



Market and Competition Issues in Mobile Termination

A REPORT PREPARED FOR VODAFONE NEW ZEALAND

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1 Introduction

Vodafone New Zealand has asked Frontier Economics for its opinion on certain issues relating to markets and competition that are raised by the recent paper released by the New Zealand Commerce Commission (the Commission): *Telecommunications Act 2001: Schedule 3 Investigation into regulation of mobile termination., Issues paper, June 2004*, (the Issues Paper).

We first consider the appropriate definition of the mobile market, outlining the rationale for the definition of a mobile services market in Section 2, and in Section 3 assessing issues with the single-operator termination market definition being considered by the Commission. In section 4 we consider the relevant issues in promoting competition and identifying and addressing market power. Section 5 considers how regulation might promote competition. Section 6 examines the effect of regulation on efficiency. Section 7 presents some conclusions.

2 A mobile services market

2.1 VODAFONE'S DECISION TO ENTER NEW ZEALAND

At the outset of Chapter 4 of the Issues Paper, the Commission notes:

The Commission needs to identify the telecommunications markets in which competition may be promoted as a result of regulatory intervention. However, in contrast to Schedule 1 to the Act, investigations under Schedule 3 do not explicitly rely on the identification of relevant markets.¹

Notwithstanding this, there are very good reasons why the Commission does and should choose to identify relevant markets. In particular, one can only analyse the structure of a market if one can define the market. If one cannot specify the market, one cannot say what it means to enter the market and one cannot examine the extent of concentration in the market.

When Vodafone decided to become a mobile carrier in New Zealand, it decided to invest in a mobile network. It made this investment decision on the basis of projections that it would make sufficient revenue from its mobile operations that it would (over time) be able to justify the investment and operating expenditure that this decision would require. It understood that the revenue that it hoped would justify this investment decision would come from selling a range of services that the network would support: these included a range of originating services and terminating services. Vodafone and other mobile network operators have never made a decision to invest solely to produce terminating services. The decision to enter the New Zealand mobile market was a decision to produce both originating and terminating services.

Vodafone's decision to enter the New Zealand mobile services market through investment in a mobile network illustrates a fundamental and immutable fact about mobile telecommunications: the mobile network that supports terminating services is the same mobile network that supports originating services. No mobile service provider ever makes a decision to begin producing one of these types of service. The decision is always to produce both or to produce neither.

2.2 A CLUSTER MARKET

Mobile termination and origination services are produced within a single cluster market. That is, these services will be included in the same market, but not because they are regarded as close substitutes for each other. Rather, they are included in the same market because complementarities in demand and production mean that firms will only be able to compete by producing both types of services. Mobile termination and originating access services are complements in production and demand such that a firm is required, or best able, to compete

¹ Issues Paper, para 66.

by offering both types of services rather than by specialising in one to the exclusion of the other.

Before examining the extent of substitutability in demand or supply for a given product and seeking to draw conclusions about the market definition based on actual or potential substitution possibilities, it is important to consider the question of how substitution and the process of competition actually operates.

In some cases, it is appropriate to examine the process of competition by considering the substitution for a single product. In other cases, the answer may be that it is more appropriate to consider substitution for a cluster of goods or services.

As noted by Henry Ergas:²

A cluster market arises when the economies of scope are such as to require firms to compete not on individual items but rather on a set of items taken jointly. These economies may operate at a range of levels: in production, with joint production (say, of wool and lamb) being an extreme case; in distribution, as in the optimal assortment of goods sold in retail stores; and in consumption, as in the likelihood of consumers purchasing razors and blades from the same supplier. Examples of clusters (which are merely provided as illustrations and may be controversial in specific instances) include aggregates such as 'in-patient services', which reflects the economies of scope hospitals can derive from providing a full set of the relevant medical equipment, staff and services; 'transactions banking services', which groups together the range of functions for which a branch network is required; and 'grocery stores', which will generally have a core assortment of frequently-purchased 'convenience' goods.

Thus, to say that good A and good B form a cluster is to imply that a firm selling only A or only B would not be able to compete with one selling both A and B – either because the supply cost of producing A and B jointly is substantially below that of producing them separately, and/or because consumers incur additional costs when they purchase A and/or B separately as against purchasing them jointly. This, in turn, implies that a cartel which – out of an initially competitive market – grouped all firms which jointly produced A and B, but excluded those which produced only A or B, could profitably increase the joint price of A and B, and hold that price above the competitive level for so long as entry into full-line supply did not occur. It is consequently the cluster of A and B which meets the 'ideal collusive group' test that underpins modern approaches to market definition.

The activities of mobile origination and mobile termination exhibit classic economies of scope. That is, the cost of undertaking these two activities within the one enterprise is less than the sum of undertaking them in separate enterprises.³ This means that in reality (to adapt the words of the Court of

² Henry Ergas, *Cluster Markets: What they are and How to test for them*, Working Paper, The Centre for Research in Network Economics and Communications, School of Business and Economics, The University of Auckland, page 3.

³ J C Panzar and R D Willig, "Economies of scope", *American Economic Review*, vol 71, 1981, pp 268-72.

Appeal in *Tru Tone v Festival Records*) no mobile operator could run a business on the basis of offering only origination or of offering only termination services.

The economies of scope can be thought of in the following way. The costs of offering mobile services can be divided into three categories.

- Costs that need to be incurred if only termination or only origination services were offered. These costs are said to be common costs; and, in the case of mobile services, would include most of the costs associated with the coverage of a mobile network.
- Costs that need to be incurred as a result of adding the activity of termination services to those of origination services. The provision of termination services requires that a network have the capacity to deliver those services. So a network that delivers origination and termination services will require a greater capacity than one that delivers merely origination services.
- Costs that need to be incurred as a result of adding the activity of origination services to those of termination services.

The economies of scope arise because of what Panzar and Willig called a quasi-public sharable input – in this case the network and marketing costs. If two separate mobile businesses were established (one undertaking origination services and the other undertaking termination services) they would either have to double-up on incurring all the common costs or they would have to enter into a contract for one company to do the originating and one company to do the terminating services and to share the network and marketing costs. No companies have ever entered into such a contract.

The relevance of economies of scope (complementarities in supply) was considered by the High Court and the Court of Appeal in *Tru Tone Ltd v Festival Records*. In that case, the plaintiffs had argued that a separate market should be defined with respect each album because the distributor of any best-selling album had a great deal of discretion as to the price that it could charge for that album. The Court of Appeal had this to say:

Viewed in relation to product and time the single album definition of market ignores commercial realities. It focuses on short run phenomena. It presents a snapshot rather than a moving picture of continuing commercial activity. Supply to distributors is not acquired on an album by album basis, but by licensors giving rights to any album produced by the artist or label. In arranging supply the distributor achieves economies of scope in what is a continuing activity. And retailers and consumers along with distributors are dependent on a flow of new albums to join and, in part, to displace existing albums – a process recognised and encouraged in the promotional and pricing arrangements.⁴

Any mobile service provider has to make a decision as to which geographic markets it enters. No mobile service provider ever makes a decision to offer only

⁴ *Tru Tone Ltd v Festival Records Retail Marketing Ltd* (1982) 2 NZBLC per Richardson J at 103,293.

termination or origination services. To imagine that they would, is to ignore both the facts and commercial commonsense.⁵

2.3 THE APPROACH OF THE ACCC DECISION

The recent decision of the ACCC proposes to distinguish the mobile termination service market from the market for retail mobile services. The Final Decision elects not to include these two services within the same (cluster) market because the two services are sold to different categories of buyer:

The Commission does not believe ... that the MTAS should be considered as being supplied as part of the same cluster of retail mobile services for the purposes of this inquiry. While the Commission agrees there are some complementarities in demand and supply with regard to the MTAS and retail mobile services, the Commission considers that the MTAS (as opposed to the ability to receive calls) is not being *sold* at the retail level to mobile subscribers. This is because the MTAS is clearly a wholesale service sold to other network operators, while retail mobile services are sold directly to a different group of end-users.⁶

This view of the Final Decision follows directly from its explanation of recent approaches to the definition of mobile telecommunications markets in Europe. But, as has frequently been observed by the courts and commentators in Australia and New Zealand, the Australasian approach to market definition does not follow that of other jurisdictions.⁷ In particular, Australian and New Zealand courts consider substitution of both demand and supply when they define markets. The result is that 'Australian and New Zealand courts are prepared to define markets more broadly than appears to be characteristic of the EEC approach'.⁸

The Final Decision's opinion as to the meaning of 'standard cluster market analysis' is inconsistent with the approach that has been taken over many years by the Australian courts, the Tribunal and, indeed, by the ACCC itself. The Final Decision seeks to confine cluster market analysis to cases where the bundle is *sold* to a single type of purchaser.

