Statement of Jerry Hausman

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1. My name is Jerry A. Hausman. I am the MacDonald Professor of Economics at
   the Massachusetts Institute of Technology in Cambridge, Massachusetts, 02139,
   USA.

2. I received an A.B. degree from Brown University and a B.Phil. and D. Phil.
   (Ph.D.) in Economics from Oxford University where I was a Marshall Scholar.
   My academic and research specialties are econometrics, the use of statistical
   models and techniques on economic data, and microeconomics, the study of
   consumer behavior and the behavior of firms. I teach a course in "Competition in
   Telecommunications" to graduate students in economics and business at MIT
   each year. Issues in mobile telecommunications, including competitive and
   technological developments in the industry, are among the primary topics covered
   in the course. I was a member of the editorial board of the Rand (formerly the
   Bell) Journal of Economics for the past 13 years. The Rand Journal is the leading
   economics journal of applied microeconomics and regulation. In December 1985,
   I received the John Bates Clark Award of the American Economic Association for
   the most "significant contributions to economics" by an economist under forty
   years of age. I have received numerous other academic and economic society
   awards. My curriculum vitae, including a listing of my articles and presentations
   in the last ten years, is attached as Exhibit A.

3. I have conducted significant academic research regarding the economics of the
   telecommunications industry. I have published a number of research papers in the
   area of mobile telecommunications. These papers include "Valuation and the
   Effect of Regulation on New Services in Telecommunications," *Brookings Papers
   on Economic Activity: Microeconomics,* 1997, "Mobile Telephone, New Products
   and the CPI," *Journal of Business and Economics Statistics*, 1999, "Efficiency
   Effects on the U.S. Economy from Wireless Taxation," *National Tax Journal*,
   2000, "Competition in U.S. Telecommunications Services Four Years After the

1996 Act," (with R. Crandall), in S. Peltzman and C. Winston, eds., Deregulation of Network Industries (2000), and "From 2G to 3G: Wireless Competition for Internet-Related Services, R. Crandall and J. Alleman ed., <u>Broadband</u>, Brookings, 2002. I also wrote the chapter on "Mobile Telecommunications" for the *Handbook of Telecommunications Economics*, 2002, edited by M. Cave et. al. In 2003 I gave the Shann Memorial Lecture at the University of Western Australia, "Mobile, 3G, Broadband and WiFi," published in R. Cooper and G. Madden (eds.) *Frontiers of Broadband, Electronic and Mobile Commerce* (2004).

4. I have studied the mobile telecommunications industry since 1984. I provided consulting advice to Pacific Telesis regarding its purchase of Communications Industries in 1985. Subsequently, I have provided declarations and testimony regarding mobile competition and regulation to state public utility commissions and to the U.S. Federal Communications Commission (FCC) on a number of occasions. I have testified before the FCC in en banc hearings where issues in mobile competition were discussed. I have consulted for many wireless service providers in the U.S. I have consulted for wireless service providers in the UK, France, Germany, Spain, Sweden, Hong Kong, New Zealand, and Australia, including Optus and Vodafone. In addition, I have consulted for a number of wireless equipment manufacturers including Motorola, Lucent, Nortel, Ericsson, Samsung, and Nokia. I have been invited to give talks regarding the wireless industry on many occasions, including to the Mobile Telephone Industry Association (CTIA). I have also testified before the United States Congress and Administrative Agencies of the Federal Government on issues involving the mobile industry telecommunications. For example, in 1995, I testified on "Competition in Mobile Markets," Testimony before the U.S. House of Representatives, Committee on Commerce, October 12, 1995. In 2001 I testified on "Competition in Mobile Markets in Australia," before the Australian Competition and Consumer Commission (ACCC)

5. I have extensive experience analyzing antitrust and industrial organization issues. I have published a number of papers in this area, including "A Proposed Method for Analyzing Competition Among Differentiated Products," *Antitrust Law*

Journal, 1992; "Competitive Analysis With Differentiated Products," *Annales d'Economie et de Statistique*, 1994; "Market Definition Under Price Discrimination," *Antitrust Law Journal*, 1996; "Valuation of New Goods Under Perfect and Imperfect Competition," ed. T. Bresnahan and R. Gordon, <u>The Economics of New Goods</u>, University of Chicago Press, 1997; "Economic Analysis of Differentiated Products Mergers Using Real World Data," *George Mason Law Review*, 1997; "Efficiencies From the Consumer Viewpoint," *George Mason Law Review*, 1999; "A Consumer-Welfare Approach to the Mandatory Unbundling of Telecommunications Networks," *Yale Law Journal,* 1999; "The Competitive Effects of a New Product Introduc tion: A Case Study," *Journal of Industrial Economics*, 2002; "Does Bell Company Entry into Long-Distance Telecommunications Benefit Consumers?," *Antitrust Law Journal,* 2002; "Why do the Poor and the Less-Educated Pay More for Long-Distance Calls?," *B. E. Topics in Economics Analysis and Policy* 2004; and "Competitive Analysis Using a Flexible Demand Specification," forthcoming *Journal of Competitive Law and Economics*, 2005.

6. I have testified as an expert witness in approximately 11 antitrust proceedings. The most recent proceeding is <u>U.S. v. Oracle</u> (2004). I have testified in antitrust proceedings in Canada, Australia, New Zealand, the UK, and the European Union (EU) as well as the US. In Australia I testified in "Universal Music Australia vs. ACCC" (2001-2003). I have also been involved in actions before the US Department of Justice (DOJ), the Federal Trade Commission (FTC), the Canadian Antitrust Agency, the Australian competition authorities, the UK competition authorities, the German competition author ities, the Slovenian antitrust authorities, the New Zealand competition authorities, and the European Commission. In addition, I have given a number of invited lectures on antitrust issues to members of the Department of Justice, the Federal Trade Commission, the Australian competition authorities, and to the American Bar Association.

I. <u>Market Definitions</u>

7. In defining markets, I will use the approach used in the "ACCC Merger

Guidelines" (MG, 1999) and which I have previously applied in Australian and U.S. competition proceedings. The MG consider both demand side and supply side substitutability. (¶ 5.39) Market definition considers 4 dimensions: product, geographic, function, and time. (¶ 5.40). The MG adopt a SSNIP approach or "hypothetical monopolist approach"—could a hypothetical monopolist elevate the price above competitive levels for a significant period of time? (¶ 5.42-5.48)

8. The first product market that I consider is a fixed to mobile (FTM) services market. The ACCC claims that fixed to fixed (FTF) calls are not an adequate substitute to constrain the price of FTM calls.[1] I will accept that claim in my affidavit. However, the ACCC never considers whether sufficient demand side substitution exists from mobile to mobile (MTM) calls to constrain a hypothetical monopolist from increasing the price of FTM above competitive levels.

9. Using a SSNIP approach I consider whether if all the fixed line providers formed a cartel (a hypothetical monopolist), could the cartel increase the price of FTM calls above the competitive level by a significant amount and increase their profits? I do not find this result likely to occur because of the constraining effect of MTM calls.[2]

10. In rejecting the constraining effect of FTF calls, the ACCC emphasizes the mobility factor that gives the caller the ability to reach someone at any time, so long as their mobile phone is turned on. Note that MTM allows for this same mobility factor.

11. Since the ACCC states that mobile penetration in Australia is about 72%, (p. 22) the large majority of FTM callers have the option of choosing MTM instead since no convenience will be lost.[3] Indeed, Optus estimates that currently 11 billion MTM minutes are used while only 4.24 billion FTM minutes are used so that

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[1] ACCC, "Mobile Terminating Access Service," (ACCC Report, June 2004), p. 22.
[2] Note that I am not claiming that MTM calls constrain the price of FTF calls.
[3] I note that the June 15, 2004 issue of the *Financial Review* had an estimate of the mobile penetration rate of 83%. Similarly, Prof. M. Armstrong in "Competition in Two-Sided Markets," (revised Feb. 2004) claims that mobile networks in equilibrium have low charges for outbound calls and claim they have high charges for call termination. (p.5) However, he fails to recognize that the low charges for outbound calls will constrain the call termination charges since with a high mobile penetration the large majority of FTM callers can substitute MTM with their "low charges" for FTM.

MTM is used to reach a mobile subscriber about 2.59 times as much as FTM. [4] Dividing the 11 billion by the penetration rate of approximately 0.72 gives 15.3 billion minutes or about 3.60 times as much as FTM on a per subscriber basis. The ACCC has failed to take account of the substitution for MTM for FTM to reach a mobile subscriber. Along both functional and time dimension MTM offers a good substitute for FTM since mobile providers could increase their MTM output without any required increased in their network infrastructure for output increases that would arise from an attempted FTM price elevation.

