

Competition, Essential Facilities, Bottlenecks And the Pricing of Mobile Phone Service¹

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I. Introduction

Two mobile service pricing frameworks have developed around the world, calling party pays (CPP) and mobile party pays (MPP). With CPP, a wireline customer is billed for placing a call to a mobile phone, and there is no charge to the mobile customer for receiving the call. The mobile customer is charged for placing a call, and there is no charge to the receiving party, wireline or mobile. In contrast, with MPP the mobile customer pays for both incoming and outgoing calls, and there is no charge to a mobile or wireline customer for placing calls to or receiving calls from a mobile customer other than those normally associated with placing a call from a mobile or wireline phone or receiving a call on a mobile phone.²

¹ The views expressed in this paper are those of the authors and may or may not be those of TELUS.

² MPP has sometimes erroneously been called receiving party pays (RPP) (see, for example, Littlechild (2006)). RPP is incorrect because with a call from a mobile to a wireline phone, for example, the

These two pricing frameworks have resulted in different pricing schedules, and the need for regulation is different under each of the two frameworks. These differences have sometimes been recognized in the literature, in particular the more costly call termination charges associated with CPP (see, for example, Littlechild, 2006), but there has not been a rigorous explanation of the causes of these disparities. Understanding the causes of these disparities is necessary to develop a policy response that will effectively address the problem.

This paper provides a more rigorous analysis of the competition and monopoly issues behind the CPP and MPP regimes and offers the tools to understand if regulation is needed under each of the two pricing frameworks and, if so, over what specific prices and under what conditions. To do so, one begins with an analysis of what competition means for mobile service. This continues with the distinction between an essential facility and a bottleneck and the application of these concepts to mobile service in order to understand more completely the reasons for the different pricing outcomes that result under CPP and MPP. The general theoretical framework of essential facilities, bottlenecks, and market power offers particular insight into the specific case of mobile termination rates. The paper also identifies regulatory interventions in selected jurisdictions aimed at the control of mobile termination charges and assesses those measures using the concepts of an essential facility and a monopoly bottleneck.

This analysis can explain, for example, why calls to mobile telephones in countries with CPP are often so expensive, while the overall level of prices under MPP is often much less. With a clear understanding of essential facilities and bottlenecks, and their application to mobile service, it becomes apparent which mobile-related prices might require regulation under various circumstances and which will not, given an otherwise competitive retail market for mobile service.

The second section of this paper addresses the concepts of bottlenecks and essential facilities and explains how these relate to mobile service. The third section of the paper uses these concepts to understand the disparities in pricing between CPP and

receiving party does not pay but the mobile party does. This framework is correctly MPP. The use of RPP indicates that there is not a clear understanding of the MPP framework, and this has probably served to inhibit an understanding of the reasons for the differences, particularly in pricing mobile call termination, between CPP and MPP.

MPP. The final section includes some conclusions and recommendations for regulation of mobile service.

II. Bottlenecks and Essential Facilities

At the outset, it is useful to explain and distinguish between two concepts: an essential facility and a bottleneck. An essential facility is a tangible or intangible asset, subject to monopoly control by a firm or group of firms, that cannot be duplicated or otherwise obtained other than from the owner, and is required as an input to produce a service in the downstream market (Robinson and Weisman 2008, p. 519). It is conventional to trace the origins of the essential facility doctrine to a series of U.S. Supreme Court (USSC) decisions beginning with the decision in *United States v. Terminal R.R. Ass'n*, 224 U. S. 383 (1912) which held that that terminal facilities owned by a group of railroads must be made available, on an equal basis, to rail competitors that did not own the terminal facilities (Robinson and Weisman 2008, p. 519).

A leading formulation of the essential facilities doctrine is set out in *MCI Communications Inc. v. AT&T* (MCI) (1983). In MCI, the Court held that that the following elements must be established for a finding of liability under the essential facilities doctrine:

- (1) Control by a monopolist;
- (2) Inability of the competitor seeking access to practically or reasonably duplicate the essential facility;
- (3) The denial of the access to the facility to the competitor; and
- (4) The feasibility of providing the facility.