However, this is not true of the decision by the Australian Competition Tribunal in *Sydney International Airport*. It is hardly surprising that that decision adopted a cluster market for airport services when, clearly, the services sold by Sydney Airport are sold to different categories of buyers. As the Tribunal stated: "Such

⁵ Judgment of Trial Court, quoted by Court of Appeal (per Richardson J) in *Tru Tone*, at 103,292.

⁶ ACCCm Mobile Terminating Access Service, Final Decision, June 2004, p 46.

⁷ See Burchett J in *News Limited v Australian Rugby Football League Ltd* (1996) ATPR 41-466 at 41,677; Nicholson J in *Regents Pty Ltd v Subaru (Aust) Pty Ltd* (1998) ATPR 41-647 at 41,174; and Maureen Brunt, "Australian and New Zealand Competition Law and Policy" (1992) Reprinted in Maureen Brunt, *Economic Essays on Australian and New Zealand Competition Law*, Kluwer, 2003, 239-87.

⁸ Brunt, *Ibid*, 251.

airports also typically provide a bundle of services (for example, international and domestic passenger services and freight services.”⁹

A recent striking example of a cluster market where the business in question sold its services to quite distinct groups of customers is *ACCC v Rural Press*. In that case, the ACCC pleaded a publication market that embraced both advertising services and news information, where the advertising was sold to advertisers and the news information was sold to purchasers of the paper:

The ACCC contends that the relevant market is the market for the provision of services by the publication of regional newspapers containing information and news and advertising, and providing the opportunity for advertising, in the Murray Bridge area (including the Mannum area).¹⁰

Rural Press disputed this market, not on the ground that it was a cluster and so too wide, but on the ground that it was too narrow. The trial judge (Mansfield J) adopted the cluster market pleaded by the ACCC.¹¹ The same arguments were rehearsed at the Full Court, where again the Court supported the ACCC. The argument was not repeated before the High Court.¹²

In *Rural Press*, the ACCC was pleading a cluster market whose dimensions were very similar to those adopted by the Tribunal in *Re 7-Eleven Stores*. In that decision the Tribunal defined a “market for the publication and distribution of metropolitan daily newspapers offering two interconnected products: news, information and entertainment; and classified and display advertising.”¹³ In the language of the mobile termination decision, one of the products is sold at retail (to final consumers) and the other is sold wholesale

These examples from different cases involving newspapers illustrate the proposition that it is quite standard for the Australian courts, the Australian Competition Tribunal and, indeed, the ACCC itself to adopt a cluster market where a business produces services that are sold to distinct groups of customers.

2.4 A CLUSTER MARKET AND THE SSNIP TEST

Paragraph 73 of the Issues Paper refers to the “ssnip” test:

One approach to identifying a significant degree of market power (in the context of market definition) is in terms of the ability of the hypothetical monopolist to increase profits by imposing a small and non-transitory increase in price (a “ssnip”) above the competitive level. For the purposes of determining relevant markets, the Commission will generally consider a *ssnip* to involve a five to ten percent increase in price for a period of at least one year. Starting from a small initial group of close substitutes, other potential substitutes are added to the group, until

⁹ *Sydney International Airport* (2000) ATPR 41-754 at 40,771.

¹⁰ *ACCC v Rural Press Limited* (2001) ATPR 41-804 at 42,735.

¹¹ See para 108.

¹² HCA 75 (11 December 2003) para 27.

¹³ *Re 7-Eleven Stores Pty Ltd, Australian Association of Convenience Stores Incorporated and Queensland Newsagents Federation* (1994) ATPR 41-357 pp 42,672-3.

the hypothetical monopolist is able to profitably impose a *ssnip*. When this occurs, then all possible close substitutes must be encompassed by the proposed market definition.

It is notable that this definition of the *ssnip* test starts off with a single price rather than with a set of prices for the bundle of products that the business in question produces. This is an inappropriate way to determine how to define the market in which termination and origination services are supplied for two reasons:

- First, as outlined above, these services are part of a cluster market. A firm's ability to maintain a SSNIP on an individual product supplied as part of a cluster of goods or services yields no useful information about the appropriate market definition.
- A second and related reason is that for multi-product firms with substantial common costs, the extent to which the price of a given product exceeds its fully allocated cost will not yield any useful information about market definition or market power.

If mobile termination and originating access services are part of a cluster of services that together comprise mobile telephony services, the market definition cannot be informed by considering the ability of a firm to maintain a SSNIP for either the mobile termination or origination services.

To assert that the SSNIP test will inform the appropriate market definition is analogous to arguing that the ability of a supermarket to maintain a SSNIP on a specific product will yield information about the market in which supermarkets compete.

Consider the following example. Suppose a supermarket introduces a 10 per cent increase in the price of caviar. It is highly likely that the supermarket will be able to sustain this price increase. However, this will not provide information about actual or potential substitution possibilities in the market in which the supermarket operates, or facilitate an understanding of the process of competition. The supermarket is competing in the market for supermarket services which is based on a range of factors such as location, product range, and price for key product items. A supermarket's pricing of any given product will reflect factors such as its views about the relative price elasticity of demand for that product. That is, as the Commission, Tribunal and Court has found consistently over the past decade, the market in which a supermarket competes is not the retail caviar market (as would be suggested by the application of the SSNIP test to a particular product line) but, rather, the grocery distribution market.

In the *Queensland Independent Wholesalers* authorisation case, the Australian Competition Tribunal noted complementarities that linked the range of products sold within a supermarket. And they noted that these complementarities are changing over time: The capacity of a supermarket or grocery store to sell a wide variety of items depends on its trading area. Grocery retailers of all sizes sell a range of dry groceries and some other foods (such as eggs and packaged milk), and increase and diversify their product range according to the size of the store..... This retailing formula, where a large supermarket offers a

A mobile services market

comprehensive range of “fresh foods” around a core-product range of conventional dry groceries, is described as the “food emporium” concept, and has proven very popular in recent years. The trend to this design of supermarket has been led by Woolworths Ltd., and is accepted in the industry as the likely future pattern of commercially successful food retailing.¹⁴

The definition of the market in cases of this kind does not, of course, disregard the SSNIP test. Rather it examines complementarities in demand or supply before it applies the SSNIP test. That is, before it examines substitutability, it attempts to define an appropriate group of products to which the SSNIP test can then be applied.

In the case of mobile services, the appropriate market to consider is the market that comprises both terminating and originating services.

¹⁴ *Re Queensland Independent Wholesalers Limited* (1995) ATPR 41-438 at 40,936.

3 A single-operator termination market

3.1 THE SINGLE-OPERATOR TERMINATION MARKET IS CONTINGENT ON CALLING PARTY PAYS

The Recent Mobile Termination Decision of the ACCC is based on its definition of the relevant markets. It considers that there is a separate market for the wholesale mobile termination services of each individual mobile network operator. This judgement is quite fundamental to the whole decision. If one accepts this proposition, it follows that each individual mobile network operator has a monopoly on the provision of the services provided in its market and that this market power is unfettered by competition. This reasoning about market power and competition led the ACCC to argue for declaration of the wholesale termination service.