12. I now analyze the effect of MTM substitution. Vodafone (VOD) charges 20 cents per call (not per minute) for MTM on-net calls. Hutchison (Hutch) offers the first 5 minutes free for on-net MTM calls and then charges the regular rate per minutes depending on the customer plan. [5] Optus charges postpaid customers for MTM on-net calls during peak periods, and it offers free on-net calls during off-peak periods and free on-net prepaid to prepaid calls during both peak and off-peak periods. [6]

13. To apply a SSNIP test I analyze the effect of decisions made at the margin, since pricing decisions are made at the margin. I first consider a hypothetic monopolist of all fixed line carriers. I assume that the marginal cost of a fixed line call is 0.5 cents per minute plus 12 cents per minute paid to the mobile carrier. If I use 21.25 cents as the competitive price of a FTM call, if all fixed line carriers attempt to increase the price by 5% above the competitive price, the strategy will be unprofitable if 10.8% or more of FTM calls are shifted to MTM. [7]

14. I now consider the substitution possibility from the "hypothetical monopolist" mobile provider profitability viewpoint. Suppose that the marginal cost of a

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[4] The Optus estimates are from the submission of Dr. T. Hird (2004), Table 4.1, p. 22.

[5] The free MTM on-net calls are limited to 300 minutes per month.

[6] The free on-net calls are limited to 20 minutes for post-paid customers and 300 minutes per recharge for prepaid customers.

[7] See J. Hausman, "From 2G to 3G: Wireless Competition for Internet-Related Services," R. Crandall and J. Alleman ed., Broadband, Brookings, 2002, for previous use of this type of calculation. I am assuming here that the hypothetical monopolist of fixed calls does not gain profits when a call shifts from FTM to MTM. Even if I were to double the marginal cost of the fixed line component, the amount of call that need to shift to make the strategy unprofitable is 11.4%.

mobile call is 5 cents per minute.[8] If I again use 21.25 cents as the competitive price, if all mobile carriers attempt to increase the price by 5% above the competitive price, the strategy will be unprofitable if only approximately 6.3% of the calls shift from FTM to free MTM.[9] Since mobile penetration is said by the ACCC to be 72%, if 8.8% of FTM callers shifted to their mobile phones to make the calls, the attempted price increase would be unprofitable. Since going forward mobile penetration will increase further, the 8.8% required diversion will decrease. Thus, I conclude that an FTM market is too narrow. Instead, a product market comprising both FTM and MTM should be used. I agree with the ACCC that the geographical scope of the market should be Australia-wide.

15. I next consider the other market at issue: the mobile services market. Here I analyze whether there should be separate markets for mobile origination services and mobile termination services, or whether a market comprising both type of services, as well as other mobile subscription services, make more economic sense.

16. In analyzing this question, it is crucial to recognize that mobile services are an example of a "two-sided" market. A two-sided market exists where customers' demand and valuation of a product or service depends on the usage by the other side of the market.[10] Thus, an important factor in the decision to purchase mobile service by many subscribers is whether they can reach people who have mobile phones and whether other people can reach them. As the penetration of mobile phones increases the demand and value to a consumer increases because the consumer will be able to call more people who will have mobile phones and more people with mobile phones will be available to the consumer.

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[8] The marginal cost is expected to much less than TSLRIC since most fixed investment costs are not included.

[9] I take account of the cost of the fixed line component of FTM in my calculation. The actual price of FTM likely exceeds the competitive price because of the exercise of market power by Telstra. I use the approximate competitive price to base the calculation on which gives a more conservative approach. Subsequently, I support the level of the competitive price that I use here.

[10] J. Rochet and J. Tirole define a two-sided market: " A market is two-sided if the platform can affect the volume of transactions by charging more to one side of the market and reducing the price paid by the other side by an equal amount; in other words, the price structure matters, and platforms must design it so as to bring both sides on board ("Two-Sided markets: An Overview," 2004, p. 40). I would agree with this definition except with the clause "an equal amount." No limitation to an "equal amount" is required in a two-sided market.

17. The two-sided market feature is common in many network industries and often leads to a firm or government subsidizing one side (or both sides) of the market to increase demand. In fixed line telecommunications, government policy in many countries, including the U.S. and Australia, was to subsidize local residential telephone services because as more households subscribed the network became more valuable to all subscribers.[11] Also, in the U.S. most banks allow "free" transactions for consumers for the use of online debit cards because the banks' goal is to cause more merchants to purchase the necessary equipment to allow them to accept online debit transactions.[12] Other examples are auction platforms (e.g. ebay), videogame platforms (e.g. Nintendo, Sony Play Station, and Microsoft X-Box), and software producers who must attract both users and applications developers.[13] Analysis of economic welfare and regulatory policy are usually very different in the context of two sided markets than in the traditional one-sided market situation.[14]

18. When I consider the possibility of a mobile origination services market only, a hypothetical monopolist who attempted to increase price above competitive levels would lose demand from two sources, because of the two-sided market. Marginal customers would decrease their demand for mobile services because outgoing calls would be more expensive, but they would also decrease their demand for mobile services because they would recognize that fewer people would call them since overall mobile service subscription demand would decrease. Since mobile customers place a value on calls they receive, this decreased quantity of incoming calls would affect their subscription decision. Especially in countries with

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[11] As fixed line penetration approaches 100%, this policy has become less important.

[12] In the U.S. a competing service of offline debit cards is also available, and the merchant use its credit card acceptance equipment for these transactions. Another often-used classroom example of two sided markets, is bars (hotels) that have free admission or lower priced drinks for female customers with the aim of increasing the demand from male customers.

[13] For example, software platforms often charge a low price for the applications development kit and often provide software development support for free.

[14] In a recent paper by J. Rochet and J. Tirole, op. cit., the authors state: "It[the paper] also shows that policies adopted by two-sided platforms are radically different that those that are optimal under the "vertical view" of markets, in which the platform supplies an input to sellers who then deal with buyers (so the platform interacts with only one side of the market)." (p. 4) A fundamental mistake in the ACCC approach to mobile termination is that its analysis follows the "vertical view" of the market in which mobiles operators supply mobile termination input to fixed networks who deal with calling parties. The ACCC fails to take account of the two-sided nature of mobile termination in its analysis.

"Calling Party Pays" (CPP) such as Australia, a mobile subscriber would place a very high value (consumer surplus) on incoming calls since they are free.[15]

19. When I consider the possibility of a mobile termination services market only, a hypothetical monopolist who attempted to increase price above competitive levels would again lose demand from two sources, because of the two-sided market. As I discussed above, the large majority of terminating calls are MTM calls, not FTM calls. Thus, a hypothetical monopolist would recognize that increasing the terminating price for mobile calls will lead to decreased demand from potential mobile customers who plan to make outgoing MTM calls, but would now find these calls to be more expensive.

20. From these considerations it follows that to do a correct economic analysis of the mobile services market, one must consider the effects of a given price increase that arises from originating service effects and terminating service effects. Almost no mobile subscriber would purchase mobile service for only originating service or only for terminating service. When a potential consumer subscribes, (s)he would make the decision whether the monthly subscription price is less than the combined value received from originating calls and terminating calls, which she receives for "free." Thus, the hypothetical provider of mobile service would take both originating and terminating services into account when setting its price, since the combined revenues from both services must pay for the variable costs and the fixed costs of the mobile network infrastructure.

21. Perhaps the easiest example is to consider a "bucket plan" where a mobile provider offers a given number of outgoing minutes for a fixed monthly payment, say $50 per month for 200 minutes.[16] A potential subscriber would decide whether the economic value of the 200 (or less) minutes of outgoing mobile calls, both MTM and mobile to fixed (MTF), plus the value of the incoming calls, FTM

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[15] Consumer value for a service is measured as the maximum they would be willing to pay to receive the service minus the amount they actually pay. If the amount paid is zero, the value will be higher ceteris paribus.
[16] Vodafone has recently introduced "bucket plans" into Australia.

and MTM, exceeds $50.[17] Since the hypothetical monopolist knows that the consumer's value depends on both outgoing and incoming calls, it will set the originating and terminating prices to lead to maximum profits. If the hypothetical monopolist only concentrated on one of the two prices, it would not achieve maximum profits.[18] The hypothetical monopolist would be acting in an economically irrational manner. Both government competition authorities, e.g. the U.S. Merger Guidelines (1992), and the U.S. Supreme Court have stated that they will assume that firms do not behave in an economically irrational manner.

22. Thus, given the facts that consumers who subscribe do so on the basis of both outgoing and incoming calls compared to monthly subscription price and that mobile providers (and the hypothetical monopolist) will take into account both originating prices and terminating prices in the attempt to gain maximum profits, I conclude that a mobile services market comprising both origination services and termination services provides the correct market definition to analyze competition. Again the geographic scope of the market is Australia-wide.

