evidence set out above suggests that they would more than offset any incoming call charges by reductions in outgoing call charges, which would assist in explanation and justification. (Whether they would actually introduce charges for incoming calls is unclear, as discussed below.)

Operators would probably reduce initial discounts on subscription charges, reduce but not eliminate handset subsidies, and reduce the range of handsets available, but would not need to publicise any of these modifications. Explaining and justifying their proposals to customers would presumably be easier if all operators had to revise their policies at the same time, which would be the case with a general mandated switch from CPP to RPP.

Offsetting any costs and disruption to mobile operators would be a reduction in the burden of regulation. They would no longer need to record incoming calls (though they might wish to do some analysis for their own marketing purposes) nor bill other operators. Fixed operators and their customers would no longer have to cross-subsidise mobile operators. Neither kind of operator would henceforth need to incur the heavy costs of periodic price control reviews on mobile termination charges.

¹³⁰ “Critics also point out that fixed and mobile operators would incur huge administrative costs if they were to change their billing systems to accommodate RPP.” Richard Handford, “Academic report: mobile called party should pay if termination rates are to come down”, *Telecom Markets*, June 1, 2004, pp. 3-4.

¹³¹ “Such a change would be technically easy for operators, say experts contacted by *BP* billing experts argue that it would be relatively simple and cheap to do. They say the practical issues in changing from CPP to RPP would be virtually nil, with only minor changes necessary to an operator’s billing system. ... The consensus view among experts is that a shift to RPP would not cost an individual cellular operator a significant amount. Estimates vary from tens of thousands of euros up to euro 100,000 – 200,000 (US\$123,000-246,000). ... But the technical work involved would be straightforward, say all experts, offering few practical obstacles.” Richard Handford, “RPP might be a cheaper option, but it’s also a risky one”, *business plus*, vol. 6, no. 10, June 14, 2004, p. 6, at www.telecoms.com/billingplus.

¹³² “The evidence we received suggested that the MNOs might be able to change their systems to RPP at reasonable cost.” (UKCC 2003 vol.1, pp. 113-4)

2.14 Disadvantages to customers

The nature of the alleged disadvantages to customers is seldom spelled out in detail. Some suggest that mobile operators would need to engage in additional marketing because customers would initially be resistant to paying to receive calls.¹³³ Oftel explained the political and other problems that this ‘consumer resistance’ would cause for itself and the competition authority.¹³⁴

It is true that consumer groups in the UK have argued against a change from CPP to RPP. Internationally, INTUG has noted the problems of changing from CPP.¹³⁵ Customers in Singapore reportedly favoured free incoming local calls.¹³⁶ And some US visitors have seen attractions in European practice.¹³⁷

However, paying to receive calls is widely accepted by customers in RPP countries. Although the leading US mobile operator association favoured the introduction of CPP in 1999, consumer groups in the US opposed this.¹³⁸ If mobile operators did introduce charges for incoming calls in present CPP countries, such charges are unlikely to be high, and would be more than offset by reductions in charges for outgoing calls. International experience is that average price per call-minute in RPP countries is about half the level in CPP countries. Most customers would be better off.

Recently, some refer to a possible huge increase in junk or marketing calls.¹³⁹ However, although these are a problem in the US as elsewhere, RPP is not perceived there as the cause of unwanted calls to mobiles (cellphones). There would still be a

¹³³ A change to RPP “would probably get a negative reception from users. ... The much harder task for operators would be selling the change to their customers. ... A heavier expenditure [than on billing systems] would be on the additional marketing needed to explain the change to users. That could run into millions of euros.” Handford, *business plus*.

¹³⁴ “In Oftel’s view, existing mobile users would react strongly against having to pay to receive calls. Oftel would have a hard job explaining that overall it was in their interests to pay for such calls when previously they received them for free. Oftel believes that MNOs would also be likely to criticise the changes, lobby against them, and blame the CC and Oftel for their introduction. The political outfall would be considerable.” Oftel 2002, para 12, p. 4.

¹³⁵ Submission to FCC Notice of Inquiry into the effect of foreign mobile termination rates, INTUG (International Telecommunications Users Group), January 2005, p. 4.

¹³⁶ “‘In two separate polls conducted by The Straits Times Interactive and Infocomm Development Authority of Singapore last year, 95 per cent and 80 per cent of survey participants wanted free incoming [and] local calls respectively.’ It [StarHub] said in a statement yesterday.” *Straits Times*, 29 March 2003, at http://it.asia1.com.sg/newsdaily/news003_20030329.html. It is not clear what the participants were told about the likely impact on prices of outgoing calls.

¹³⁷ “This situation [free incoming calls] certainly encourages one to give out one’s cellphone number and to invite people to use it! ... Receiving free incoming calls is one of the most pleasant experiences imaginable!” <http://www.thetravelinsider.info/2002/03/0315.htm>.