This definition of markets and analysis of market power was not based on any facts that the ACCC discovered in the course of its investigation. It was based on *a priori* reasoning that has had recent currency in the United Kingdom. The reasoning is that every user of voice telephony wants the option of being able to call every other user. Each mobile network operator has a certain number of subscribers and the network operator is in a strong bargaining position in demanding a price to complete calls to those who have subscribed to its network. The bargaining position is particularly strong because the price that is charged for completing any call is generally not known by the person who initiates the call. Indeed, the person who initiates the call may not even know the identity of the network that is completing the call. Yet the network of the caller will pass on to the caller the price it pays for having the call completed on another network.

The Issues Paper acknowledges the dependence of this particular definition of markets on the system of calling party pays:

Both the ACCC and Ofcom found in their investigations into mobile termination that each mobile network operator has a monopoly in respect of termination on its mobile network. Their conclusions were partly based on the mobile technologies currently available, and on the presence of the Calling Party Pays ("CPP") arrangement (as opposed to the mobile phone subscriber paying for calls received). Under CPP, consumers of the downstream retail services have little ability to constrain the suppliers of mobile termination services. Both the technological characteristics and the CPP arrangement are features present in the New Zealand market.¹⁵

The analysis of the ACCC and Ofcom leads to the conclusion that the mobile termination service will present problems of monopoly no matter how many mobile carriers are established and no matter how vigorous the rivalry among them. These factors would be irrelevant because, so long as New Zealand has a CPP system, each mobile termination service will be an unassailable monopoly with 100 per cent market concentration and absolute barriers to entry.

¹⁵ Issues Paper, para 8.

The reasoning of the ACCC and Ofcom immediately raises the question as to whether regulation can do anything to promote competition. If the market power of each provider of mobile termination services is due to (i) current technology; and (ii) the CPP system, then regulation will not help: it will change neither of the two factors that account for the market power of any of the mobile operators.

Indeed if it was in fact CPP that established market power for mobile terminating networks, we would not expect there to be any move away from this model. However, commercial experience is that Vodafone does offer services on the basis of RPP. Frontier is aware that Vodafone will be providing information to the Commission about the pricing of these services.

3.2 THE SINGLE-OPERATOR TERMINATION MARKET FOCUSES NARROWLY ON A PARTICULAR PRICE

The definition of the single-operator termination market arises because the bargaining power that a network operator has in influencing the price that it can obtain for an individual call is identified with monopoly power in a market. This erroneously leads to a specific focus on a specific price – the price for mobile termination services. Given that mobile operators provide both termination and origination services, the focus on a particular price disregards the commercial realities of a multi-product firm.

Most multi-product firms face different degrees of price sensitivity among the different products that they sell. For some products, the demand will be relatively elastic, which means that seller will have little power to bargain over price. For other products, demand may be relatively inelastic, which means that the seller will have more power to bargain over price. Multi-product firms use this information to set different mark-ups on the goods that they sell. Typically, firms will place higher mark-ups on the price of goods for which demand is relatively inelastic, and lower mark-ups on goods for which demand is relatively elastic. For example, a petrol station in the metropolitan area would typically charge a very low margin on sales of petrol, because motorists are quite price-sensitive and highly likely to fill up at a competing petrol station if there is even a small differential in price. Conversely, petrol stations typically have much higher mark-ups on items such as cigarettes and soft drinks, because demand for such items is not as sensitive to price. Such mark-ups are designed to cover fixed and common costs that cannot be attributed to the sale of any individual item. So long as the market in which the firm operates is competitive, the overall returns to the firm would not exceed its costs (including its cost of capital) in the long run.

This concentration on a particular price can be seen by considering another aspect of the service offered by a mobile operator. Consider what would happen if a mobile operator provided very poor termination service such that it was unable to complete half the calls that were made to its subscribers. It is likely that those subscribers would be upset at being unable to receive their calls and, if the problem were not quickly resolved, they would transfer to an operator which was able to terminate calls.

A single-operator termination market

Mobile origination and termination services are complements in supply: they are characterised by economies of scope. They are also complements in demand: if the provider of mobile services were to increase the price of origination services, it would lose subscribers and so have a reduced demand for its termination services. Of course, under a CPP system this complementarity is not symmetrical; and this fact has been used to support the definition of a single market and the inference of unfettered market power.

An appropriate definition of a market would take complementarities of demand and supply into account. An appropriate market definition would be the market for mobile telephony services. This definition takes into account the fact that mobile telephony service providers offer a package of services, and that the same infrastructure is used for outbound and inbound calls.

4 The identification of market power and competition

4.1 DEFINITION OF EFFECTIVE COMPETITION

Paragraph 111 of the Issues Paper refers to perhaps the most-celebrated definition of effective competition - that offered by the U.S. Attorney-General's National Committee to Study the Antitrust Laws in its Report of 1955:

The basic characteristic of effective competition in the economic sense is that no one seller, and no group of sellers acting in concert, has the power to choose its level of profits by giving less and charging more.¹⁶

The single-operator wholesale mobile termination market is inconsistent with this definition. Single-operator termination markets imply, by definition, that each individual mobile network operator faces no rivals either within the market or in the form of potential entrants. The ACCC reasoned, consistent with its identification of wholesale mobile termination markets, that these markets are perfectly concentrated and surrounded by absolute barriers to entry. However, this unfettered market power that the ACCC identified is not the power to 'choose its level of profits by giving less and charging more'. According to the definitions of markets in the ACCC's Decision, each mobile network operator has this unfettered market power and, indeed, any mobile network operator (even one with only one subscriber) operating in a calling-party pays system would have the same, unfettered market power. However, it is not credible to say that every such mobile network operator could 'choose its level of profits by giving less and charging more'. It is not credible because the large fixed costs associated with establishing a network can only be justified if the network attracts a large number of subscribers. A network would not 'choose' to run its network with the level of losses that would be imposed on it if it had only one subscriber.

4.2 APPROPRIATE COST CONCEPTS

Question 4.2 of the Issues Paper asks about evidence of the relation of prices to cost and about how costs might best be estimated; but it does not specify what concept of cost it has in mind. There are (at least) three concepts of cost that may be relevant to the considerations of the Commission.

It is commonly said that, in economics, all costs are opportunity costs. This means that the notion of cost is only well-defined if one can specify the resource allocation decision that is to be made and the constraints on the person who is making the decision. If one considers the regulation of mobile termination, any or all of the following three cost concepts may be relevant:

- marginal cost;
- total service long-run incremental cost (TSLRIC); and/or

¹⁶ Quoted by the Tribunal in *Re QCMA and Defiance Holdings* (1976) ATPR 40-012 at 17,245.

- the total costs relevant to a decision to enter the mobile services market.

4.2.1 Marginal cost

Marginal cost of termination is the opportunity that is forgone by making a decision to terminate one extra call. If the relevant operator has already invested in a network, the marginal cost of termination can be seen to be very small indeed. It will include no allowance for the costs that are common to the offering of both terminating and originating services; and unless some allowance is made for these, the mobile operator will have no incentive to invest (or continue to invest) in their network.

It is a standard proposition in economics that an efficient allocation of resources occurs when prices are set at marginal costs. This may not be possible if (as is the case with telecommunications) there are substantial fixed and common costs. Nevertheless, considerations of economic efficiency suggest marginal cost as the relevant notion of opportunity cost.

If the regulator is concerned to promote economic efficiency, the standard way to cope with the problem of fixed and common costs is to mark-up marginal costs in accordance with the Ramsey rules so that an efficient operator would recover its fixed and common costs.

4.2.2 TSLRIC

The TSLRIC of the termination service may be defined as the cost that would be avoided if the production of the termination service were discontinued leaving all other output levels (such as originating services) unchanged.¹⁷ This notion of costs (like that of marginal costs) makes no allowance for common costs. In the case of a mobile operator, the TSLRIC of the terminating service would make no allowance for the investment that would be needed to provide the present coverage.

In the case of services other than the mobile termination service, incremental cost does have a relationship to the theory of competition and efficiency. The relationship is to the theory of cross-subsidies. In the case of a firm producing multiple products, a product is said to be cross-subsidised if the incremental revenue it yields is less than the incremental cost of producing the service.¹⁸ It can be shown that such a cross-subsidy is inefficient and will not occur in a competitive market. So the minimum incremental revenue that would be generated by a product in a competitive market is its TSLRIC.