23. The FTM market is an example of a vertical market relationship because the fixed provider uses the mobile service as an input to provide FTM service. Since fixed providers also provide long distance and international long distance call services, the market might also include these services. These services may be included in the market because on the demand-side customers generally buy the products together. This outcome may indicate a "cluster market." (ACCC MG ¶ 5.60) However, note that MTM would still compete with FTM as above, because mobile customers also buy national long distance (at no extra charge usually) and international long distance call services with their mobile subscription packa ge. Since mobile international long distance call services are priced very competitively compared to fixed international long distance call services a subscriber who decides to switch from FTM to MTM because of a price increase

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[17] I assume here that the potential subscriber knows her outgoing usage will be less than or equal to 200 minutes per month. Very few mobile subscribers exceed their bucket plan minutes. I demonstrate this proposition in the Appendix.
[18] For example, if a hypothetical monopolist of terminating minutes took over the mobile industry and raised terminating pric es by 5% profitably, it could achieve even higher profits by decreasing the monthly subscription price to create increased mobile subscribers to receive incoming calls, both FTM and MTM.

by the hypothetical monopolist, will not be dissuaded from doing so by the fact that the FTM provider typically sells long distance and international long distance call service in a bundle.[19]

II. The ACCC Has Not Demonstrated that Optus has Significant Market Power for FTM Calls

24. The ACCC "Mobile Services Review: Mobile Terminating Access Service" finds that mobile products are highly differentiated. (Report, p. 98) Thus, the ACCC cannot claim that coordinated interaction (e.g. tacit collusion) is occurring. Each carrier is expected to unilaterally maximize profits. In its MG the ACCC considers the exercise of unilateral market power: "The unilateral exercise of market power does not depend on the cooperation of other market participants. A firm with unilateral market power can assume that its rivals will behave competitively in response to market prices, but nevertheless their capacity to defeat a price rise is limited." (¶ 5.11)

25. In its MG the ACCC uses the definition of market power: "Market power is the ability of a firm or firms profitably to divert prices, quality, variety, service or innovation from their competitive levels for a significant period of time." (¶ 5.6) Here I concentrate on prices and use the definition that market power is the ability to price above the competitive level for a significant period of time. This definition is one I have used in my experience in the U.S. and Australia in previous proceedings.

26. The problem that typically arises in trying to apply a market power test is to determine the competitive benchmark. Under perfect competition, the competitive benchmark is price equals marginal cost. However, with imperfect competition where fixed costs are important, price must exceed marginal cost or the firm will not earn back its fixed costs and will exit the market. Economists

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[19] While international rates are difficult to compare, fixed to international mobile to the UK is 48 cpm. Standard mobile to international mobile is 36 cpm. However, international fixed to fixed is sometimes less expensive than mobile to fixed. Nevertheless, since almost all mobile customers also have access to a fixed line, they can placed the less expensive calls to fixed international receiving parties over their fixed line. This option will provide a significant constraining effect on international MTF calls.

and regulatory authorities have long recognized that telecommunications networks, including mobile networks, have a high proportion of fixed (and sunk) costs in total costs. Thus, marginal or incremental cost cannot provide a competitive benchmark.

27. An approach that I have previous used and that has been accepted by Courts in both the U.S. and Australia is to consider the price of a firm that cannot have significant market power. I use its price to determine a competitive price. If a different firm does not price above this price, I conclude it is not exercising market power. Since the ACCC claims that any mobile carrier, no matter how small has significant market power over terminating calls (Report, p. 54), I consider the price of outgoing calls to determine the competitive benchmark.

A. Hutchison and Vodafone Provide a Competitive Benchmark

28. The Hutchison CDMA network (Hutch) has an extremely small share of 1.9% - 2.1% (Report, p. 73) and Hutch is losing money. (Report, p. 96) Hutch has no barriers to expansion as it has significant excess capacity. Vodafone (VOD) also has a relatively small market share of 15.8%. (Report, p. 73) VOD is not earning its cost of capital. (Report, p. 96) VOD has no barriers to expansion as it also has significant excess capacity.[20]

29. Hutch does not have market power for originating mobile service, nor does VOD have market power. Here the term "market power" means the ability to price above the competitive level for a non-transitory period of time and earn supra-normal profits. Typically, when no barriers to expansion exist no market power can be exercised in a unilateral manner.[21]

B. ACCC Claims that Each Carrier is a Monopoly Provider of Termination Services is Not Supported by Market Data

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[20] The VOD network covers over 90% of the Australian population, virtually the same as Optus. See Table 4.1 of the ACCC Report, p. 73. Also, both Hutch and VOD have significant financial resources to fund expansion. Indeed, VOD is the largest mobile company in the world and has the largest capitalization on the London Stock Exchange.

[21] The ACCC discusses barriers to entry at length but does not consider barriers to expansion.

30. Under the ACCC theory for termination each carrier is a monopoly provider and thus has significant market power. The ACCC states:

> "Given mobile termination services provided on each individual mobile network are defined to be provided in their own individual product markets, it follows that each network operator has a monopoly over the provision of mobile termination services on its own network." (Report, p. 68)

However, this claim is never tested with real world empirical data. Instead, the ACCC compares the wholesale price, claimed to be about 22 cents, to a TSLRIC cost estimate of about 12 cents, and the margin is claimed to demonstrate monopoly power. Thus, the ACCC uses the TSLRIC to provide its competitive benchmark. TSLRIC stands for "total service long run incremental cost" and is often used by regulators as a basis to set prices. I note here that the TSLRIC estimate used by the ACCC is not based on Australian data in any manner.

31. No explanation is given regarding the TSLRIC estimation procedure. However, I have published numerous academic papers that discuss why TSLRIC estimates are incorrect when significant sunk costs exist arising from sunk and irreversible investment. TSLRIC calculations make the assumption that no proportion of fixed costs are sunk. Sunk costs are costs that are not recovered if the firm were to cease providing mobile service. The ACCC MG recognizes the importance of sunk costs:

> "Sunk costs are costs which are unrecoverable on exit, creating a risk from entry. Their extent depends on factors such as capital specificity, whether there are developed markets in rental of equipment and requirements for investment in advertising and promotion." (MG ¶ 5.117)

Mobile radio transmitters and the associated control equipment are capital specific to mobile networks and rental markets do not typically exist. Similarly brand advertising and promotion are in part sunk costs.

32. The assumption of no sunk costs is incorrect when applied to mobile networks where much of the investment is sunk. See e.g. J. Hausman: "Valuation and the Effect of Regulation on New Services in Telecommunications," Brookings Papers on Economic Activity: Microeconomics, 1997; "Regulation by TSLRIC:

Economic Effects on Investment and Innovation," <u>Multimedia Und Recht</u>, 1999; and "The Effect of Sunk Costs in Telecommunication Regulation," in J. Alleman and E. Noam, eds, <u>The New Investment Theory of Real Options and its Implications for Telecommunications Economics</u>, 1999. General agreement (with some exceptions) now exists that TSLRIC underestimates the investment costs when sunk and irreversible investments are present, although the amount of downward bias is subject to debate.[22] The ACCC report recognizes the importance of sunk costs in mobile networks.[23] (Report, e.g. p. 50)

33. The ACCC report also recognizes the importance of common costs. (Report, p. 137) Common costs are typically fixed costs that arise from more than one product or service. Again the radio transmitters are both a sunk cost and a common cost since both originating and terminating services use the same radio transmitters and control units. Common costs must also be recovered for a company to earn its cost of capital. However, the ACCC assumes that no common costs should be recovered from mobile termination. In reality all multi-service businesses with significant fixed and common costs recover them from all of the services. The ACCC report never estimates the importance of common costs. This omission of common costs also creates a bias when the ACCC compares prices and TSLRIC costs of terminating services. Thus, I conclude that the use of TSLRIC does not provide a correct competitive benchmark. Thus, the ACCC calculated 12 cents benchmark ignores both the effects of sunk costs and the effects of common costs and does not provide a competitive benchmark that can be relied upon.[24]

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[22] I first presented my results to the ACCC at a conference it sponsored in Melbourne in 1997. I find it extremely interesting that the ACCC quotes the book by J.J. Laffont and J. Tirole, <u>Competition in Telecommunications</u>, (MIT, 2000) on p. 50 to support its claim of market power by each network, but the ACCC fails to note that in the same book Laffont and Tirole state that the use of TSLRIC is not supported by economic analysis (pp. 148-149). Indeed, the authors refer to my academic research, which demonstrates that TSLRIC leads to a downward biased estimate (p. 150) and ignores the option value created by sunk costs investments. (pp. 153 ff.)

[23] No debate regarding the importance of sunk costs can occur given the results of the discontinued OneTel network.

[24] I understand that TSLRIC is often used in a regulatory setting to set regulated prices. However, in the US an allowance for common costs is typically made and the FCC has recognized the importance of sunk costs in its recent decisions. More importantly, it has long been recognized in US antitrust proceedings that a comparison of price to some measure of incremental cost cannot be used correctly to demonstrate

C. Application of the Competitive Benchmark Test for Market Power

34. I testified in an antitrust (Section 46) proceeding in Australia in 2001 where the ACCC claimed that each major record company in Australia had market power, even though each of the defendant's shares were each less than 20%. The ACCC claimed that this market power arose from the fact that hit records were "essential" for a retailer to be able to compete.[25] The argument is quite similar to the ACCC argument here that access to mobile customers is an "essential facility." (Report, p. 114) In my previous testimony, I pointed out that Jive Zomba and other small record companies, which could not be claimed to have market power, charged the same wholesale prices as the major record companies.[26] Yet if the major record companies had market power they should be charging systematically a higher wholesale price than the smaller companies. I concluded that the major record companies did not have market power.