Facilities found to be essential have traditionally been subject to mandatory unbundling to permit sharing with competitors. Without access to an essential facility, firms could not enter the downstream market, thereby blocking competition. Furthermore, the owner of an essential facility, having a monopoly, has market power because entry is not feasible. Therefore, if monopoly profits are to be prevented *via* the mandated sharing of an essential facility with other firms, the price of the essential facility must be regulated.

The question of duplicability is at the “core of the doctrine” (Robinson and Weisman 2008, p. 523). If the functionality of a particular facility can be duplicated by a reasonably efficient competitor, then no order for mandatory sharing is justified. In most developed countries, and in many less-developed countries, there are generally a number of independent mobile networks providing service over their own infrastructure. It is doubtful that these networks use any assets – other than numbers – susceptible to characterization as essential facilities. All of the network elements of a mobile network in these countries have been duplicated by other network operators, or can be duplicated,³ with the result that such networks do not constitute essential facilities.

Bottlenecks are different from essential facilities and can arise even in the presence of competing networks with no essential facilities. Call termination is a common type of bottleneck (Armstrong and Wright, July 2008, pp. 1-2). Call termination involves the completion of a call to a subscriber on one network placed by another subscriber using that same network or another one. A bottleneck occurs in this case once the customer receiving the call selects a service provider. This is the case because the network completing the call enjoys a bottleneck on call termination to its customer – there is no way to reach that customer but through the network serving that customer. Even though the retail market is competitive, and even though the customer has a choice of service providers (there is no essential facility), once the customer has selected a service provider (and, consequently, a network), the service provider controls a bottleneck in the form of the call termination to that customer and, consequently, possesses market power. This permits the service provider to raise the price for call termination above market levels, perhaps by a significant amount.

Such call termination bottlenecks have given rise to concerns, probably justified, that network operators are exploiting the monopoly power they enjoy in such a situation by charging termination rates that exceed competitive or cost-based levels. This has particularly been the case with respect to mobile call termination rates in countries with CPP where such call termination rates were not initially regulated and, it would seem, service providers were free to exploit their market power. The problem of call termination bottlenecks, in otherwise competitive retail markets, seems to have revealed

³ This is subject to the qualification that the government permits more than one carrier to use spectrum for mobile communications services. Typically, there are three or more carriers with their own spectrum.

itself over time and has subsequently attracted the attention of regulators in various countries who have sought to constrain the ability of mobile operators to freely establish call termination rates (see, for example, Ofcom May 20, 2009, and TR Daily June 8, 2009).

III. Mobile Service Pricing

CPP was put in place to encourage the adoption of mobile phones. A mobile phone owner could get a phone and keep it on and receive unlimited calls at no charge. The calling party paid, and the calling party, rather than the receiving party, would decide if the call was worth the price. This did encourage the adoption of mobile phones, but it required a separate mobile code so the calling party knew he was being charged. Penetration rates in countries with CPP have generally been higher, although there are substantial measurement problems discussed briefly below that make inter-country comparisons difficult. CPP also resulted in high rates, especially for call termination, because service providers were permitted to exploit the market power resulting from their call termination bottleneck. For whatever reason, regulators found retail service to be competitive, and they did not regulate the prices of retail service, but they also did not regulate the price of call termination, even though it was a bottleneck giving the service provider exploitable market power.

MPP, on the other hand, was designed so that calls to mobile and wireline phones would be transparent to the caller. The purpose was to integrate mobile phones more closely into the telecommunications infrastructure. A caller would not know, when calling a phone number, if it was to a mobile or wireline phone.⁴ Initially, when mobile charges were high, mobile telephone owners sometimes did not give out their numbers or did not keep their phones on except to make calls.⁵ As mobile charges fell, this became a non-issue.

⁴ Mobile carriers in the U. S. and Canada were assigned prefixes, just as wireline carriers were assigned prefixes, with 10,000 numbers (some sharing was implemented eventually), but it was certainly beyond nearly every customer, with the possible exception of telephone company employees, to remember which prefixes were for mobile phone and which were for wireline, and, in any case, it did not make any difference in terms of the price paid to place a call or in the dialing arrangement.

⁵ To address customers' reluctance to receive calls on mobile phones and to be forced to pay for them without having the information to judge if the call was worth the price, service providers did two things.