This theory provides little guidance for those who are charged with the regulation of mobile termination rates. The theory requires that one compare the incremental cost with the incremental revenue of providing the termination

¹⁷ This follows from the standard definition of incremental cost. See J C Panzar, "Determinants of Firm and Industry Structure", in Richard Schmalensee and Robert D Willig (eds), *Handbook of Industrial Organization*, vol I, North-Holland, 1989 at p 13.

¹⁸ See G Faulhaber, "Cross-Subsidization: Pricing in Public Enterprise", *American Economic Review*, vol 71, 1975, pp 966-77.

service. However, if a mobile operator refused to provide any terminating services, one would guess that it would lose all its subscribers and its revenue would fall to zero. That is, its incremental revenue from providing the terminating service would be the whole of its revenue. This suggests that TSLRIC would be of no relevance in analysing possible cross-subsidies of termination services by mobile operators: the application of the proper test would always lead to the conclusion that mobile termination services did not receive a cross-subsidy – because their incremental cost would always be less than their incremental revenue. This reasoning does not suggest that mobile termination services generate a cross-subsidy: that would require that they generate more revenue than their stand-alone costs. That is also very unlikely to be the case.

Neither Oftel nor the ACCC has favoured a pure TSLRIC as the basis for regulating the price of mobile terminating services. Both these regulators have acknowledged that it would be inappropriate to place on origination services the burden of providing all the revenue needed to cover the common costs of mobile telecommunications.

4.2.3 The cost of entry

The total cost of investing in and operating a mobile network (including the opportunity cost of shareholders' funds) must be recovered if mobile operators are to invest and are to continue to invest in mobile networks.

This cost is clearly relevant to any assessment of competition and market power. The use of "choose its level of profits" in the definition refers to what is known as 'economic profit'; that is, profit in excess of the opportunity cost of shareholders' funds.

Any multi-product firm will attempt to gain such a margin on the marginal cost of supply of each of its products so that, over the life of its investment, it will earn a rate of return that at least covers the opportunity cost of these shareholders' funds. If it fails to do this, it will regret its investment. Indeed, it will only enter into any investment (or reinvestment) if it believes that it has a reasonable prospect of earning profits of at least this rate.

This theory (that has been part of economics since the eighteenth century) is the basis of the mark-ups on marginal cost that are allowed by the Ramsey rules. That is, the Ramsey rules allow for sufficient mark up on marginal cost such that, summing over all products and the life of the investment, the investor will be able to justify the original investment.

4.3 THE WATERBED EFFECT

In the course of the Oftel inquiry, there was much discussion of what became known as the 'waterbed' effect. This is simply that the higher the revenue available from termination, the greater will be the incentive for mobile operators to attract subscribers. So high revenue from termination is likely to be dissipated through competition for subscribers. So the effect of mobile operators having a strong bargaining position in determining termination prices will not be high

profits for mobile operators but lower prices for services that attract mobile subscribers.¹⁹

Some of the companies argued before Oftel that competition among mobile companies meant that they were earning only a normal rate of return on their funds invested. Accordingly, the waterbed effect could be expected to be of the order of 100 per cent. That is, any reduction in revenue caused by regulation of termination rates would eventually need to be compensated by an increase in revenue from other charges.

The debate in the United Kingdom over the magnitude of the 'waterbed effect' is yet another illustration of the proposition that one can only analyse competition among mobile operators by considering the sum total of their operations. All parties acknowledged the existence of the waterbed effect. There is some confusion as to the real views of Oftel. Although it assumed a waterbed effect of 50 per cent in some of its modelling, Littlechild reports that most of Oftel's modelling assumed a waterbed effect of 100 per cent.²⁰ Despite this implicit assumption in its modelling of a highly-competitive multi-product mobile services market, Oftel still defined a separate market for termination services on each network.

Whatever one's views of the consistency of the reasoning of Oftel, it is clear that the debate in the United Kingdom over the magnitude of the 'waterbed effect' assumes that entry and exit occurs in the business of mobile telecommunications and not in the business of terminating services on a particular network.

4.4 REVENUE FROM MOBILE TO MOBILE CALLS

The Issues Paper raise questions about the state of competition in what it characterises as the 'retail market for the supply of mobile-to-mobile calling services'. Paragraph 137 of the Issues Paper appears to make a mistake in reasoning:

Since the Telecom Mobile and Vodafone mobile networks have roughly equal customer numbers, the number of calls Telecom Mobile customers make to Vodafone customers should be similar to the number of calls Vodafone customers make to Telecom Mobile customers. The mobile termination charges that each mobile carrier has to pay the other should approximately balance out so the level of the charge will not be important. However, a new entrant in the mobile market might find that, on average, its customers make more calls to customers on other networks than they receive. In this case, the level of the mobile termination charge would be important. Accordingly, while New Zealand has only two similar-sized mobile networks, the termination rate charged for mobile-to-mobile calls is not likely to have the same effect on mobile-to-mobile call pricing that it does on fixed-to mobile calls provided by fixed network operators.

¹⁹ For a survey of the debate before Oftel, see Stephen C Littlechild, "Mobile Termination Charges: Calling Party Pays vs Receiving Party Pays", CWPE 0426, April 2004, section 2 (e).

²⁰ Littlechild, *op cit*, pp 13-14.

The mistake is the remark about the effect of termination charges on a new entrant. The reasoning in the paragraph about Telecom Mobile and Vodafone assumes that the subscribers to the two networks do not systematically call subscribers to one network as compared with the other. If this same assumption is applied to subscribers to a new, small network, then that network will have as many incoming as outgoing calls; and it will be indifferent to whether it is making its money from originating or from terminating.²¹

²¹ For a more-formal exposition of this proposition, see Philip L Williams, "Interconnection Prices in Local Telephony: The Implications of Symmetry", pp 4-56 of Australia, Bureau of Industry Economics, *1995 Industry Economics Conference, Papers and Proceedings*, Australian Government Publishing Service, 1995.

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5.1 THE FACTUAL AND THE COUNTERFACTUAL

Paragraph 150 of the Issues Paper suggests that the Commission is contemplating fixing mobile termination charges at total service long-run incremental cost (TSLRIC):

In the current case, the Commission intends to construct a factual in which mobile termination charges in New Zealand are regulated in such a way that they reflect the estimated cost of providing the mobile termination service.²²

As was noted in our earlier paper, all costs in economics are opportunity costs. This means that they are the opportunities forgone as the result of a decision. The decision that the Commission seems to have in mind is the decision by an existing mobile operator to dispense with mobile termination services. That is, the cost of providing the mobile termination service is the cost that could be avoided if a mobile operator were to refuse to terminate calls but were to provide exactly the same level of other services that it is currently providing. This is the usual definition of TSLRIC.

If this is the factual the Commission intends to examine, three observations should be made.

- The first is that, if prices are to be fixed at TSLRIC, the TSLRIC needs to be apportioned among the units of the termination service. In effect, it appears that the Commission proposes prices should be regulated at an average total service long-run incremental cost. That is, although TSLRIC is an opportunity cost as recognised in economics, it is an opportunity forgone as the result of a decision to eliminate the whole of one category of service. It is not an opportunity forgone as the result of a decision to provide one less unit of a particular service. This means that the average TSLRIC that seems to be considered by the Commission is not an opportunity cost: it is not an opportunity that would be forgone as the result of any decision. So, if the user of a service is confronted by the average TSLRIC of that service, the user is not being confronted by the opportunity cost of the decision that the user is making.
- Secondly, in the absence of detailed empirical support, economic theory does not lead to the conclusion that regulation of mobile termination prices at (average) TSLRIC would promote either competition or efficiency. In particular, economic theory has no model that suggests that this is the price that would emerge under conditions of effective competition or that this is the efficient price.

²² Issues Paper, para 150.