35. The Federal Court of Australia—Full Court in "Universal Music Australia vs. ACCC" (2003) ruled that "none of the major record companies (PolyGram and Warner) had demonstrated an ability to raise prices and maintain them above the level of other suppliers (large or small) even for hits…" (¶ 133). The Court stated (quoting Hill J.):

> `In summary, the significant difference between the witnesses was that for Professor Hausman market power could only be present where there was the ability to raise prices. For Mr Ergas the question in the present case was a different one. It was whether Warner and *Universal* had the power that Jive Zomba may or may not have had, to use the threat of a refusal to supply so as to impose a unilateral vertical restriction that had anti-competitive effect." (¶ 137)

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significant market power. Using the ACCC approach of comparing price to TSLRIC most US multi-product firms would be found to have significant market power despite a high level of competition. For example, Samsung sets its price of DRAMs above its incremental cost yet the DRAM industry is extremely competitive. I could give numerous additional examples.

[25] Hill J, the original judge, "found it was regarded as essential that a retailer, who wished to service the market in general, should be able to offer products from each of the major suppliers." (¶ 138)

[26] The ACCC witness, Mr. Ergas, did not claim that the small companies had market power.

Yet the Full Court ruled: "In our opinion, the evidence did not establish that either PolyGram or Warner had a substantial degree of power in the wholesale market for recorded music in Australia." (¶ 164)

36. I now turn to a real world market test of whether each mobile carrier, no matter how small, has significant market power as the ACCC has claimed in this proceeding similar to my testimony in the 2001 proceeding discussed above. I assume that neither Hutch nor VOD has significant market power for <u>originating</u> mobile service.[27] I consider the prices of prepaid mobile services because I can find a per call charge, no credit risk exists, and carriers do not have contracts with prepaid subscribers in Australia that require regular monthly payments nor do they send bills, which would create additional costs.[28] I find that in June 2004 Hutch on its Orange 2G CDMA network charges between 30 cents/minute to 72 cents per minute depending on the plan.[29] Even after temporary discounts are applied the cost is between 20 cents per minutes and 48 cents per minute.[30] VOD charges for prepaid are similar amounts.[31] VOD charges between 20 cents per minute and 60 cents per minute plus a 20 cent connection fee which would put an average mobile call in the range of 26-66 cents per minute. I again note that neither Hutch nor VOD have any barriers to expansion given the significant amounts of excess capacity on their networks.

37. I recognize that these are retail prices, but even applying a 20%-25% discount, which is at the upper end of discounts applied by regulatory decisions for avoided costs of retail services, I note that the amounts exceed the ACCC's claimed 22 cents per minute price charged for mobile termination. Thus, mobile terminating prices satisfy the competitive benchmark test. What this empirical test demonstrates is that TSLRIC estimates cannot be sensibly used to demonstrate market power. This conclusion is especially true in the mobile industry where

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[27] I do not imply that either Telstra or Optus does have significant market power. I use Hutch and VOD since the ACCC cannot credibly claim that these carriers have market power over originating mobile services.

[28] Further, carriers receive the float from the prepaid amounts and also do not refund the money from expired accounts.

[29] 2G is second generation digital mobile service used by almost all mobile subscribers n Australia.

[30] http://www.orange.net.au/ visited on June 8, 2004.

[31] http://www.vodafone.com.au/index.jsp, visited on June 8, 2004.

most of the investment costs are sunk and irreversible investments and technology advances quickly requiring investment in new networks, e.g. 2G and now 3G is being introduced into Australia.[32]

38. The ACCC has failed to demonstrate that terminating mobile service does give each carrier a monopoly because the terminating charges are very much similar to Hutch and VOD originating prices where it cannot be claimed that significant market power exists. I find that using the competitive benchmark the mobile carriers' terminating prices are not significantly different from competitive benchmark originating prices. Thus, I conclude that the mobile carriers are not exercising significant market power over their terminating prices.

D. MTM Constrains the Price of Optus FTM Calls

39. Above I discuss why FTM and MTM should be included in the same market because MTM constrains the price of FTM given the high mobile penetration in Australia. I now demonstrate how MTM constrains the possible exercise of market power, even if one were to assume that a separate FTM market exists. Since Optus has a 35% share (Report, p. 73) and if I make the assumption that FTM callers are randomly distributed among carriers, Optus customers comprise 25.2% (0.72*0.35) of all FTM calls to the Optus network.[33] In other words, of all FTM calls to the Optus network, 25.2% of them could be replaced with calls from an Optus mobile. This percentage far exceeds the approximately 10% amount, which I calculated above, necessary to constrain Optus pricing power at the margin.[34] Thus, the constraining effect of competitively priced MTM on-net calls stops Optus from exercising significant market power for FTM calls. MTM calls will be competitively priced because a subscriber to a mobile network pays for the

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[32] Indeed, the WCDMA 3G networks required substantial amounts of new investment since the predecessor GSM 2G networks do not provide a significant basis on which to launch the 3G networks. While CDMA does provide a significant basis for CDMA2000 I note that Hutch has decided to use WCDMA in line with its 3G network in other countries, e.g. the UK and Italy. Telstra, Optus, and Vodafone have also decided to use WCDMA.

[33] Economic analysis would lead me to expect that an even higher percentage of MTM call that terminate on the Optus network originate on the Optus network because of incentives created by pricing plans. The calculation follows from the fact that 72% of callers can shift from FTM to MTM given that they have mobile phones.

[34] I use the fact here that all Optus pre-paid to Optus pre-paid are free at all hours.

MTM calls and thus takes into account the price in choosing which mobile network to subscribe to.

40. This calculation assumes that a caller knows the mobile network of the recipient. The ACCC recognizes from survey evidence that many callers know the network of their most often called parties. (Report, p. 51) Even if I make the most extreme assumption to an originating caller has <u>no knowledge</u> of the network for any of its terminating calls, I would still find that (0.24)*(0.35) = 8.4% of calls would be Optus on-net which again is approximately sufficient to constrain the price of FTM calls.[35] This constraining factor is actually even higher because a high percentage of Optus MTM calls are free because they occur during off-peak periods or are Optus pre-paid to Optus pre-paid calls which are always free. Further, since mobile penetration will continue to increase in the future this constraining factor of MTM calls on FTM calls will remain. Thus, when the effect of marginal decisions are considered, an economic analysis demonstrates it is the only correct method to make pricing decisions - substitution of MTM is sufficient to constrain FTM prices on the Optus network.[36]

III. <u>Market Outcomes</u>

A. <u>The Mobile Services Market in Australia is Effectively Competitive</u>

41. The ACCC claims that the mobile industry is not effectively competitive in Australia: "…the Commission believes that, while the retail mobile services market is exhibiting more encouraging market outcomes than the markets for fixed-line telecommunications services, it is unlikely to be effectively competitive as yet."[37] (Report, p. 125). The ACCC considers structural factors, e.g. concentration levels, but the ACCC never conducts a proper economic test of

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[35] This calculation follows from multiplying (1-.154)*(1-.72) = .24 where 15.4% is the estimated Optus share of retail FTM minutes. (Report, p. 100)

[36] Substitution to other services is also available which would add further constraining factors. However, MTM by itself is sufficient to constrain FTM prices.

[37] It has been my experience over many years that regulators very rarely find that industries they regulate are effectively competitive, since they would have no regulatory authority over the industry. Among the oldest sayings in regulation is: "Its no fun to be a regulator unless you get to regulate." (Hausman 1997) In the U.S. Congress directed the FCC to price deregulate mobile in 1994 and the industry has worked well since that time.

using a competitive benchmark.[38] I assume that the ACCC uses the term "effectively competitive" to mean that mobile prices are not at the competitive level.[39]

42. I return to the condition that the ACCC only considers unilateral effects; it has not claimed that coordinated interaction occurs in the mobile industry in Australia.[40] I again use as competitive benchmarks Hutch and VOD. The ACCC states that neither of these firms is earning supra-normal profits; indeed, neither is earning its cost of capital. Neither company has any barriers to expansion and VOD offers mobile service that covers the vast majority of the Australian population. Thus, their originating prices provide a competitive benchmark, as I discussed above. When I compare Optus' mobile prices to VOD, I find them to be very similar. For VOD's "SuperCap" plan, I find the charge to be 20 cents for flagfall plus 60 cents per minute.[41] For a similar Optus plan (no contract), "Yes 75" I find 25 cents for flagfall plus 44 cents per minute.[42] Thus, the Optus plan is less expensive than the VOD plan for similar amount of monthly expenditure and contract terms.

43. Comparison of actual prices paid by consumers provides a far superior competitive benchmark to structural factors that the ACCC attempts to use. No spectrum shortage exists in Australia since the OneTel spectrum is unused; hence, I conclude that barriers to entry are low.[43] Rates of return are notoriously difficult

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[38] While the ACCC places a high reliance on concentration levels, most economists agree that concentration levels play no role in assessing likely competition in a market with differentiated products and only unilateral effects (e.g. no coordinated interaction). I explained this outcome over ten years ago, e.g. J. Hausman et. al., "A Proposed Method for Analyzing Competition Among Differentiated Products," Antitrust Law Journal, 60, 1992. The ACCC states that mobile services are differentiated and does not claim coordinated effects in its Report.

[39] This assumption is consistent with the ACCC MG discussion of effective competition. (¶ 5.4-5.5)

[40] Given differentiated products and the wide variety of pricing plans and mobile telephone rebates, I would not expect coordinated interaction to take place.