¹³⁸ Crandall and Sidak 2004, p. 19. “In particular, the Texas Office of Public Utility Counsel (OPC), the Consumer Federation of America (CFA) and the Consumer Union (CU) submitted joint comments to the FCC arguing against CPP. The reasons cited included the fact that prices would rise for the calling party and this would reduce accessibility to mobile users ...” Frontier, *Modelling*, p. A32, citing Joint comments of the Texas Office of Public Utility Counsel, Consumer Federation of America and Consumer Union (OPC/CFA/CU) dated September 1999, FCC Notice of Inquiry, WT Docket No. 97-207.

¹³⁹ “Free calls to mobile phones would lead to enormous volumes of junk traffic such as marketing calls, causing huge irritation – and cost – to users.” Handford, *Telecom Markets*. “The lower cost of calling mobile phones would lead to a huge increase in unwanted marketing calls, with resulting discontent.” Handford, *business plus*.

charge for originating calls, albeit possibly smaller than in CPP countries, so junk and marketing calls would not be free. Telemarketing to both fixed and mobile phones is restricted in the US.¹⁴⁰ Such restrictions could be applied or extended elsewhere if desired.

2.15 Switching off mobile phones

The claim that RPP would or might lead to significant numbers of consumers switching off their mobile phones was the UKCC's only specific reason for deciding against RPP. It is an emotive proposition that is still advanced today.¹⁴¹

An ITU Workshop on mobile interconnection suggests a mixed picture.¹⁴² In Mexico, subscribers reportedly turned off their phones before the change from RPP to CPP.¹⁴³ In China some phones were on "stand-by" as a result of RPP but there is no reference to switching off or standby phones in Hong Kong.¹⁴⁴ Many customers reportedly kept their phones switched off in St Kitts & Nevis before the change to CPP.¹⁴⁵ However, the case study of India, where the courts blocked the proposed change from RPP to CPP, does not mention the phenomenon.¹⁴⁶ The Singapore regulator indicates that phones are not turned off in the RPP system there.¹⁴⁷

Anecdotal evidence suggests that switching off occurred in the early days of US mobile telephony, and withholding of telephone numbers was also noted.¹⁴⁸ In 1999 the FCC reported "significant evidence that CPP would help encourage CMRS [Commercial Mobile Radio Services] subscribers to leave their handsets on", although it did not exhibit this evidence.¹⁴⁹ However, other commentators were noting

¹⁴⁰ The Telephone Consumer Protection Act 1991 prohibits the use of automatic dialers for delivering prerecorded messages. Telephone solicitation calls to the home are prohibited before 8am or after 9pm. The FTC and FCC have operated a national Do-Not-Call registry since October 2003. There are no mobile phone directories at present, Directory Assistance does not extend to mobiles, and inclusion in any future directory or Directory Assistance programme would presumably be voluntary.

¹⁴¹ In addition to sources cited above, see Feldmann 2003, p. 6; Bomsel et al 2003 p. 20; Thompson et al 2005.

¹⁴² Samarajiva and Melody 2000; see also Samarajiva 2001.

¹⁴³ Briceño 2000, p. 25; see also Zehle 2003.

¹⁴⁴ "Fixed-Mobile Interconnection: The case of China and Hong Kong SAR", Xu Yan, Fixed-Mobile Interconnection Workshop, ITU New Initiatives Program, Geneva, 20-22 September 2000, pp. 10, 12. (The recent demand for CPP noted in the text above comes from mobile operators rather than from customers.)

¹⁴⁵ Mobile Marketing, Cable & Wireless, St Kitts & Nevis, cited in Zehle 2003, p. 10.

¹⁴⁶ "Fixed-Mobile Interconnection: The case of India", Lara Srivastava and Sidhartha Sinha, Fixed-Mobile Interconnection Workshop, ITU New Initiatives Program, Geneva, 20-22 September 2000. See also Srivastava and Sinha 2001. It has been said that subscribers changed their telephone number instead. Stefan Zehle, personal communication, 30 October 2003.

¹⁴⁷ "It is unlikely that a move to CPP will bring about a significant increase in traffic volumes or mobile usage as users in Singapore already do not restrict incoming calls even under MPP." *Charging for mobile phone services: MPP vs CPP*, Infocomm Development Authority of Singapore (IDA), 23 September 2002, para 4.

¹⁴⁸ "... customer research carried out by Bell Atlantic (2001) ... found that personal users in the US had relatively limited distribution of their mobile number under RPP. The main reason cited (by 33% of personal users who did not distribute their number) was that it costs them to receive calls." Frontier Modelling, Annex 3 p. A 28. The Bell Atlantic study is not further referenced there.