- Finally, the setting of mobile termination prices at (average) TSLRIC means that the termination service would make no contribution at all to the costs that are common to the terminating and the originating services. These costs are not likely to be small; they will include all the costs of ensuring the current level of coverage of any mobile service provider. Any fixing of mobile termination prices at (average) TSLRIC would mean that (in a long-run competitive equilibrium) the prices of originating services would have a substantial mark-up on their (average) TSLRIC so as recover all the common costs. This loading of all common costs on originating services is an important factor for the Commission to bear in mind when analysing the effects of its proposed regulation on competition and efficiency.

For the reasons given in response to the issues raised in Chapter 4 of the Issues Paper, Frontier Economics believes that the best way to analyse the effects of the proposed regulation on competition is within the context of an integrated mobile services market. However, Chapter 4 suggest that the Commission is inclined to define the following markets:

- wholesale markets for the supply of mobile termination services on each mobile network;
- a retail market for the supply of fixed-to-mobile calling services; and
- a retail market for the supply of mobile-to-mobile calling services.

For the purposes of this section of the submission, we shall adopt these markets and attempt to analyse the possible effects on competition in each of these markets of the regulation that is being considered by the Commission.

5.2 EFFECT ON COMPETITION IN THE MOBILE TERMINATION MARKETS

The Issues Paper has (tentatively) defined the mobile termination service of each mobile network operator as a separate market. This definition implies that each incumbent has a market share of 100 per cent and that entry is blockaded. The definition also implies that each of the incumbents in these mobile termination markets has unrestrained market power. Furthermore, as the Issues Paper notes, the definition also implies that these propositions will continue to be true so long as: (i) current technologies persist; and (ii) New Zealand has a CPP charging system.

If the mobile termination markets are defined in this way, it follows that regulation cannot promote competition in the mobile termination markets. To the extent that regulation might address any problem of market power in the termination markets, it does so through the regulation of prices, rather than through the promotion of competition.

Regulation, and the consequent lowering of mobile termination charges, will (at least in the short run) decrease the profits of the mobile operators and will, thereby, discourage entry into the business of mobile telecommunications. However, this will not be a long-term effect; it will end when entry has adjusted

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to the new price levels. There will be no change in the (assumed) absolute barriers to entry.

5.3 EFFECT ON COMPETITION IN THE FIXED-TO-MOBILE MARKET

The standard argument as to how regulation of mobile termination charges might promote competition is that it would reduce the likelihood of specialist fixed-line operators being subject to a vertical squeeze by those who combine fixed-line and mobile operations. The argument is that, under CPP, mobile termination services are an input into the production of FTM calls. With a high mobile termination charge, integrated (fixed and mobile) operators can afford to charge a low or negative margin for the origination part of the FTM service; and they will do this to eliminate competition from the non-integrated fixed line operators. In effect, the vertical squeeze is a form of predatory conduct.

The argument is presented in paragraph 147 of the Issues Paper:

It can be argued that the current market structure provides incentives for mobile operators and integrated carriers in particular to keep mobile termination rates high. An integrated carrier with a substantial share of the mobile market can price discriminate by setting retail fixed-to-mobile prices for its most lucrative fixed line customers at around, or even below, the mobile termination rate and rely on the mobile business earning a margin from the high termination charges. This tactic will impose a price squeeze on any fixed network operators trying to offer retail fixed-to-mobile calls in the same market and limit these operators' ability to compete for fixed line customers.

Any evaluation of this argument must focus critically on the costs that are relevant to the decisions of the integrated firm that might undertake the predatory conduct and those relevant to the specialist firm that might be subject to the predation.

As with all arguments about profit-maximising behaviour, the standard arguments concerning predation and vertical squeezes concern the incremental revenue and incremental cost of particular decisions. Predatory conduct is normally modelled as the predator setting prices so that revenue does not cover the (incremental) costs of particular decisions. This forces the predatee out of the market and the predator is then able to restore its margins.

One way of considering this argument is within the framework of the fixed-to-mobile market that is (tentatively) raised in the Issues Paper. The other way of considering this argument is within the framework of fixed-line telecommunications as a whole.

5.3.1 Price squeeze in an FTM market

The Issues Paper defines a 'retail market for the supply of fixed-to-mobile calling services'. The price squeeze argument might be considered within the framework of this market. To make the argument tractable, suppose there are two participants in the FTM market: (i) an integrated fixed and mobile carrier and (ii) a specialist fixed carrier. The incremental cost to the integrated carrier of

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operating in this market is very small: it is the cost that it would avoid if it were to exit this market but to continue all its other activities. That is, one must suppose that the integrated carrier were to continue to provide all its current suite of fixed and mobile services but were to refuse to offer FTM calls. The avoidable cost number would be small because most of the network, marketing and billing costs would continue to be incurred even if the FTM service were to be discontinued.

The avoidable cost to the specialist fixed-line operator of being in the retail FTM market is different from that of the integrated operator. The reason for the difference is that the cost that it would avoid by refusing to supply FTM services includes the expenditure it is making for the mobile termination service. To the extent that this is higher than the avoidable cost to the integrated operator of providing that service, the avoidable cost of the FTM service to the integrated firm is below the avoidable cost of the FTM service to the specialist firm.

In order to make the argument specific, we shall put (purely hypothetical) numbers on the problem. Suppose:

- the avoidable cost of providing the mobile termination service is averaged out at 10 cent per minute;
- the avoidable cost of providing the fixed origination service is averaged out at 12 cents per minute; and
- the mobile termination price is 30 cents per minute.

If we stick with the assumption of per minute costs and prices, the avoidable cost to the integrated carrier of providing FTM calls is 22 cents, whereas the avoidable cost to the specialist carrier is 42 cents. The argument concerning vertical squeezes is that the integrated carrier can price its retail FTM calls between 23 cents and 41 cents and still make a profit, while forcing the specialist fixed-line operator out of the market.

It may further be argued that regulation can help solve this problem by reducing the difference between the avoidable cost of mobile termination and the mobile termination price. Note that no regulator has fixed the mobile termination price at the avoidable cost of 12 cents. That would mean that the mobile carrier would gain no contribution to its common costs from its termination services; and all common costs would have to be recovered from its origination services. The more likely regulatory outcome is that the regulator fixes the mobile termination price so as to allow for some contribution to common costs. For example, the mobile termination price is fixed at 20 cents.

Such a form of regulation will do nothing to address the problem of potential price squeezes. The integrated carrier would still be able to set its retail price (between 23 cents and 29 cents) at such a level that it could make a profit and force the specialist carrier out of the market. The only way to rule out any possibility of a price squeeze is to set the termination charge at incremental cost – or (if the regulator is concerned with short-lived periods of predation) at short-

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run marginal cost. As Gans and King argue, this is the only way in which regulated access prices will be competitively neutral.²³

The strongest argument to the effect that regulation of mobile termination charges might promote competition is that it will help overcome the possibility of a vertical squeeze in the FTM market. However, even if the argument is considered within the context of a retail FTM market, the argument is flawed. It is flawed because it only holds (even within the context of a retail FTM market) if the regulator fixes the mobile termination charge that gives no margin for contribution to common costs. This would place all that margin on originating services; and regulators in England and Australia have not countenanced such a proposal.

5.3.2 Price squeeze in a fixed-line market

The argument in the preceding section was assessed within a framework of a retail FTM market. This facilitated consideration of a specialist carrier being forced from the market. However, the analysis has an air of unreality because it is inconceivable that a carrier (whether specialist or integrated) would be forced to drop FTM calls. Customers demand any-to-any connectivity. So a carrier will only drop FTM calls if it closes down completely.

The problem with the argument in the preceding section is that it ignored what would happen to the revenue of both carriers if they stopped providing retail FTM services. The argument implicitly assumed that the only revenue that would be affected would be the revenue from FTM calls. It failed to consider that the dropping of the FTM service would mean that all of its subscribers would leave the retail network and so the carrier would lose all of its revenue.

Consider the assumed (non-regulated) mobile termination price of 30 cents. If the integrated carrier were to charge a retail FTM price of 30 cents, it might look as though the specialist carrier would improve its profits by refusing to offer a retail FTM service. But that is not necessarily true.