[41] http://www.vodafone.com.au/rep/prepay.jsp?gs=foryou&hd=mobiles&st=promo280803&ss=prepaid#supercap. Checked on Sept. 15, 2004. Rate plan for "Super Cap $79" for a monthly expenditure of $79 per month. Charges are done by the second.

[42] http://www.optus.com.au/shop/browseplans/1,20566,,00.html. Checked on Sept. 15, 2004. Charges are done by the second. The rate plan is for a monthly expenditure of $75 per month which is closest to the VOD plan expenditure of $79 per month. For higher levels of monthly expenditure, Optus is even less expensive than VOD.

[43] The ACCC discussion of barriers to entry is incorrect. Note that since all existing carriers will be required to construct 3G networks, no significant barriers to entry exists from the requirement that a new entrant would need to construct a sunk cost 3G network. The ACCC conclusion regarding barriers to entry

to use especially in a dynamic industry such as mobile where the 2G networks will rapidly become economically obsolescent as 3G is rolled out in Australia.[44] However, using VOD's prices as a competitive benchmark does not encounter these difficulties. The ACCC states that VOD has only a 15.8% share and is not earning its cost of capital.[45] (Report, p. 73) Thus, VOD is too small to have significant market power. Yet if Optus was charging above the competitive price VOD could undercut it and gain profits. VOD uses the same 2G technology (GSM) as Optus. VOD has no barriers to expansion, has similar geographic coverage to Optus, and has no capital constraints since its parent company is the largest (or second largest) mobile company in the world with a market capitalization of US$160 billion.[46] But actual market prices demonstrate that Optus' prices are similar to VOD's prices, and perhaps slightly lower. Since the ACCC does not claim coordinated interaction (tacit collusion), I conclude that mobile industry in Australia is competitive and that Optus does not have significant market power.[47]

B. Competitive Market Effects on the Price of Mobile Termination Services

44. Since I find that the mobile services market is effectively competitive in Australia, if follows that is unlikely that the mobile termination prices will be set above competitive levels. Two sources of competitive constraints lead to this

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arising from sunk costs (p. 75) is incorrect, because barriers to entry arise from <u>asymmetries</u> in required sunk investment costs, which do not exist here. Given the availability of spectrum in Australia, no significant barriers to entry exist.

[44] A large economics literature concludes that rates of return cannot be used to determine market power in an accurate manner. One of the important problems is to determine economic depreciation. This problem becomes extremely difficult when the technology is rapidly changing as in the mobile industry. Indeed, as long ago as 1980 the U.S. Federal Trade Commission determined that it could not use rates of return to determine market power. To the best of my knowledge, none of the FTC, DOJ or FCC in the U.S. have attempted to used rates of return to attempt to demonstrate market power.

[45] In industries with substantial fixed costs that create economies of scale as in mobile, economists expect that larger companies will be more profitable. However, the presence of profit does not demonstrate that an industry is not effectively competitive. An example is the personal computer industry (PC) in the U.S. Dell, the largest provider, has consistently earned above its cost of capital while HP, IBM, and Gateway have, at best, broken even on their PC sales in the past few years. Yet no economist would claim that the PC industry is not extremely competitive.

[46] China Mobile now has more mobile customers, but a much smaller yearly revenue base and market capitalization and (US$57 billion) than Vodafone.

[47] The differentials I find in flagfall and per minute charges demonstrate that coordinated interaction is extremely unlikely to be occurring in Australia.

conclusion. First, potential subscribers compare the economic value of their subscription to the price paid to decide whether to subscribe, as I discussed above. While the mobile operator sells terminating service for FTM to a fixed operator, it can only sell the services to its own subscribers.[48] If a mobile operator sets its termination price above the competitive level, a competing operator can offer greater value to subscribers by charging a lower price that leads to more incoming calls.[49] Thus, too high a termination price would lead to fewer subscribers and less terminating revenue so competition would not lead to this outcome.

45. The second source of economic constraint is the use of MTM calls. Since mobile penetration in Australia is about 72% (or higher), the large majority of FTM callers have the option of choosing MTM instead since no convenience will be lost, as I discussed above. Competition for MTM calls is extremely high among mobile providers as all providers offer plans that offer low price or free call MTM calls when the receiving party subscribes to that network. ("on net" calls) Indeed, Optus estimates that currently 11 billion MTM minutes are used while only 4.24 billion FTM minutes are used so that MTM is used to reach a mobile subscriber about 2.59 times as much as FTM. The economic analysis that I did above for market definition holds here, and it demonstrates that Optus could not profitably set its terminating price at above competitive levels in a profitable manner.[50] I find it remarkable that the ACCC did not investigate the constraining effect of MTM calls on the price of FTM calls in its report.[51] The ACCC states that it has received few complaints regarding MTM calls (Report, p. 26) and it provides no

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[48] While the ACCC refers to Laffont and Tirole, op. cit., for the claim that an access provider has monopoly power (Report, p. 50), Laffont and Tirole do not take account of the effect on subscription competition in this analysis.

[49] The ACCC recognizes from survey evidence that many callers know the network of their most often called parties. (Report, p. 51). Thus, they would be aware of the high price and decrease their number of calls. Since pricing is done at the margin, this outcome would be sufficient to keep prices at a competitive level.

[50] The ACCC MG recognize that market definition and market power analysis are closely related. (MG ¶ 5.36)

[51] The ACCC refers to the book by Laffont and Tirole (p. 50) to support its claim that each operator has monopoly power over termination. However, Laffont and Tirole also do not recognize the constraining effect that MTM has over FTM. When they wrote their papers and book approximately 6-7 years ago mobile penetration was typically much lower that 72% so that MTM did not provide as much of a constraint. Also, the ACCC citation to Wright about having a "bottleneck" is incorrect since a bottleneck implies that no economic alternative exists. Since subscribers choose among mobile providers based on perceived economic value and MTM exists, no bottleneck exists.

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evidence they MTM are prices above the competitive level. Nevertheless, the ACCC also decides to regulate MTM call prices, which I find are priced at competitive levels.

C. Effects of the ACCC Approach in Non-Competitive Markets

46. In determining appropriate regulatory policy for FTM services, a question arises whether the fixed market is effectively competitive. The ACCC has noted that the market for fixed-to-mobile calls "*remains far from being effectively competitive despite multiple suppliers at the retail level.*"[52] Telstra accounts for approximately 89% of fixed telephone services in Australia and 65% of all fixed minutes terminated. Lower termination prices are not efficient if they further strengthen Telstra's position in fixed line telephony by reducing the fees it pays to other mobile carriers. While MTM does provide a constraint on FTM, because customers must pre-subscribe for a fixed operator to provide both FTM and long distance calls and most customers use the same provider for their local calls, Telstra is able to exercise market power.

47. In my previous academic research I have demonstrated that the amount of a price reduction typically depends on the degree of competition in the market.[53] Thus, to the extent that the fixed market is not effectively competitive and the ACCC requires a reduction in the mobile terminating price charged by mobile operators, the ACCC is creating a transfer from a competitive industry, mobile operators, to a non-competitive industry, fixed line telephone and in particular Telstra. A straightforward result in economic analysis is that Telstra's profits will increase while the mobile operators' profits will decrease. Since Telstra is significantly larger in fixed telephony than in mobile, overall Telstra will benefit while Optus and Vodafone will earn decreased profits.

48. Indeed, market evidence appears to demonstrate that this outcome has already occurred. From April 2002 to June 2004 Optus mobile termination fee decreased

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[52] ACCC, *Telecommunications Reports 2002-2003* page 19. See
http://www.accc.gov.au/content/index.phtml/itemId/515681.
[53] J. Hausman, "Efficiencies from the Consumer Viewpoint," George Mason Law Review, 7, 1999.

from **[commercial-in-confidence]** cents per minute to **[commercial-in-confidence]** cents per minute due to ACCC regulation.

Terminating Rates

Date	Cents
1/7/1996	**[commercial-in-confidence]**
1/7/1997	**[commercial-in-confidence]**
1/1/1998	**[commercial-in-confidence]**
1/7/1998	**[commercial-in-confidence]**
1/7/1999	**[commercial-in-confidence]**
1/1/2000	**[commercial-in-confidence]**
1/7/2000	**[commercial-in-confidence]**
1/12/2000	**[commercial-in-confidence]**
1/7/2001	**[commercial-in-confidence]**
1/7/2002	**[commercial-in-confidence]**
1/10/2002	**[commercial-in-confidence]**
1/1/2003	**[commercial-in-confidence]**
1/4/2003	**[commercial-in-confidence]**
1/7/2003	**[commercial-in-confidence]**
1/10/2003	**[commercial-in-confidence]**
1/1/2004	**[commercial-in-confidence]**
1/4/2004	**[commercial-in-confidence]**

[commercial-in-confidence] I assume that Optus has no significant market power in the fixed line market, so that these results demonstrate that it is unlikely that any of the decrease in mobile termination rates has been passed on to residential FTM customers and at best, a very limited amount or even none of the decrease has been passed on to all FTM callers.[54] Thus, the entire basis of the proposed ACCC policy is subject to serious question. Previous regulation of the mobile termination price has not been demonstrated to promote competition among FTM providers, so the ACCC does not have a basis to claim that more stringent regulation will promote competition.