¹⁴⁹ Wireless CPP Docket, Declaratory Ruling and Notice of Proposed Rulemaking, FCC 99-137, released 7 July 1999, at para 3. The detailed explication of the quoted statement (at para 23) said only that CPP subscribers "may be more likely to leave their wireless phones in an activated mode" and that

that mobile operators had taken steps to reduce or eliminate the financial obstacles to receiving calls (e.g. by providing “buckets” of free minutes, making the first minute of any incoming call free to the receiver, providing free caller ID).¹⁵⁰ The FCC’s present position is that switching off is a theoretical issue without any practical substance in the US.¹⁵¹

It seems that switching off to save money did occur in some RPP systems in the past. In the absence of tangible evidence, it seems plausible that switching off would be a means of controlling cost, especially for lower income customers, that it is likely to be greater the higher the cost of receiving calls, and that it is more likely to have occurred in mobile networks at an early stage of development. However, there seems to be no quantitative evidence anywhere on what proportion of mobile subscribers in RPP networks switched off their phones, nor on what proportion of the time these phones were switched off.¹⁵² Nor are there comparable figures for CPP networks, where subscribers may also switch off mobile phones (for example, in order to avoid being disturbed at inconvenient times, to avoid particular calls, or simply to avoid running down the battery.) It is presumably the difference between the proportions for the CPP and RPP systems that is of concern.

This lack of quantification and evidence is an unsatisfactory basis for responsible policymaking.¹⁵³ But it seems that the issue is no longer relevant. In the past, penetration and income levels were lower than today, the charges for receiving calls were higher, and this issue may have been a valid concern. Today, switching off mobile phones to save money is no longer an issue in most RPP countries. The threat of switching off is thus no longer a credible argument against RPP in policy debates in developed economies today.

2.16 Adverse impact on economic efficiency

an RPP subscriber “may turn his or her wireless phone off”. The FCC referenced five industry sources for its general comments about CPP (footnote 53); I have not been able to examine these sources.

¹⁵⁰ Doyle and Smith 1998, p. 482, Hausman 2002.

¹⁵¹ “In theory, MPP [RPP] creates an incentive for wireless subscribers to switch off their mobile phones when not placing calls to avoid being charged for incoming calls, and for the same reason it also discourages them from giving out their mobile phone number. ... In practice, U.S. mobile operators have managed to counter the potentially adverse incentive effects of MPP [RPP] by introducing bucket plans to stimulate usage.” FCC *8th Mobile Report*, paras 212-213. C.f. also Crandall and Sidak 2004 p.16 citing Linda Mutschler, *The Next Generation VII*, Merrill Lynch, Equity Research, Feb 21 2003, p. 28.

¹⁵² Oftel (2002, para 3) claimed “in USA 20% of mobile customers never switch their phones on except to make a call”, though it immediately qualified this remark (fn 1) by noting that “The trend may have changed recently, as US MNOs have recently introduced packages with generous quantities of bundled free minutes covering both inbound and outbound calls.” Oftel has subsequently attributed the statistic to evidence provided to the UKCC by the industry, but I have not seen this evidence. One company subsequently mentioned the statistic but it was simply citing Oftel. *Review of mobile wholesale voice call termination markets: Energis Response*, Oftel, 24 July 2003, p. 10.

¹⁵³ Whether switching off mobile phones is an unambiguous detriment also seems worth a little consideration. If this prevents the receiver from unwanted disruption, or receiving an unwanted call, then it represents a benefit. Many other people might welcome a reduction in the number of mobile phones switched on, particularly in trains, restaurants, shops and public places. Some provision is made for this in some places, but the welfare analyses do not seem to consider this factor, or negative externalities more generally.

The recognition that ‘RPP would remove the competition problems associated with CPP’ seems to have superseded early arguments that RPP would reduce economic efficiency. Oftel has nonetheless argued that RPP could be less efficient than CPP because of the failure of the receiver to take into account the benefits accruing to the caller.¹⁵⁴ There are several reasons why this argument is not persuasive.

First, it is equally possible that CPP could be less efficient than RPP because the caller could fail to take into account the benefits accruing to the receiver. CPP and RPP could each fail to provide some beneficial calls. Whether one system is better than the other in this respect is an empirical matter: there is no theoretical reason why CPP is more efficient here, and no empirical evidence has been adduced. In fact, it has been argued that CPP would be less efficient.¹⁵⁵

Second, there are ways of internalising such externalities where one subscriber is particularly concerned to hear from another subscriber.¹⁵⁶ This applies in either system.¹⁵⁷ This would seem more efficient than using the blunt instrument of CPP or RPP for such purposes.¹⁵⁸

Third, there is now abundant international evidence that unregulated CPP leads to termination charges substantially in excess of cost, whereas RPP does not. Regulation can reduce some of the imperfections of CPP, but is still associated with higher costs per call, fewer calls, and continuing discounts or subsidies on subscriptions and handsets. It has not been demonstrated that any externality benefits of CPP offset the significant and observable distortions that it entails.

RPP is more efficient than CPP in other respects. For example, with RPP, operators are not constrained to a single termination charge: they can and do offer their customers rates that decline with usage (via ‘bucket plans’ etc). Subscribers can trade off terminating minutes against originating minutes. If cost declines with output (marginal cost is below average cost), bucket plans can be more efficient than average cost pricing. This is presumably difficult or impossible for operators under a CPP regime, since they cannot ensure that other operators will pass on any declining wholesale rates to individual customers.¹⁵⁹

¹⁵⁴ Oftel 2002, although this was not an argument endorsed by the UKCC.