If the specialist retailer were to drop its FTM service, it will likely lose all of its retail customers. In that case, the incremental (avoidable) revenue to the specialist carrier from its FTM service, is the whole of its retail revenue.

Mobile operators do not make a decision to enter the mobile termination 'market'. Similarly, fixed-line operators do not make a decision to enter the 'retail FTM market'. A fixed line operator must offer a retail FTM service as part of its suite of services. So any analysis of predatory behaviour must assume that the fixed line operator will either stay in business or it will close down completely.

This still leaves open the question as to whether the pricing of the mobile termination service may not force a specialist fixed-line operator out of the market or, to put the proposition in an alternative way, whether the regulation of mobile termination charges may not promote competition by encouraging entry

²³ Joshua Gans and Stephen King, "When are Regulated Access Prices Competitively Neutral? The Case of Telecommunications in Australia", mimeo, 2004.

into fixed-line operations? In order to consider this question, one must consider the phenomenon known in the UK as the waterbed effect.

5.3.3 The waterbed effect

The waterbed effect was explained in Section 4.3 above. The intuition behind the waterbed effect is very simple. Consider a mobile carrier. Most of its costs are common between terminating and originating services. In order for it to be viable (in the long run) it must recover these costs and make a return on funds invested sufficient to cover the opportunity cost of shareholders' funds. If we assume an effectively competitive mobile services market, carriers will only just be recovering their costs (including the opportunity cost of shareholders' funds).

If a regulator comes into such a market and requires a reduction in terminating prices, then originating prices must rise. And if the market is effectively competitive, the reduction in revenue from terminating services must be exactly offset by an increase in revenue from originating services.

The waterbed effect applies to fixed-line services as much as it applies to mobile services. If we assume that fixed-line services are effectively competitive, then regulation (and a decrease in prices) of mobile termination services will increase the operating surpluses of fixed-line carriers. Competition among fixed-line carriers is likely to lead to some decrease in prices of fixed-line operators. This decrease in prices will not necessarily be limited to FTM calls. But, the closer the fixed telecommunications market is to effectively competitive, the more likely is it that the increase in net revenue as a result of regulation will be dissipated in a decrease in revenue from a reduction in retail prices.

The waterbed effect alerts us to the proposition that the proposed regulation may well encourage entry (or discourage exit) from the provision of fixed-line services. It may well be that this effect is marginal; and, in any case, it will not be sustained. Regulation will merely decrease some prices (and increase others). This will have the temporary effect of encouraging entry into some activities and discouraging entry into others. It will not change the structure of any market in the long term.

5.4 EFFECT ON COMPETITION IN THE RETAIL MOBILE MARKET

The Issues Paper takes as its starting point that (given current technologies) the CPP system increases the bargaining power of those who offer mobile terminating services compared with an RPP system. If we assume effective competition, we can use the notion of the 'waterbed' to make some generalisations about the relative prices of originating and terminating calls under a CPP system compared with an RPP system:

- a CPP system is likely to have higher mobile terminating prices and lower mobile originating prices than an RPP system; and

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- if regulation is introduced to decrease the mobile termination charges under an CPP system, the likelihood is that this will decrease retail FTM charges and it will increase retail mobile charges.

These propositions follow from the assumption of the ‘waterbed effect’ – to the extent that it applies to mobile and to fixed operators. The ‘waterbed effect’ is merely a colourful way of restating the standard proposition in economics that, in the long-run, firms in a competitive market will earn a rate of return on shareholders’ funds equal to the opportunity cost of those funds. It should be emphasised that this is a proposition about the long run.

Propositions about long-run equilibrium in economics assume that competitive forces (including the possibilities of entry and exit) have had time to play themselves out. The immediate effect of any regulation that decreases mobile termination prices is likely to be a reduction in the profitability of mobile carriers. However, the reduction in profits will have to be regained because firms must earn profits at least equal to the opportunity cost of shareholders’ funds. It is commonly supposed that profits are most likely to be restored by an increase of retail mobile subscription prices.

The above reasoning assumes that competition is effective in both mobile and in fixed line services. To the extent that competition is not fully-effective, some modifications will need to be made to the reasoning. In effect, the waterbed may not be 100 per cent.

5.5 CONCLUSIONS ON EFFECTS ON COMPETITION

Regulation of the form proposed in the Issues Paper will do nothing to promote competition in the markets that the Commission has defined.

- Regulation cannot, by definition, affect the degree of competition in the mobile termination markets.
- Regulation will not affect the ability of integrated carriers to implement price squeezes in the retail FTM markets unless the termination charge is set at the avoidable cost the termination service. Regulators in Australia and the United Kingdom have not proposed such a price because it would force mobile operators to recover all their common costs through margins on originating services. Regulation may lead to a temporary increased incentive to enter the activity of fixed telecommunications; but it will not affect barriers to entry to that market. It will not affect the competitiveness of the FTM market in the long term.
- Regulation will not affect the degree of competition in retail mobile services. Regulation may lead to a temporary decreased incentive to enter the activity of mobile telecommunications; but it will not affect barriers to entry to that market. It will not affect the competitiveness of the retail mobile services market in the long term.

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6 Effect of regulation on efficiency

6.1 THE NEED FOR QUANTIFICATION

The analysis of competition in Section 5 of this Report suggests (via the metaphor of the waterbed) that the effects on efficiency of the proposed regulation are ambiguous. Some prices would be increased; some prices would be decreased. That is, some prices would be higher and some prices would be lower under the factual than under the counter-factual. But the fundamental structure of the markets would not be affected so long as technologies remain as they are and the CPP system is the norm in New Zealand.

As with regulators in the United Kingdom and Australia, the Issues Paper of the Commerce Commission places much emphasis on the relative efficiency of the factual compared with the counter-factual. The importance of allocative efficiency to this inquiry somewhat distinguished this inquiry from others conducted by the Commission:

- In the first place, standard competition analysis will be of little relevance to this particular inquiry. It is hard to see how the proposed form of regulation will have any effect on the structures of the markets that the Commission has defined or the definitions of the markets that we prefer.
- Secondly, the analysis of the effects on welfare are likely to depend on fine issues of quantification. The proposed regulation will cause some prices to increase and some prices to decrease. Whether the net effect is to increase or decrease welfare will depend on fine judgements of the virtues of respective approaches to modelling.

These points are made by a recent paper by Stephen Littlechild, assessing the recent debate over the regulation of mobile termination in the United Kingdom. It raises the issue as to whether, under the New Zealand statute, the Commission is able to address issues of efficiency except so far as they are relevant to a consideration of issues of competition.

Oftel's approach, which the Commission adopted, thus focuses on what economists call 'allocative efficiency': an improved allocation of resources. It is worth emphasising that the logic of this approach demands that detailed welfare calculations be done, no matter how reliable or otherwise they can ever hope to be. Moreover, the use of allocative efficiency as the benchmark means that the net benefits are always likely to be small. In this respect the price controls on mobile termination charges stand in contrast to price controls on other utility networks.

To explain, the RPI-X price controls on gas, electricity and water network serve two main functions: they protect customers from excessive prices and they stimulate the companies to greater efficiency.

The first function has in practice led to significant redistributions of income from producers to consumers, in all three sectors mentioned. However, the logic of the economic analysis underlying the determination of mobile termination rates – in simple terms the waterbed effect – means that the control on mobile termination charges does not serve this function. As noted earlier, it may serve to redistribute

income between different types of consumers, but not between consumers and producers.

The second function of utility price controls has also been remarkably effective elsewhere. Operating costs in particular have reduced spectacularly in gas and electricity, and to a substantial extent in water too. No doubt this reflected the higher costs that accumulated over many years of operation in the nationalised sector of the economy. However, this function too is inapplicable to mobile termination charges: the mobile networks were not built and have never operated in the nationalised sector, and it has not been argued that a purpose of the control has been to improve the efficiency of the mobile operators.