49. This regulatory induced transfer will have negative effects on investment incentives for future technology, e.g. 3G, since the economic returns will be

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[54] Given the fact that Telstra is a dominant firm and is regulated under price cap regulation, the usual finding that at least some of the price decrease in mobile termination rates would be passed on, no longer continues to hold here. However, since the mobile providers are not price cap regulated, the usual economic analysis would hold for their pass on strategy.

lower.[55] Thus, the scope and timing of the rollout of WCDMA in Australia could be adversely affected.

D. Efficient Pricing Policy in Two-Sided Markets

50. Above I emphasized the importance of recognizing the two-sided nature of the market, which involves mobile termination. The ACCC recognizes that the markets are two-sided in nature. (Report, p. 46) However, the ACCC makes a significant mistake because it does not take account of this factor in its analysis. The ACCC states:

> "Given this, in the absence of declaration, mobile operators will have the ability and incentive to raise the price of the MTAS above its underlying cost of production. Given the two-sided nature of the service, however, mobile operators may choose to use some of the economic profits from MTASs to subsidise retail mobile service offerings in order to attract mobile subscribers to their networks, subject to the constraint that this increases net profitability. The greater is the effectiveness of competition with regard to the retail mobile services, the greater will be the transfer of economic profits from mobile termination to retail mobile services. Further, to the extent that the prices of MTASs are set above cost, this is likely to generate above-cost prices for FTM calls." (Report, p. 179-180)

However, in a two-sided market, however competitive it may be, I would expect to see some prices with higher gross margins (e.g. price minus marginal cost) than other prices. This expected result occurs because the economic externality that arises in two-sided market causes prices to diverge from costs, if the prices are economically efficient.[56] The ACCC makes a fundamental mistake in not recognizing that efficient prices will diverge from costs in a competitive two-sided market. Below I demonstrate that the ACCC regulatory policy will harm consumers, demonstrating that its proposed regulatory price policy is not economically efficient. Here, I demonstrated why prices diverge from cost by different amounts in a competitive two-sided market.

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[55] The ACCC proposes to regulate the price of terminating services on 3G networks.
[56] An externality arises from an activity that affects other people without those other people paying or being paid for the activity. Economists have recognized at least for the last 80 years that to be efficient in the presence of an externality, prices must reflect the positive or negative value of the externality.

51.   I give two examples of differential pricing in competitive two-sided markets. While I recognize that the first example may be "trivial", it demonstrates the point about two-sided market very vividly. Consider a bar/pub (hotel) that serves drinks. Because of intense competition it will charge competitive prices. The bar now decides to introduce dancing. Typically it will offer reduced admission fees or reduced drink prices (if permitted by regulation) for women. To break even it will charge a higher admission price to men or higher drink prices to men, if no admission is charged. No market power is present, yet the bar charges "above cost" prices for drinks to men and "below cost" prices for drinks to women. The bar will find this strategy economically efficient because men receive an (network) externality from women being present to dance with. The bar has no monopoly over women nor is it an "essential facility" or "bottleneck", but by offering a "subsidy" to women it competes better. A more "serious" example with the same properties is Internet auction sites. Buyers and sellers on Internet auction sites both pay transaction fee for each sale. However, sellers typically are required to pay a registration fee to begin a new auction for a good they want to sell.[57] Thus, buyers receive "more favorable" treatment than sellers.[58]

52.   A somewhat similar outcome occurs in mobile markets where Calling Party Pays (CPP) exists. The calling party receives economic value (consumers surplus) when it makes a FTM call.[59] The more subscribers to mobile services, the more economic value it receives arising from the (network) externality. However, typically a caller cannot help pay the monthly subscription fees for a potential mobile subscriber.[60] But it will increase profits if a mobile company can attract more subscribers since that will lead to more FTM and MTM calls. Thus,

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[57] On ebay the seller pays a registration fee to sell a good and a transactions fee if the good is sold. The buyer pays no fee and thus receives a complete subsidy for the use of the service. This outcome where the platform makes little or no money on one side of the market and recoups costs on the other side of the market is very common in two-sided markets.

[58] Other examples exist of two-sided markets with a common property that one side of the market is subsidized while profits are made on the other side of the market.

[59] The economic value of the call exceeds the price of the call would not be made.

[60] Many corporations pay for or subsidize mobile service for employees so they can be reached when necessary.

the competitive strategy will be for a competitive mobile company to charge "above (TSLRIC) cost" prices for FTM calls and charge lower prices to subscribers than would occur without the two-sided nature of the market.[61] Under effective competition, no excess profits will exist since they will be competed away, yet the results of prices not equal to (TSLRIC) costs will remain.

53.   Thus, the ACCC has made a fundamental mistake in economic analysis by comparing the price of mobile terminating services to cost (TSLRIC) and, upon finding a divergence, deciding that a competitive problem exists. More seriously, the ACCC's proposed regulatory pricing policy, by not allowing the externality to be reflected in prices, will lead to an economically inefficient outcome.

54.   While the ACCC criticizes the application of Ramsey pricing theory in the current situation (Report, p. 170), it is incorrect that Ramsey (Boiteux) pricing must require market power in the sense of setting price above competitive levels. A multi-product firm subject to effective competition will not have market power but will set its price to recover its fixed and common costs using Ramsey principles.[62] While the ACCC is correct that a monopolist will also use Ramsey principles, in the situation of effective competition the Ramsey approach is the correct approach to use. Since as I demonstrated above, VOD has no barriers to expansion and is not earning its cost of capital while charging similar prices to Optus and Telstra, the ACCC has not demonstrated a lack of effective competition among mobile providers.[63] Thus, given the multi-product nature of

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[61] See the Appendix for a mathematical demonstration of this result. However, no indication exists that a "subsidy" will exist to mobile subscribers as the ACCC claims (without evidence) above. A cross-subsidy exists when prices are below incremental cost. I have seen no evidence that mobile subscription and originating prices are set below incremental cost.

[62] This result follows from profit maximization by the firm. Otherwise the firms would be acting in an economically irrational manner. Indeed, Laffont and Tirole (op. cit., p. 81-82) give an example of a competitive industry where the optimal outcome is given by application of Ramsey prices in their book which the ACCC quotes from.

[63] The ACCC claims that "it is not possible in competitive markets to hold prices above levels consistent with long-run cost recovery" (Report, p. 171) is correct but demonstrates that the depreciation of 2G investment has not been sufficient rapid to take account of 3G replacement, which is now ongoing. I discuss this problem in J. Hausman, "Valuation and the Effect of Regulation on New Services in Telecommunications," Brookings Papers on Economic Activity: Microeconomics, 1997 as do Laffont and Tirole. (op. cit. pp. 150ff)

mobile service provision, a competitive outcome should approximate the Ramsey approach.

E. Other Reasons for Divergence of Prices from Costs

55. Even in the absence of two-sided market, an additional reason exists for prices to diverge from costs. Mobile networks have significant fixed costs. If they only provided a single product, effective competition would cause price to equal average total cost. However, mobile providers are multi-product firms that have significant fixed and common costs.[64] For multi-product firms, either regulated or unregulated, average costs of a product no longer exist. Prices are set above (marginal) costs so that these fixed and common costs can be recovered. Otherwise, the firm would go bankrupt. Thus, for example Hewlett-Packard (HP), which competes in many markets, will decide how to mark up its costs to determine prices. In some markets such as PCs, the percentage markup of price over costs will be very small while in other market the percentage markup will be higher. Overall, while HP earns a normal economic profit because of competition, we expect these differential markups to exist. Indeed, they lead to ("second-best") economic efficient prices.[65]

56. While the ACCC recognizes the importance of fixed and common costs at numerous points in its report, it does not take correct account of their importance. First, it puts the onus on the mobile provides to "prove" that their prices are efficient. Yet economic analysis expects efficient prices to have different percentage markups so I do not see why the operators must prove their markups are efficient when differential markups are expected under competition. Also, in designing its regulatory pricing proposal the ACCC adopts an economic inefficient outcome. It adopts the "regulatory accountant's approach" of equi-proportional markups on all services. Basic economic analysis demonstrates that this approach is economically inefficient. Before the ACCC adopts a regulated

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[64] Common costs are costs that cannot be assigned uniquely to a given service.

[65] "First best" is price equal to marginal costs but this outcome cannot exist in the presence of fixed and common costs. The "second best" solution exists when fixed and common costs are covered so that prices exceed costs, but economic distortions are minimized. Effective competition will typically cause this outcome to occur. This analysis has been recognized by economics for the last 70 years.

pricing policy, it should be required to demonstrate that it will do better than the unregulated competitive outcomes. The ACCC has failed to make this demonstration despite an explicit policy goal of the long term interests of end-users (LTIE) that is supposed to guide its policy. I return to this subject subsequently and demonstrate that the ACCC's inefficient policy will lead to a decrease in the economic welfare of telecommunications users.