These two pricing regimes had clearly-specified objectives, and the pricing regimes are consistent with these objectives. Based on this, they are both successful. At the time these pricing regimes were implemented, there did not seem to be any recognition or discussion of the call termination bottleneck and resulting market power. It does seem, though, by accident, that MPP has prevented the exploitation of the market power resulting from call termination while CPP has not. This is because the mobile customer with MPP is responsible for paying the price charged for mobile call terminations; the customer is charged for incoming mobile calls which include the cost of mobile call termination. This price becomes part of the retail price of mobile service as far as the mobile customer is concerned, and it is subject to competition. In the case of CPP, the mobile customer does not pay for the cost of mobile call terminations, and that price is not part of what is subject to retail price competition for mobile service. In the absence of the regulation of call termination prices under CPP, MPP has, therefore, been better for customers. Indeed, the customer under CPP has an incentive to select the service provider charging the *highest* price for mobile call termination if some of that monopoly revenue is used to subsidize the customer's handset or monthly service price.

The consequences of the CPP and MPP pricing regimes are consistent with expectations. Table 1 (Federal Communications Commission 2009, p. 104) shows that minutes of use are generally *much higher* in MPP countries and that revenue per minute is generally *much lower* in MPP countries. Revenue per minute in this context is a reasonable proxy for price, and the lower prices under MPP have had the predictable effect of generating higher minutes of use.

The table also presents data on penetration rates, although these require some qualification. Penetration rates are probably higher in CPP countries, consistent with the expectation that high mobile termination rates under CPP will lead to discounted subscriptions and subsidized handsets, which would in turn be expected to drive higher penetration (Littlechild, p. 256). Mobile service providers under CPP probably use some of the monopoly rents from exploiting their market power over mobile call termination to

First, all provided Caller-ID service as part of the basic service so that the called party had the possibility of determining who was calling before answering. They also provided voice mail as part of the basic service so that callers could leave messages when the called party decided not to answer. Second, some service providers did not charge for the first minute of incoming calls, permitting the called party to answer and determine if he wanted to talk without incurring a charge for airtime.

lower the price of monthly subscriptions and to subsidize handsets.⁶ This further locks in customers, making them more likely to stick with the mobile service provider, enhancing the service provider's market power from the call termination bottleneck. In countries with GSM service, which uses SIM cards (all of the countries on the table except the U. S. and Canada, with some exceptions), penetration is not actually measured, however. What is measured is the number of SIM cards. Partly because of high pricing, many customers in these countries have more than one SIM card. A visitor to a country who purchases a SIM card is also counted. All of this serves to overstate penetration rates in these countries, evidenced in part by suspiciously high "penetration" rates, often over 100%. The significantly lower penetration rates in the U. S. and Canada, where SIM cards are less common and where individuals generally have only one mobile telephone number, are a more accurate measure of actual penetration because it is closer to a measure of the number of individuals who have mobile service than in countries that count SIM cards. The penetration rates in the U. S. and Canada are certainly not as much lower as the data indicate.

⁶ Handsets are offered at a reduced price in MPP countries as well, generally as part of a longer-term service contract. It is not clear whether these discounts or subsidies are as great as those that are generally available in CPP countries.

Table 1: Mobile Market Structure and Performance in Selected Countries

| Country | Average Revenue per Minute (US cents) | Minutes of Use | Mobile Penetration (% of population) |
|----------------------|---------------------------------------|----------------|--------------------------------------|
| MPP Countries | | | |
| USA | 6 | 812 | 84 |
| Canada | 11 | 439 | 61 |
| Hong Kong | NA | 510 | 138 |
| Singapore | 8 | 349 | 125 |
| CPP Countries | | | |
| UK | 19 | 185 | 122 |
| Germany | 21 | 102 | 118 |
| Italy | 18 | 139 | 153 |
| Sweden | 15 | 191 | 115 |
| France | 17 | 249 | 89 |
| Finland | 12 | 307 | 122 |
| Japan | 26 | 138 | 82 |
| South Korea | 11 | 319 | 90 |
| Australia | 16 | 208 | 104 |