In contrast, the justification for a price control on mobile termination charges depends essentially on promoting allocative efficiency. This benefit – the so-called welfare triangle or dead-weight loss – is likely to be an order of magnitude smaller than the gains from reducing prices or costs. (It reflects the product of two relatively small magnitudes: a change in price or cost times a change in output rather than times output itself.) It also required calculating not only the costs and benefits of the present allocation of resources, but also predicting what the alternative allocation of resources would be and what the costs and values of the resulting outputs would be. As indicated, this is by no means a straightforward task, and for the most part not one that regulators of other utility sectors have taken on board.²⁴

Any comparison of the Commission's factual with their counter-factual will depend, critically, on detailed welfare analysis of the relative sizes of various areas of consumer surplus. A critical part of this modelling will be the optimal way to recover the fixed and common costs of the fixed and mobile networks.

6.2 EXTERNALITIES AND RAMSEY PRICING

Pricing for allocative efficiency in the presence of fixed and common costs is based on three principal propositions. These are:

- in the absence of fixed costs, common costs and externalities, allocative efficiency is encouraged by prices that equal marginal costs;
- the setting of prices at marginal costs may not be consistent with the recovery of total costs because of the presence of fixed and common costs; in this case, economic efficiency is encouraged by marking up prices above marginal costs in accordance with the Ramsey rules; and
- in addition to the adjustment of prices needed to allow for the recovery of fixed and common costs (the preceding point), prices may also need to be adjusted to account for external effects.

Each of these propositions will be considered in turn.

²⁴ Stephen Littlechild, "Mobile Termination Charges: Calling Party Pays vs Receiving Party Pays", CWPE 0426, April 2004, pp 14-15.

6.2.1 In the absence of fixed costs, common costs and externalities, allocative efficiency is encouraged by prices that equal marginal costs.

The economists' presumption in favour of prices being set at marginal cost ('the marginal cost rule') grew out of work by the late nineteenth and early twentieth-century Cambridge economists, Marshall and Pigou. Their contributions were sharpened by debates among writers of the 1930s (such as Dobb, Lange and Lerner) who were exploring how the planning hierarchy of a socialist economy might best promote the economically efficient use of capital.²⁵

Economics always defines costs in terms of opportunities that are forgone as a result of particular decisions. That is, one can only specify what is meant by a cost, if one is quite precise about what decision is being made.

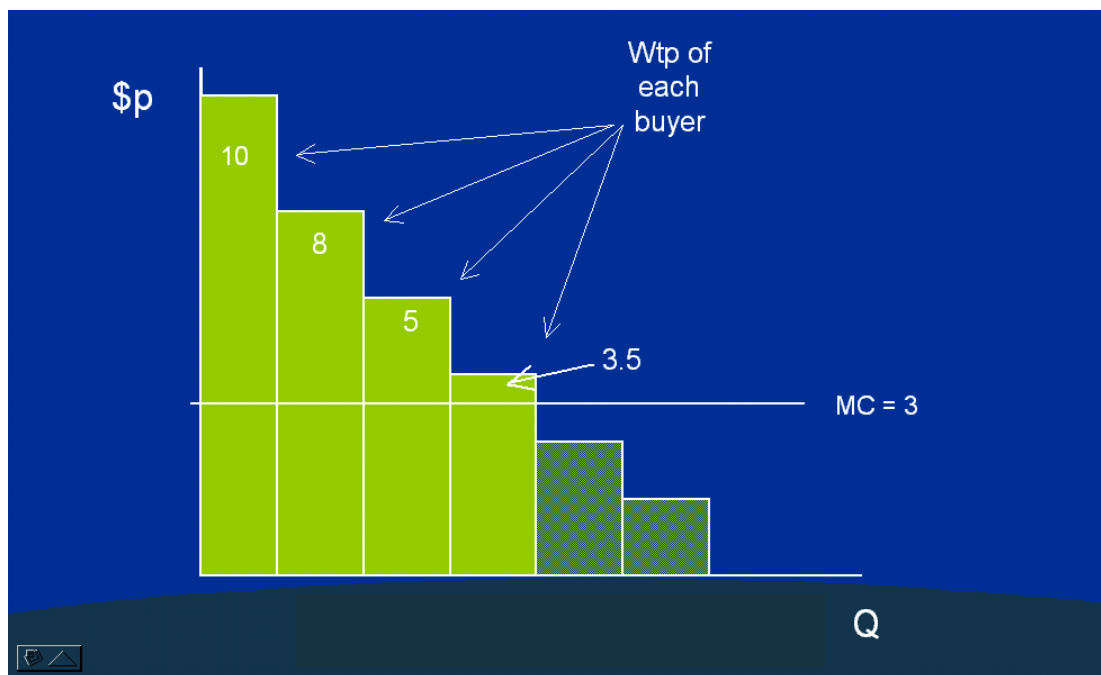
The marginal cost rule is concerned with the decisions of producers as to the rate at which they should produce output from a given stock of infrastructure. The marginal cost is the value of opportunities that are forgone as the result of a decision to increase the rate of output by one unit.

The idea behind the rule that prices should equal marginal costs is that this will ensure that the decisions (as to their rates of output) made by individual producers in maximising their profits will also be consistent with economic efficiency in the sense of maximising the value that can be generated by the resources that are available to society at large.

The logic of the rule can be illustrated with the aid of Figure One. Dollar values are measured on the vertical axis and units of quantity (Q) are measured on the horizontal axis. Economics defines value as the difference between willingness to pay and opportunity cost. Willingness to pay is represented by the green bars in Figure One. These show the maximum that a particular purchaser would be prepared to pay for a particular unit of the commodity rather than doing without that unit. In Figure One, the purchaser with the highest willingness to pay (WTP) is prepared to pay \$10, the purchaser with the next highest WTP is prepared to pay \$8, and so on. So long as the prospective purchaser is willing to pay more than the cost of producing an extra unit of a commodity, then that extra unit should be produced. Figure One suggests that 4 units of this commodity should be produced because for each of those units the WTP of a purchaser exceeds the additional cost to society of producing that unit. The fifth unit should not be produced because the WTP of the purchaser is less than the cost to society of producing that unit.

²⁵ The history of the proposition is surveyed in N Ruggles, "The Welfare Basis of the Marginal Cost Pricing Principle", *Review of Economic Studies*, vol 17, 1949, and N Ruggles, "Recent Developments in the Theory of Marginal Cost Pricing", *Review of Economic Studies*, vol 17, 1949.

Figure 1: The logic of the marginal cost rule



The rule that price should be set at marginal cost can now be explained. By setting the price at \$3, only four units of the commodity will be purchased. The fifth unit will not be purchased because the fifth purchaser would not be prepared to pay a price as high as \$3. If the price were set at \$3, prospective purchasers would, in effect, be forced to pay a price equal to the cost that they would impose on society as a result of their decision to consume that unit of the commodity. So, when making a decision whether or not to consume a unit of the commodity, the consumer will incur all the costs and benefits that accrue to society as a whole. The consumer will make a decision in his or her best interests that will coincide with the decision that is efficient from the point of view of society as a whole.

6.2.2 The setting of prices at marginal costs may not be consistent with the recovery of total costs because of the presence of fixed and common costs; in this case, economic efficiency is encouraged by marking up prices above marginal costs in accordance with the Ramsey rules

Although the marginal cost rule is regarded by economists as the starting point of any discussion about efficient prices, economists rarely advocate the setting of prices equal to marginal costs. The reason for this is that the key qualifying assumptions (zero fixed costs, zero common costs and zero externalities) are rarely met. The result is that marginal cost has to be adjusted to make allowance for these other factors.

Marginal costs are the extra opportunities that are forgone as the result of a decision to produce an extra unit of output. If this decision assumes a given telecommunications infrastructure, the costs incurred in building that infrastructure will not be included in marginal costs. These costs will not vary as a result of a decision to produce an extra unit of service with a given infrastructure. The costs incurred in building the infrastructure are said to be fixed with respect to that decision. If prices are equal to marginal costs, the fixed costs of building the network will not be recovered.