¹⁵⁵ “when both parties benefit from a call, they should bear its costs in proportion to the benefit they receive. Therefore, imposing all of the costs of an inter-network call on the calling party’s network can be inefficient” DeGraba 2003, abstract.

¹⁵⁶ For example, in both systems the recipient can pay for 800 numbers to enable the caller to call free. In the US it is possible for one subscriber to pay the costs incurred by other nominated subscribers (e.g. dependents) in receiving calls.

¹⁵⁷ Oftel 2002 recognises the possibility of internalisation, and asserts that “it is probable that CPP facilitates the internalisation of a greater proportion of call externalities than RPP”. The basis for this is the suggestion that “the problem of mobile customers not publicising their number is likely to be smaller”. But since mobile customers would have an incentive to ensure that those whom they wished to call them would know their number, it is not clear that this problem is of much practical significance, particularly if (as in RPP countries today) the termination charge is low.

¹⁵⁸ Crandall and Sidak (2004) discuss at some length the practical scope for internalising externalities. Jeon et al (2001) provide a more formal mathematical analysis and discuss some earlier references.

¹⁵⁹ For this and other examples see DeGraba (2000) pp. 27-29. More generally, see Atkinson and Barnekov (2004) on the Coasian rather than Pigovian approach to regulation. The possibility of bucket plan pricing between mobile operators in a CPP system (rather than with individual customers) does not seem to have been explored.

PART THREE: REVIEW AND A WAY FORWARD

3.1 Summary of regulatory experience with CPP and price controls

There has been widespread and increasing concern internationally at the high level of mobile termination charges. Regulators have now largely accepted that this reflects the market power conveyed by the Calling Party Pays (CPP) principle. They have responded by imposing severe price controls on mobile operators, cutting termination charges by up to 65 per cent.

An examination of price control reviews in CPP countries shows that regulators estimate termination charges to be up to twice the level of termination costs. However, they tend to set price controls on the basis of estimated termination costs at the top end (10-11 US cents per minute) of what one regulator has deemed a plausible range of such costs (4 to 11 US cents). Regulators estimate that mobile operators secure considerable income transfers from consumers and/or from fixed operators (about US \$1 billion per year in the UK and Australia). They also estimate that (static) net welfare gains from price control are remarkably small (from US \$1 to \$11 per capita per year). In contrast, the costs of carrying out price control reviews can be heavy: perhaps around £25m - nearly US \$50m - in the last UK exercise.

CPP regulators accept in principle that a waterbed effect exists, whereby high termination charges lead to discounts or subsidies on subscription fees and handsets. However, they challenge its magnitude. They argue that price controls will lead to little or no increase in subscription fees and handset prices and little or no reduction in mobile penetration rate. Mobile operators challenge these assumptions, claim that reducing termination charges will have several adverse effects, and argue that even the low figures for price control benefits are overestimates.

3.2 Summary of experience with RPP and evaluation of regulatory views about it

Countries using the Receiving Party Pays (RPP) principle have not been characterised by excessive termination charges, since these are regulated to zero or a low level. Some lower income RPP countries have had different problems, associated with lack of growth and operator profitability. Some time series studies reportedly show that traffic volumes and profitability increased when these countries switched from RPP to CPP. However, the evidence is conflicting and there may have been other problems including a greater variety of technological systems.

Simple cross-section comparisons suggest that average price (revenue per call minute) is significantly lower in RPP systems, average number of call minutes per subscriber is significantly higher, and there is no significant difference in average penetration rate. Multiple regressions on a larger sample of countries suggest that various other economic and technical factors also have an influence. However, after allowing for these factors, it is still the case that RPP tends to reduce average revenue per minute and increase average usage without adversely affecting mobile penetration.

Comparisons of call charging plans of companies operating in the US and UK confirms that US call charges under RPP are significantly less than in the UK under CPP, particularly for larger volume call plans. Monthly subscription charges are roughly comparable in the two countries, and there are significant handset subsidies in both systems, but there seem to be more initial discounts on the subscription charges and a greater and more subsidised range of handsets in the UK.

Regulatory authorities in CPP countries have been surprisingly reluctant to consider RPP. Only the UK has explored, and then perfunctorily, the possibility of switching to RPP. UK regulators have acknowledged that 'RPP is likely to remove the competition problems associated with CPP'. However, they have identified a number of concerns: that RPP would be costly to operators, that there would be (largely unspecified) disadvantages to customers, that RPP would be less efficient than CPP, and (apparently most importantly in the UK) that subscribers would switch off mobile phones. Most of these concerns have no real substance. However, there is a strong perceived antipathy on the part of CPP customers to the idea of paying to receive mobile telephone calls.