Retail mobile service is provided on a competitive basis in nearly all developed countries and in many developing countries throughout the world. In many of these countries, competition for the provision of mobile service is sufficiently advanced that retail prices are not subject to regulatory price controls. This lack of regulation has typically extended to mobile call termination rates and, in CPP countries, concerns have arisen with respect to the excessively high prices for mobile termination. The problem of excessive mobile termination rates has come as somewhat a surprise to some observers given that retail mobile service is provided on a competitive basis in these countries. It appears that this is, at least in part, because the concept of a bottleneck and how it applies to mobile service was not well understood. A further source of perplexity was that the problem of high mobile termination rates did not appear to be an issue in countries that employ a MPP framework.⁷

Over time, various explanations have attempted to account for high mobile termination rates in CPP countries. For example, information asymmetries (consumer ignorance) have been invoked as one possible explanation for high mobile termination rates (Gans and King 2000). Other explanations have focused on network size (Dewenter and Haucap 2005). Still other explanations have focused on forms of network externalities as well as on the desirability of subsidizing mobile handset and subscription prices (see arguments catalogued in Albon and York 2006, p. 369). These explanations, however, do not identify the market power resulting from the call termination bottleneck and the possibility of exploiting this market power under CPP. This appears to be the real reason for the high mobile termination rates in CPP countries.

⁷ The fact that there was confusion over what exactly MPP is, often mis-identifying MPP as receiving party pays (RPP), probably contributed to the lack of understanding of the call termination bottleneck and how it resulted in high prices for calls to mobile networks under CPP.

Although there has been some recognition of the role of the call termination bottleneck in causing high prices for calls to mobile networks (Littlechild 2006, Armstrong and Wright July 2008, pp. 1-2), the interaction between bottlenecks, market power, and retail pricing frameworks has not been well understood. Consequently, remedies are often proposed that do not address the problem. Littlechild, for example, catalogues a range of remedies including the use of multiple SIM cards, price transparency requirements, call termination bypass arrangements, mandated bill-and-keep, among others (Littlechild 2006, p. 244). Ofcom's 2009 consultation on mobile termination rates identifies six possible remedies for dealing with high mobile termination rates, (Ofcom 2009, p.3), but the only solution that addresses the actual cause of the problem is regulation of mobile call termination rates to address the market power resulting from the call termination bottleneck. There is no discussion of the nature of the problem, how CPP permits service providers to exercise market power over call termination prices, nor how WPP provides a market-based solution to the market power problem.

Switching to MPP would also address the problem and would be a remedy for the high price of calls to mobile customers, but the practical considerations of such a switch may make it unlikely to occur. On the other hand, and perhaps perversely, Hong Kong is permitting service providers to switch from MPP to CPP (TR Daily April 28, 2009, and TeleGeography's CommsUpdate April 27, 2009), a move that may have adverse consequences on the price of calls to mobile customers.⁸

⁸ The unique situation in Hong Kong, with different pricing regimes allowed, coupled with the fact that low prices are well-established under the current regime, may prevent the pricing situation from deteriorating to what is seen in countries with CPP.

In general, there seems to be a reluctance among regulators, and among industry observers, in countries with CPP to admit to a problem with CPP and, as a result, to address the market power from the mobile call termination bottleneck by regulating mobile call termination rates. No other solution, other than MPP, will be effective. There are some moves in the European Union, at least, to regulate mobile call termination rates downward, which will begin to address the market power that service providers have as a result of their call termination bottlenecks. But there does not seem to be analysis comparing the advantages of switching to MPP, providing a competitive solution to high mobile termination rates, with the on-going necessary regulation of mobile call termination rates that is required under CPP.

IV. Conclusions and Recommendations for Regulation

MPP, by accident and probably not by design, has led to the prices of all components of mobile service being subject to competition and does not exclude call termination from competitive pressures as is the case under CPP. This means that, insofar as the customer is concerned, MPP has proved to be better in that it delivers lower prices, resulting in, not surprisingly, more usage. While it is difficult for regulators to switch in either direction between CPP and MPP, there seems to be no reason to switch from MPP to CPP. There does, however, seem to be no discussion in CPP countries of the advantages of moving to WPP, which would clearly provide the most effective remedy to the market power that service providers hold over mobile call termination. If regulatory agencies want to maintain CPP, they must do so with the understanding that call termination rates will need on-going regulation because, even though mobile service

might competitive at the retail level for mobile subscribers, mobile service providers can exploit their market power that results from control of a call termination bottleneck.

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