F.   Economic Principles for Economically Efficient Prices.

57.   While it is quite complicated to determine an economically efficient termination price given the unknown own and cross price elasticities, economic analysis demonstrates that an efficient price should exceed termination cost for two reasons. First, common network costs must be recovered by a firm to justify its investment. Optus has invested hundreds of million of dollars in its 2G network and will likely spend hundreds of million or billions of dollars to develop its 3G network. Much of these investment costs are common costs and cannot be determined to be either separate origination costs or separate termination costs. To recover these common costs both origination prices and termination prices should be above their respective costs. To the extent that the termination own price elasticity is less (in magnitude) than the origination own price elasticity, economic efficiency will increase if the termination margin (price minus cost) exceeds the origination margin.[66] The ACCC regulatory approach of not permitting common cost recovery is incorrect and leads to economic inefficiency. As such it is not in the Long Term Interest of End-Users (LTIE).

58. The second economic principle is that the termination price should exceed cost because of the (externality) value that FTM callers receive from mobile subscribers. A calling party receives economic value (consumers surplus) when she makes a FTM call. The more subscribers to mobile services, the more economic value she receives arising from the (network) externality. An economically efficient termination price should be above cost to reflect this

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[66] To solve for the optimum prices, known as the Ramsey solution, can be quite complicated. However, to note that the termination margin should exceed the origination margin, only the relative sizes of the elasticities need be known.

externality value. Consider the following "experiment": start with the termination price equal to cost and increase the termination price by a small amount. As I demonstrate below, all mobile operators, and even a monopolist, will decrease its mobile subscription price by part of its "extra profit" from the price increase. The mobile operator will find this strategy increases its profits since more subscribers will create more FTM calls so profit will increase. However, FTM callers will now receive increased consumers surplus, as I demonstrate below, because they will be able to call an increase number of mobile subscribers. The "externality value" of the increase in mobile subscriber will cause efficient economic termination prices to exceed their cost.

59. Both of these economic reasons demonstrate that the efficient termination price should exceed its cost. While the ACCC has recognized the existence of both of these economic factors, the ACCC has not taken account of them in its regulatory proposal. Thus, the ACCC proposal does not lead to economically efficiency prices. Subsequently, I consider whether the ACCC proposal is in the LTIE compared with the current market outcome. I determine that the ACCC proposal is not in the LTIE. Thus, the ACCC proposal neither leads to economically efficient prices nor is the ACCC proposal in the LTIE.

III. Investment Effects on Mobile Providers

60. The ACCC recognizes that mobile providers in Australia are subsidizing handsets. These subsidies lead to greater demand for mobile subscriptions as my academic research has demonstrated. [67] Competition among mobile providers leads to these subsidies, which are partly recovered, by increased mobile subscribers leading to more FTM calls. However, mobile handset subsidies are even greater in the U.S. which has Receiving Party Pays (RPP) and which almost

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[67] See J. Hausman, "Mobile Telephone," in M. Cave et. al. eds, Handbook of Telecommunications Economics, North Holland, 2002. Other research has found similar effect in both mobile subscription and subscriptions for other services such as satellite TV. For example, in the U.S. satellite TV dishes are subsidized by providers, yet the providers have no market power since they are small relative to cable providers and two satellite competitors exist.

universal agreement exists that the mobile market is extremely competitive.[68] Thus, handset subsidies in Australia cannot be claimed to be an outcome of the exercise of market power in FTM nor caused by CPP.[69]

61. Under the proposed ACCC regulatory price policy, I would expect these subsidies to decrease causing a decrease in mobile penetration, compared to what it would be absent the regulation.[70] I do not expect a decrease in MTM call rates, since these are highly competitive currently and I expect the inter-network traffic to approximately balance out for the 3 major mobile networks.

62. When I consider the effect on the fixed line market, the answer depends in part on how much of the decrease in mobile termination charges will be passed on to fixed line customers. Even if all of the reduction were passed on, no increase in fixed line penetration would occur since it is near 100% in Australia. To the extent the reduction is passed on, additional FTM calls will be made. However, the number of people that own mobiles and can be reached by mobile will decrease. I consider these two counteracting effects subsequently.

63. To the extent that a significant proportion of the decrease in mobile termination rates is not passed on to FTM calls, the outcome will be largely negative. Since Telstra is the dominant provider of fixed line services, a transfer of revenue from mobile providers to Telstra will occur as I discussed above. Since the ACCC intends to extend its price regulation to 3G voice services, the effect will be decreased investment incentive for mobile operators to invest in 3G. Nor will there exist increased incentives for investment in fixed line services because Telstra will gain the large majority of the profits accruing to fixed line operators.

64. Thus, I conclude that overall there will be fewer mobile subscribers and mobile operators will have decreased investment incentives. Overall, the ACCC policy

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[68] Indeed, neither the DOJ nor FCC raised an objection to the second largest mobile provider, Cingular, buying the third largest mobile provider AT&T Wireless. Further, the Federal Communications Commission (FCC) has repeatedly found that the US mobile market is "effectively competitive." See e.g. FCC, "Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services." (FCC Report) Sept. 28, 2004, ¶ 2.

[69] Nor can it be claimed that mobile subscribers receive a cross-subsidy since mobile originating prices are set above marginal (incremental) cost.

[70] Thus, mobile penetration might continue to increase but at a slower rate than otherwise. This result occurs because demand curves slope downwards since a higher price leads to less demand.

can only be favorable if the social value of increased FTM calls outweighs the negative effects of the ACCC policy. I now turn to an evaluation of this question.

IV. The ACCC has Incorrectly Valued the Social Value of Addition Mobile Subscriptions and its Policy Would Harm the LTIE

65. The ACCC has a specific regulatory policy goal for telecommunications: the Long Term Interest of End-Users (LTIE). Other countries such as the U.S. and U.K. do not have this policy goal to guide their regulation.[71] In my academic research I have demonstrated why an explicit policy goal of consumer welfare leads to better regulatory policy.[72] I have concluded that the ACCC policy of LTIE is an appropriate consumer welfare approach for telecommunications regulation. However, the ACCC has not applied a correct consumer welfare analysis in the current situation.[73]

66. The ACCC claims that the marginal social value of an additional mobile subscriber is near zero. It concludes that subsidies that increase mobile penetration have no social value. This conclusion is incorrect. The ACCC mistake arises from using an aggregate analysis, rather than recognizing that the ability to call a person is a unique good and must be valued individually.[74] I will assume, along with the ACCC, for this analysis that no reasonable substitute exists to reach a person except FTM.[75] I will make the additional assumption that

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[71] Thus, ACCC references to UK regulatory policy for mobile termination are inappropriate since the UK does not consider the LTIE in its regulatory policy. Indeed, I have previously criticized UK regulator policy for harming consumers. See J. Hausman, "Mobile Telephone," in M. Cave et. al. eds, Handbook of Telecommunications Economics., North Holland, 2002.

[72] See e.g. J. Hausman, "Taxation By Telecommunications Regulation," Tax Policy and the Economy, 12, 1998; "Economic Welfare and Telecommunications Welfare: The E-Rate Policy for Universal Service Subsidies," Yale Journal on Regulation, 16, 1999; "A Consumer-Welfare Approach to the Mandatory Unbundling of Telecommunications Networks," Yale Law Journal, 1999; and "Regulated Costs and Prices in Telecommunications," in G. Madden ed. International Handbook of Telecommunications, 2003.

[73] I recognize that in many situations an explicit welfare analysis cannot be undertaken. However, in the current situation I am able to do a welfare analysis so the usual qualitative factors do not need to be used as "proxies" for an explicit calculation.

[74] The ACCC welfare loss calculate (p. 88) is incorrect because it assumes that consumers receive no consumer surplus when they place a FTM call to a subscriber who would not be a mobile subscriber absent a handset subsidy or reduced per call price as I discuss below.

[75] Above I discuss the substitution of MTM. Here I assume away this possibility since the ACCC does not take account of it. However, I use the ACCC assumed elasticity in my calculations

a caller who wants to reach a person cannot substitute reaching another person. If significant substitution existed, no problem would arise.

A. Value to the Calling Party from a FTM Call

67. What is the value to a given caller for the ability to reach a person through FTM? Note I look at the economic welfare or consumer surplus of the calling party only in what follows.[76] Consumer surplus gives the measure of net economic value to a caller and has been used in economic analysis for over 100 years. If the potential receiving party does not have a mobile telephone economic analysis calculates the "virtual" (reservation) price that sets demand to zero. I use this approach, which I have applied in my academic research, to calculate the consumers surplus to the calling party.[77] Let the (compensated) demand to call person n be h_n with price p_n. Let the virtual price that sets demand to zero be p_n^*. The change in consumers surplus from the ability to call person n is:

$$y^1 - y* = (p_n* - p^1{}_n)h_n(p^\#, u^1) = (p_n* - p^1{}_n)\frac{\partial e(p^\#, u^1)}{\partial p_n} \quad for \ p^\# \in (p*, p^1)$$

where $e(p, u^1)$ is the expenditure function evaluated at utility level u^1. If I were to assume that the virtual price that set demand to call person n at zero is \$3.00 (which may be low given the possibility of emergencies) while I assume that the current price to call person n, p_n = \$0.40 per minutes, the amount of consumer surplus would be \$2.60 multiplied by the number of incoming FTM call evaluated at the price $p^\#$. The price $p^\#$ depends on the shape of the demand curve and the associated elasticities.

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[76] If I take into account the consumer surplus of the receiving party of an FTM call, I would find even stronger results.