3.3 Continuation of CPP and price control?

What are the available policy options? One is to continue with CPP plus price control. However, this does nothing to remove the termination monopoly and offers no prospect of an end to price control.¹⁶⁰ Nor have the price controls to date made much impact on the market power that led to their imposition. CPP regulators have opted for price controls at the top end of the cited range of termination costs whereas competition in RPP countries has driven prices to the bottom end. This and the focus on static efficiency benefits may partially explain the low estimates of welfare gains from price controls.

Neither the challenges nor the costs of price control reviews can be expected to decrease. If they cannot accurately calculate the relatively objective level of termination costs, there is no realistic prospect of regulators measuring such nebulous concepts as the six varieties of externalities referred to in their various reports. Moreover, economic conditions (demands, costs, technology etc) are constantly changing. The idea of an 'optimal price' is a chimera: there are as many optimal prices as there are different specifications of the underlying economic model. With the cross-subsidies and economic rents at stake the interested parties can be expected to continue to devise new models and to argue their corner. With the consultancy fees available there is no likelihood of economists running out of ideas or agreeing with each other. Regulation of termination charges is a Sisyphean task.

In effect, CPP regulators have taken upon themselves the responsibility for managing cartels of mobile operators: setting prices lower than the members would like, but higher than competition would imply. They have also engaged in active debate with economists representing operators and with other regulators. The setting of price controls is evidently intriguing to regulatory economists.¹⁶¹ Some of the contributions

¹⁶⁰ As one operator put it, "The MMC and the DGT would be taking on themselves the task of regulating prices for ever." MMC 1998, Views of Vodafone, para 7.74, p. 261.

¹⁶¹ The UKCC had two professors of economics on a panel of five, one of whom was the chairman. Could this have been too much of a good thing?

would grace a journal of regulatory economics. But it is a costly process. If regulators and operators in other CPP countries adopted a comparable approach to the UK, then (prorating by population or GDP) the total cost of regulating mobile termination charges would approach \$0.3 bn in Western Europe, \$0.5 bn in developed countries worldwide. Is this really an appropriate use of regulatory resources and company time? And would this approach even be feasible or desirable in developing countries.¹⁶²

Given the endless nature of the price control process, its relative ineffectiveness, and the costs involved, is there not a better way to deal with the problem of mobile termination charges in a CPP regime?

3.4 A change to RPP

The obvious alternative policy is to change from CPP to RPP. This is a policy that has been implemented successfully over many years in several relatively developed countries. Operators are typically familiar with this approach and the costs of introducing it would not be prohibitive.

RPP presents no problem of excessive termination charges, and the clear evidence is that it performs better than CPP in all the main respects. Switching to RPP could be expected to lead to lower average call charges and more use of mobile networks, without any reduction in mobile penetration. Operators would still offer some subsidies on handsets, but probably less than in CPP countries at present and on a more limited range, hence there would presumably be a lower churn on handsets. It is not clear that there would be any significant impact on monthly subscriptions apart from some reduction in initial discounts. Experience elsewhere suggests that, especially with the bucket pricing now commonplace, subscribers would not switch off their mobile phones to control usage, at least in more developed countries.

In sum, a switch to RPP would increase rather than reduce economic efficiency by generating precisely the kinds of static and dynamic welfare benefits that regulators have sought, but would do so more effectively than with price controls and at negligible cost.

The only problem with RPP – and not a negligible one - is that customers in CPP countries are perceived to dislike the idea of paying to receive calls mobile calls. Whether or how strongly they actually dislike it is unknown, and consumer groups in RPP countries have said they prefer RPP to CPP. Nevertheless, the concern has been sufficient to discourage regulators in CPP countries from pursuing the idea.

3.5 Other possible policies

¹⁶² A correspondent comments that the estimated cost of the UK price control process exceeds the gross revenue of the total mobile market in some developing countries. He suggests that, in developing countries, only one or two members of a small and understaffed regulatory office might understand the issues, and would not have the resources to mount an effective critique of the operators' proposed costs and arguments. Such countries would need to rely on international consultants, possibly paid for by international aid, which cannot be an acceptable long-term approach.

There are other ways of capping termination charges, for example by relating them to origination charges by means of a non-discrimination provision.¹⁶³ This would be simpler, more elegant and less expensive than estimating termination costs; would not rely on accurate cost data and costing practices that are simply not available in many countries; and would make greater use of competitive market forces. However, this approach too has disadvantages. For example, it still involves a substantial role for the regulator to set, interpret and enforce non-discrimination. It might also induce some distortion by increasing the incentive on operators to raise the price of outgoing calls.

It has now become apparent that another option is available. A bill and keep regime has traditionally led to RPP. However, it is also consistent with free incoming calls, as have emerged in several RPP countries. The next two sections document this.

3.6 Optional free incoming calls in North America

Until its recent merger with Sprint, Nextel was one of the smaller national carriers in the US. Even now the joint company accounts for only 15 per cent of the US mobile market.¹⁶⁴ In considering how best to respond to the offerings of its larger rivals, Nextel felt that it needed to differentiate itself in some way, as the other operators had done.¹⁶⁵ The company decided to appeal to customers by offering the option of calling plans with free incoming calls, but to be effective this would have to apply to calls from all mobile networks. Some additional capital expenditure would be needed to provide for the additional incoming calls. Nextel introduced these plans around 2003.