The same is true of common costs. Common costs are those that are incurred as a result of a decision to produce any one of a number of services. These costs are then said to be incurred for a number of services in common. These costs will not be affected by a decision to produce an extra unit of a mobile service. That is, there will be no contribution to these costs by a mobile service if its price is set at marginal cost.

Economics has a well-established method for supplementing marginal costs so as to allow for the recovery of fixed and common costs – in such a way as to minimise any damage that such a departure from marginal-cost pricing might do to efficiency. The rules for the efficient supplementation of marginal costs are known in economics as the Ramsey rules.²⁶

The underlying logic of the Ramsey rules can be explained with reference to Figure One. Although a price of \$3 will enable the recovery of marginal costs, it may be that the minimum price that would enable the recovery of all costs would be \$4.5. That would then be the Ramsey-optimal price. It is defined as the price that would enable the recovery of all necessary costs and cause the least reduction in economic efficiency compared with a price that was set at marginal cost.

²⁶ A survey of the origin of these rules is provided by William J Baumol and David F Bradford, "Optimal Departures from Marginal Costs Pricing", *American Economic Review*, June 1970, 265-83.

In many cases, the application of the Ramsey rules is more-complicated than this. If some common costs need to be incurred in order to generate multiple services, then the Ramsey rules suggest that the mark-up of price on marginal cost should be greater for those services which are relatively price-inelastic. This means that the mark-up should be greater where it causes the least reduction in quantity. The logic behind this is simply that efficiency is best encouraged (consistent with enabling the recovery of all necessary costs) if prices are marked up where they cause the least possible departure from the allocation of resources that would result from the implementation of the marginal cost rule.

As has been stressed throughout this Report, economic costs must be related to decisions. TSLRIC is related to the decision to cease providing a service. To calculate TSLRIC one must ask: how much would a mobile provider save if it ceased to provide any mobile services? That is, the incremental cost referred to in TSLRIC is not the cost of adding only the termination service. It is the incremental cost of adding (or the cost avoided by subtracting) the mobile service as a whole. This cost is then averaged over all mobile services (in an arbitrary manner) to arrive at a price per minute for the mobile termination service. The price per minute cannot be referred to in economics as a cost because it is not an opportunity forgone as a result of any decision.

Economics teaches that fixed and common costs can be recovered in a way that encourages the efficiency with which telecommunications infrastructure is utilised. This involves the application of the Ramsey rules. These rules enable the marking up of prices on marginal costs in such a way as to minimise the loss in economic efficiency caused by raising prices above marginal cost.

6.2.3 In addition to the adjustment of prices needed to allow for the recovery of fixed and common costs, prices may also need to be adjusted to account for external effects

The economic literature on the allowance for external effects dates from the 1920s and 1930s – the same period as the development of the marginal cost pricing rule and the Ramsey rules for marking up marginal costs so as to allow for the recovery of fixed and common costs. The seminal work in the literature of externalities was AC Pigou's *Economics of Welfare*, between 1920 and 1932.

The marginal cost pricing rule is based on the idea that, by setting price equal to marginal cost, the prospective purchaser will be confronted by the costs and the benefits that accrue to society as a result of his or her consumption decision. The cost of the decision is reflected in the price and the benefit of the decision is equal to the willingness to pay of the prospective purchaser.

Pigou showed that there may be costs and benefits in addition to those that are included in the willingness to pay of the purchaser and the marginal cost to the producer. He labelled these additional costs, 'external costs'; and he labelled the additional benefits, 'external benefits'. Pigou argued that external costs and benefits can be included in the calculus of economic decision-makers by means of taxes and subsidies. To the extent that a purchasing decision generates an

external benefit, the prospective purchaser should be subsidised; and, similarly, the prospective purchaser should be taxed to the extent that any purchase decision will generate an external cost. These taxes and subsidies will then ensure that (as with the simple exposition of the marginal cost pricing rule) the prospective purchaser will bear all the costs and benefits of his or her decision.

The Issues Paper observes that a type of demand externality is often said to exist in mobile telecommunications:

According to this externality argument, callers receive a benefit (a “positive externality”) from being able to call other subscribers on a network, and this benefit is not fully reflected in the retail prices faced by the calling party. As more subscribers are added to the network, this benefit increases. The fact that the benefit is not reflected in the price paid by the beneficiary (i.e. the calling party) means that mobile network operators will tend to under-supply the socially optimal amount of service to its subscribers.²⁷

This particular externality is merely a cross-elasticity of demand. Providing we can gain some idea of its order of magnitude, it should not be difficult to allow for it in the modelling that would need to be undertaken if the relative economic efficiency of the factual and the counter-factual were to be compared.

6.3 OVERALL ASSESSMENT OF COSTS AND BENEFITS

The principal argument in the United Kingdom and Australia for the regulation of the MTR is based on considerations of allocative efficiency. It has nothing to do with the promotion of competition in the long term. However, if it is assumed that the New Zealand statutory criteria allow the consideration of pure efficiency considerations, any overall assessment of the costs and benefits of the proposed regulation will depend critically on the modelling of the relative economic efficiency of the factual and the counter-factual. Any modelling of the relative efficiency of the factual and the counter-factual should be based on the economic principles that were outlined in Section 6.2 of this Report. This suggests that the modelling exercise should focus on estimating areas of the relevant demand curves above the relevant short-run marginal cost curves. In markets characterised by substantial fixed and common costs, the relative efficiency of the factual and the counter-factual will depend on which scenario enables the more-efficient recovery of those fixed and common costs. This means that the modelling should be directed to estimating the change in consumer surplus as the relevant markets move from the counter-factual to the factual.

In order to reflect the ‘waterbed effect’ of the long-run zero-profit constraint within mobile telecommunications, the model will need to incorporate (at least) three products:

- mobile outgoing calls;
- fixed-to-mobile calls; and

²⁷ Issues Paper, para 181.

- mobile subscriptions.

The explicit modelling of the prices of these three products will enable the following effects of the proposed regulation to be captured:

- a decrease in the price of fixed-to-mobile calls;
- an increase in the price of mobile subscriptions as dictated by the waterbed effect;
- a change in the price of outgoing mobile calls as a result of a decrease in the (marginal) termination charge and the dictates of the waterbed effect; and
- a shift in the demand curve for fixed-to-mobile calls caused by any reduction in the number of mobile subscriptions.

The data that would be needed for such a modelling exercise would be:

- estimates of the short-run marginal costs of the relevant services;
- estimates of the total costs of the mobile business;
- estimates of the coefficients linking the number of mobile subscribers and the demand for fixed-to-mobile calls and to the demand for mobile-to-mobile calls.

Although this outlines the modelling in a very-rough form, it is desirable that the parties before the Commission agree on the structure of the modelling before any estimation is undertaken.

7 Conclusions

A mobile network operator incurs costs that are common to originating services and terminating services. These costs are principally the costs of coverage of the network. The presence of these common costs and complementarities in demand mean that it is appropriate to analyse any effects on competition of the proposed regulation within the context of a mobile telecommunication services market. If the Commission prefers to utilise the framework of markets outlined in the Issues Paper, it must take account of the complementarities of demand and supply in the provision of originating and terminating services.

The proposed regulation would do nothing to promote competition in the long term. It would raise some prices and decrease others; and these changes in relative prices would encourage entry into some activities and exit out of others. However, this would be a temporary effect while markets adjusted to the revised prices. The argument that the proposed regulation would prevent price squeezes will not apply if the regulation fixes the MTR to allow for some contribution to common costs – as has occurred in the United Kingdom and Australia.

The argument that has generally been employed to justify regulation of the type that is proposed is that it would promote allocative efficiency. It is not clear that this argument is relevant to the criteria contained in the New Zealand statute. If it is relevant, any consideration of the net effects on allocative efficiency can only be made within the context of a proper quantification of the gains and losses of consumer surplus that would occur as a result of the implementation of the proposed regulation. This quantification would depend critically on:

- the precise level at which the MTR was to be regulated;
- the relevant own-price and cross-price elasticities of demand; and
- the precise cost functions that characterised mobile networks in New Zealand.

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