Table 10 Calling Plans of Nextel (US)

Charging incoming and outgoing calls				With Free Incoming Calls			
Monthly fee \$	Total mins	Average price cents/min	Incremental price cents/min	Monthly fee \$	Total outgoing mins	Average price cents/min	Incremental price cents/min
46	500	9.2	3.3	50	300	16.7	5.0
56	800	7.0	5.0	60	500	12.0	6.7
70	1200	5.8	8.0	80	800	10.0	7.5
86	1400	6.1	2.3	110	1200	9.2	
100	2000	5.0	5.0				
150	3000	5.0					

Source: <http://nextelonline.nextel.com/NASA> as at 3 May 2005.

Table 10 shows Nextel's calling plans (all of which include free night and weekend minutes). The prices per minute are naturally higher when they apply to outgoing calls

¹⁶³ See for example Wirzenius (1998, 2004) describing a model similar to that used in Finland from 1957. Another suggestion is that the termination rate can never be higher than half of the lowest on-net mobile-to-mobile rate. The UKCC (2003 paras 2.495-2.499) examined and rejected non-discrimination remedies, but seems to have limited itself to non-discrimination between charges to FNOs and MNOs rather than between charges for origination and termination.

¹⁶⁴ Since the merger the top three players are Cingular 28%, Verizon 27% and Sprint/Nextel 15%. "US Mobile Growth Defies Conventional Wisdom", Forrester Research Survey, 13 April 2005, at <http://home.businesswire.com>.

¹⁶⁵ Cingular had introduced rollover minutes; Verizon was offering free incoming minutes from subscribers on its own network, which counted for a great deal since it was the largest mobile carrier; T-Mobile was the lowest cost operator. Nextel had its 'push to talk' differentiator, but this worked only with another Nextel phone.

only than when they apply to all call-minutes. However, the implied price of the incoming calls seems low, and it seems that the two types of plan offer a similar total price for a similar volume of use. For example, Nextel's smallest plans offer 500 total minutes for \$46 or 300 outgoing minutes for \$50. A 500 minute subscriber using up to 300 outgoing minutes can thus extend the 200 incoming minutes to an unlimited number for only \$4 per month.

These calling plans are directly comparable to T-Mobile's plans (Table 9 above). Nextel's plans that charge both incoming and outgoing calls are more expensive than T-Mobile's comparable US plans: for 500 minutes its average price is 9.2 cents/minute compared to about 7.3 cents/minute; for 2000 and 3000 minutes its average price is 5 cents/minute compared to about 4.5 and 3.5 cents/minute (by interpolation). But Nextel's calling plans that charge outgoing calls only are less expensive than T-Mobile's comparable UK plans: for 300 outgoing minutes its average price is 16.7 cents/minute compared to nearly 13 pence or about US 24 cents/minute; for 1000 outgoing minutes its average price is 9.5 cents/minute (by interpolation) compared to 8.5 pence or about 16 cents/minutes. In very round terms, Nextel's comparable prices are about one third higher than T-Mobile's US prices but about one third less than T-Mobile's UK prices.¹⁶⁶

Nextel is not alone. Two regional US mobile companies offer optional plans with free incoming calls in their areas (US Cellular in the Midwest and Cellular South in the southeast). The broadband phone company Vonage provides free incoming calls on all plans. In Canada, at least two mobile operators (Fido linked with Rogers, and Telus Mobility) offer free incoming local calls. 'Bill and keep' at the wholesale level is thus by no means incompatible with offering a range of RPP and CPP calling plans, including free incoming calls if that is what subscribers prefer.

3.7 Free incoming calls in Asian RPP countries

In three Asian countries there has been pressure from some or all of the mobile operators to switch from RPP to CPP. The responses have been diverse.

Singapore introduced full market competition in telecommunications on 1 April 2000. New entrant StarHub offered free incoming calls and also argued for a change from RPP to CPP. The other mobile operators resisted this change. Regulatory body IDA held a consultation and in December 2002 decided against the change.¹⁶⁷ On 31 July 2003, the day before mobile number portability came into effect, market leader SingTel Mobile itself introduced free incoming call plans, some say to discourage customers from switching operators.¹⁶⁸ The third mobile operator later followed suit. Today, all plans offered by all three mobile operators in Singapore include free incoming calls. The charges in the largest plans reduce to about 6.4 US cents per

¹⁶⁶ As of November 2005 Nextel's parent company Sprint had reduced slightly the prices in the smaller conventional plans. Both sets of plans required a two-year subscriber agreement.

¹⁶⁷ *Charging for mobile phone services: MPP vs CPP*, Infocomm Development Authority (IDA) of Singapore, 23 December 2002.

¹⁶⁸ *Business Times*, 23 March 2002, *Straits Times* 1 August 2003, at <http://it.asia.com.sg/newsdaily>.

outgoing minute, with an incremental charge (from the next largest plan) of about 5.2 US cents per outgoing minute.¹⁶⁹ These rates are much below those in CPP countries.

In India, Idea Cellular introduced free incoming calls in Gujarat in July 2002.¹⁷⁰ In January 2003 cellular companies decided to offer free incoming calls across all cellular networks. They were prepared to announce free incoming calls from fixed operators too if the Telecom Regulatory Authority of India would agree to fixed line operators paying an access charge for connecting to mobile networks.¹⁷¹ The Authority did agree, and effectively introduced CPP with a cap on mobile termination charges.¹⁷²

In Hong Kong the operators' pressure for CPP has not brought about a change.¹⁷³ As yet, none of the operators offer free incoming calls.

In all these three Asian countries, the regulatory framework was different from that in the US. Fixed operators were able to terminate calls on mobile networks without charge while the reverse was not the case. Mobile operators seem to have pressed for CPP to overcome this asymmetry of termination charges that existed in favour of fixed operators. It was not that 'bill and keep' was inherently unsatisfactory. Interestingly, companies in Singapore and India perceived free incoming calls as a way of attracting customers, as Nextel did. This provides further evidence that free incoming calls are compatible with 'bill and keep' at the wholesale level, and are likely to be offered by operators if 'bill and keep' were implemented in CPP countries.¹⁷⁴

3.8 Bill and keep as the way forward

'Bill and keep' has essentially all the beneficial consequences of RPP (for which it has traditionally been the basis) but offers the prospect of avoiding the downside. By constraining wholesale termination charges to zero, bill and keep would avoid the

¹⁶⁹ Source: websites for SingTel, Mobile One and StarHub Mobile. In all three cases the largest plans are 700 or 800 minutes, and the free incoming calls apply until December 2007.

¹⁷⁰ "Idea Cellular offers free incoming calls", *Financial Express*, 24 July 2002, at http://www.tata.com/ida_cellular/media/20020724.htm.

¹⁷¹ Under previous arrangements, cellular customers paid an access charge for calls to fixed line networks, but fixed operators (previously a monopoly) have free access to mobile networks. "Cell firms offer free incoming calls", 21 January 2003, <http://www.rediff.com/money/2003/jan/21cell1.htm>.

¹⁷² The Authority's regulation of 23 January 2003 provided that "with the availability of mobile termination charges to cellular operators, there shall be no charge for incoming calls". This regulation was reviewed 29 October 2003, amended 6 January 2005 and is presently the subject of another consultation. See *Consultation Paper on issues relating to the introduction of CPP for cellular mobile services*, Consultation Paper 2000/1, 23 May 2001; *Telecommunications interconnection usage charges (TUC) Regulation 2003*, 24 January 2003; *Notification*, New Delhi 6 January 2005 at Annex A Explanatory Memorandum; and *Consultation Paper on Interconnection Usage Charge Review*, 17 March 2005, all by Telecom Regulatory Authority of India at <http://www.trai.gov.in>.

¹⁷³ "Hong Kong's mobile carriers want the industry regulator to replace the one-way, wholesale charging model that has for decades allowed fixed-line firms to pay nothing for putting through calls onto mobile networks. They have urged the Office of the Telecommunications Authority (OFTA) to consider a calling-party pays (CPP) principle that can even-out the current one-way interconnection charge levied unilaterally on mobile operators by fixed carriers." *South China Morning Post via NewsEdge*, 7 April 2005. <http://www.telecomasia.net>.

¹⁷⁴ It is also reported that one regional mobile operator in Russia implemented CPP, which proved popular, before the country as a whole changed to CPP. Ponder and Markova 2005 p. 32.

bottleneck monopoly problem and the associated waterbed distortions. It is a well-established policy and familiar to international mobile operators. It would be straightforward to introduce: in the UK this could be done following a Competition Commission reference (setting the maximum termination charge to zero instead of a specified level). Alternatively, agreement with the operators would obviate the need for that. It would involve negligible enforcement costs. It would mean lower average call charges than CPP and higher usage without reductions in mobile penetration. There would be some reduction in handset subsidies and initial discounts on monthly subscriptions.

The important point is that ‘bill and keep’ would not mandate paying for incoming calls as with RPP: it would allow mobile operators to offer customers the option of a calling plan with free incoming calls (and higher prices for outgoing calls). If there is sufficient demand – as seems likely given the perceived preference in CPP countries – options for both free and paid-for incoming calls will be offered. If the majority of customers feel sufficiently strongly against paying for incoming calls, and if operators find it expensive or difficult to introduce and market RPP, then the majority outcome (perhaps even the only outcome) will be free incoming calls. Worries about customer reaction to charging for incoming calls would not be an obstacle to reforming the arrangements in countries that presently have CPP.

Is there any downside? There might be less texting, but only insofar as voice was now a cheaper preferred alternative. Constraining termination charges to zero could be seen as heavy-handed. And insofar as mobile operators are the beneficiaries of CPP they would no longer benefit from income transfers from subscribers and fixed operators. However, mobile operators could expect greater usage of their networks, and could recover their termination costs from their own subscribers in whatever way they and their customers deem appropriate. Customers and operators, rather than regulators or economists, would decide how their mobile telephone calls should be priced. ‘Bill and keep’ thus offers a flexibility, competitiveness and efficiency that compulsory CPP does not.

The detailed implications (for example, for virtual network operators and any specialist operators that might be relatively dependent on termination charges) may need some consideration. ‘Bill and keep’ could be extended to fixed networks too, in order to avoid the problems caused by cross-subsidies and distortions in both directions.¹⁷⁵ It has been argued that it could greatly simplify regulation within present CPP countries, be consistent with EU regulatory aims,¹⁷⁶ facilitate international cooperation with present RPP systems, and mesh with peering arrangements for internet backbones and telecommunications interfaces.¹⁷⁷ International roaming is another interesting challenge.

¹⁷⁵ It might be argued that the absence or cost of caller line identification for fixed networks makes RPP more onerous there. However, fixed operators could presumably offer free incoming calls as an option. It might also be argued that competition is less likely to produce a choice between payment options in the fixed sector, and that fixed operators charging to receive calls could be politically unacceptable. However, there seems no reason why fixed operators should introduce charging to receive calls if it would be generally unpopular. See also DeGraba 2000, Atkinson and Barnekov 2000, Valletti 2003, Valletti and Houpis 2005.

¹⁷⁶ “a principle underlying the new regulatory framework is that ex ante regulation should be rolled back when it is no longer needed”, *Relevant Markets Explanatory Memorandum* p. 145.

¹⁷⁷ E.g. Laffont et al 2001, Atkinson and Barnekov 2004.

But such details and extensions go beyond the scope of the present paper. The main conclusions here are (a) that price controls on mobile termination charges are an endless, relatively ineffective, expensive and no longer defensible method of protecting users against a problem created by CPP; (b) that RPP is superior to CPP in all respects except the perceived dislike in CPP countries of paying to receive calls; and (c) that ‘bill and keep’ offers the advantages of RPP without the disadvantage: it represents a solution to the monopoly termination problem that allows competition and customer choice, instead of regulation, to determine how to pay for incoming calls.

Appendix Termination charges in the US¹⁷⁸

The Communications Act 1934, as subsequently modified by the Telecommunications Act 1996 which opened local markets to competition, required all Local Exchange Carriers (LECs) to establish reciprocal compensation arrangements by voluntary negotiation. There was a presumption that the carriers would set access rates (what might be called wholesale termination rates) that reflected cost. Competitive Local Exchange Carriers (CLECs) – in effect, new entrants - were presumed to have costs equivalent to those of Incumbent Local Exchange Carriers (ILECs), hence there was a presumption that rates would be symmetric.¹⁷⁹ But it was open to carriers not to charge each other if this would reduce costs - that is, they could operate on a ‘bill and keep’ basis (sometimes referred to as ‘sender keeps all’). Under this latter system, each carrier sets the retail rates to its own subscribers (for both origination and termination), keeps the resulting revenue, and terminates without charge to the other network any calls coming in to its own subscribers.

As part of the CALLS proposal for restructuring and reducing telecommunications charges, the industry proposed that, as from 1 July 2000, access charges should be reduced to 0.55 to 0.65 US cents per minute. There would be a higher charge (0.95 cents) for the smaller ILECs in primarily rural communities.¹⁸⁰

There was initially no regulation of access rates charged by CLECs to Inter-Exchange Carriers (IXCs). In some cases CLECs set rates much higher than those charged by the regulated ILECs. In 2001 the FCC imposed a cap on CLEC charges equal to the charges set by the adjacent local ILEC.

For purposes of reciprocal compensation, the FCC treated mobile operators as if they were CLECs. That is, there was a presumption that their access rates would be symmetric with those of ILECs and CLECs. Mobile-to-mobile rates were unregulated, but in practice the operators generally adopted a ‘bill and keep’ arrangement. Mobile

¹⁷⁸ This explanation is based on the helpful exposition by Marcus (2004), with subsequent clarification from that author. I understand there have been some changes of detail in the last year or two, but not so as to change the substance of this account. Some have argued for simplification, rationalisation and extension of US arrangements e.g. DeGraba 2000, Atkinson and Barnekov 2000, also Marcus 2004.

¹⁷⁹ That is, the termination charge from carrier A to carrier B would be the same as the charge from carrier B to carrier A.

¹⁸⁰ http://fto.fcc.gov/Bureaus/Common_Carrier/News_Releases/2000/ncc0029c.html; see also statement of FCC chairman William Kennard on 25 February 2000. These access rates are generally considered to be above the costs actually incurred by the local exchange carriers, and to constitute part of the financing arrangements for universal service.

operators were obliged to terminate calls from long-distance inter-exchange carriers (IXCs) but (surprisingly perhaps) had no right to claim compensation. In principle they could negotiate compensation arrangements, but in practice they operated on a 'bill-and-keep' basis.

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