[77] See J. Hausman, "Valuation of New Goods Under Perfect and Imperfect Competition", in T. Bresnahan and R. Gordon, eds., The Economics of New Goods, Univ. of Chicago Press, v58 (1996): 209-37; "Valuing the Effect of Regulation on New Services in Telecommunications", Brookings Papers on Economic Activity, Microeconomics, 1997: 1-38; "Mobile Telephone, New Products and the CPI," Journal of Business and Economics Statistics v17, 1999; "Mobile Telephone," in M. Cave et. al. eds, Handbook of Telecommunications Economics, North Holland, 2002; "The Competitive Effects of a New Product Introduction: A Case Study", with G. Leonard, Journal of Industrial Economics, 50, 2002; "Sources of Bias and Solutions to Bias in the CPI", Journal of Economic Perspectives, 2003.

68. In order to consider the empirical magnitude of the change in consumer surplus when an additional subscriber buys a mobile subscription I use an approach I have developed in my academic research to bound the estimate.[78] I first calculate a lower bound for the amount using the approach in the above papers. I take the Optus estimate of 13.9 million mobile subscribers and I use a per minute price of FTM to be $0.4 per minute. I use the ACCC elasticity estimate of −0.6 (fn. 275, p. 103, which may be too high) for the elasticity of FTM calls. Using the lower bound estimate (from a linear demand curve) I find the increase in consumers surplus to people calling the new subscriber to be $102 per year.[79] If instead, I use the upper bound estimate (constant elasticity demand curve) I estimate the gain in consumers surplus to FTM callers to be $378 per year. Thus, even if the new mobile subscriber receives no consumers surplus, people calling the subscriber receive substantial consumers surplus. Thus, the conclusion is that calling parties benefit significantly from additional mobile subscribers.

B. Effects on Mobile Penetration

69. How many new customers could be created by this amount of FTM calling if mobile companies compete away the profits by decreasing handset subsidies and increasing outgoing calling prices to the new subscribers? I assume the mobile company charges $0.22 per minute to terminate FTM calls and its marginal cost is $0.02 per minute. I assume that the quasi-rent (incremental profit) for the new subscriber is competed away in a lower subscription fee. I take the minimum subscription fee to be $22 per month (probably high) and I use a −0.55 subscription elasticity estimate which is consistent with my prior research and research by Frontier Economics.[80] Using the 13.9 million mobile subscribers I estimate that about 1.5 million or about 10.8% would not subscribe without the handset subsidies. Thus, the policies of "any to any connectivity" and "efficient

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[78] The discussion of the bounds is found in J. Hausman, "Sources of Bias and Solutions to Bias in the CPI", Journal of Economic Perspectives, 2003.

[79] I have assumed that a new subscriber receives the average number of FTM minutes per year. The virtual price for this bound is estimated to be $1.07 per minute which is likely significantly too low. However, that is why the estimate gives a lower bound

[80] The actual elasticity is probably significantly higher for marginal customers who are deciding whether to subscribe.

use of the mobile infrastructure" are also promoted by the existence of the handset subsidies.[81] Using this estimate I find that the additional consumers surplus to calling parties using FTM is between $153 and $568 million per year.

C. Calculation of the Net Social Gain

70. I now compare this estimate to the gain in consumers surplus to calling parties from a lower FTM price. I assume that the mobile company termination price decreases from $0.22 to $0.12 and that the fixed operators completely pass through the reduction (probably too optimistic an assumption) so that the FTM price decreases from $0.40 per minute to $0.30 per minute. I calculate the gain in consumers surplus for FTM callers for all their calls, not just calls to additional mobile subscribers. Using the same bounds approach I estimate the change to be between $32 million and $37 million per year. Thus, the ratio of the additional consumers surplus from the current FTM prices compared to the ACCC FTM regulation price is in the range of 4.8-15.4.[82] The ACCC proposal would make Australian consumers significantly worse off and thus is not in the LTIE. Indeed, the proposed ACCC regulatory policy would harm FTM calling parties because they would have fewer people they could reach by a FTM call. If I were to include the additional consumers surplus for the new subscribers, the difference would be even greater. Thus, I conclude that the ACCC policy will not increase economic welfare for telecommunications users and would harm exactly the parties that the ACCC claims to be helping.[83]

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[81] Since most of the fixed line network infrastructure for voice calls is a sunk cost investment with little new investment, economic analysis would not take account the "efficient use" of its infrastructure. However, since considerable new investment will occur for 3G networks, the "efficient use" of this infrastructure should be an important goal of regulation.

[82] Even if I use the lower bound virtual price of $1.07 (which I believe is too low), I estimate the ratio of additional consumers surplus from the current FTM prices compared to ACCC proposed regulation to be 5.5 using the constant elasticity demand curve, again demonstrating that the present market outcome is superior to the ACCC proposed regulation.

[83] These calculations are robust to reasonable changes in the assumptions. For example, if I assume that only 50% of the reduced revenue from FTM calls is passed on in terms of increase subscription prices, I still find a substantial decrease in consumers surplus from the ACCC regulatory policy the ratio of the additional consumers surplus from the current FTM prices compared to the ACCC FTM regulation price is in the range of 2.6-8.3. If I allow for a possible effect that more incoming calls leads to higher mobile subscriptions, I estimate the ratio of the additional consumers surplus from the current FTM prices

71. I now include the loss in consumer surplus to new subscribers from the proposed ACCC regulatory policy. As expected, the estimates demonstrate an even more unfavorable outcome. The ratio of the additional consumers surplus from the current FTM and mobile subscription prices compared to the ACCC FTM regulated price and changed mobile subscripts prices is in the range of 6.3-16.6.[84] Again, the ACCC proposal decreases consumers surplus and is not in the LTIE.

72. These calculations demonstrate the outcome that my academic research over the last 10 years has found repeatedly: the change in consumers surplus from a new good, here the ability to reach a person on his or her mobile, leads to much greater gains in consumers surplus than from price changes, unless the price elasticity is quite high. Both the ACCC and Prof. Armstrong (Report, p. 150) have erred in their analysis because they do not account for this welfare effect from new subscribers to people who call them.[85]

73. The ACCC claims that the externality benefit associated with marginal mobile customers is negligible. To an economist this claim is highly questionable because it assumes that calling parties do not receive consumers surplus from their calls to "marginal mobile subscribers." It would be a highly unusual outcome where each calling party's virtual (reservation) price exactly equals the FTM price the calling party pays.[86] Optus has analyzed usage data of 50,000 mobile subscribers for 2003/ 2004, both prepaid and post-paid, and has found that the ACCC's premise does not hold. The ACCC cites the fact that the majority of growth in the mobile customer base is coming from prepaid subscriptions, and the ACCC then conjectures that that because prepaid customers make fewer outgoing

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compared to the ACCC FTM regulation price is in the range of 4.1-13.2 so again the ACCC proposed policy is not in the LTIE.

[84] If I allow for a possible effect that more incoming calls leads to higher mobile subscriptions, I estimate the ratio of the additional consumers surplus from the current FTM prices compared to the ACCC FTM regulation price is in the range of 5.4-14.0 so again the ACCC proposed policy is not in the LTIE.

[85] See M. Armstrong , "Competition in Two-Sided Markets," revised Feb. 2004 mimeo. The ACCC cites to Prof. Armstrong's conclusion that net welfare would increase with a regulated decreased in the FTM price to below the unregulated level. Prof. Armstrong fails to take account of the "new good" aspect of additional mobile subscribers in his analysis. The previous academic literature that I am familiar with does not take account of this "new good" aspect because it typically assumes that subscription is invariant to pricing. This assumption may be a reasonable approximation for wireline service, but is incorrect for wireless service.

[86] The consumer surplus cannot be negative or the calling party would not place the call.

calls, they must be receiving fewer calls and therefore creating fewer external social benefits. Optus' data demonstrate that, in reality, the opposite is occurring. The Optus data demonstrate that the average postpaid customer had an annual total spend of $**[commercial-in-confidence]**, and received **[commercial-in-confidence]** call minutes. Prepaid customers, while having a much smaller total spend of $**[commercial-in-confidence]** per year, received **[commercial-in-confidence]** call minutes; significantly more than the average postpaid subscriber. This data indicates that as the prepaid customer base expands, the marginal social external benefits may actually be increasing, the opposite of the conclusion that the ACCC attempts to make based on no data.

74. The ACCC has also assumed that the later adopters of mobile phones create fewer external benefits than early adopters. Again, Optus data does not support this view. Optus has compared the incoming call minutes of early adopters against the rest of its customer base. Specifically, Optus has defined 'early adopters' as customers that have subscribed to Optus' network for at least 120 months (10 years). It was found that these subscribers received an average of **[commercial-in-confidence]** call minutes annually, while the remainder of Optus' customer base received an average of **[commercial-in-confidence]** call minutes per year[87]. Optus then analyzed the call data of customers that had subscribed to Optus' network for only either 19 or 20 months[88]. These customers received, on average, **[commercial-in-confidence]** call minutes a year, while the prepaid customers (who are more likely that postpaid customers to be first time subscribers) received even more call minutes at **[commercial-in-confidence]** per year. Thus, again the ACCC's assumptions are refuted by actual data.

75. Where previous analysis of this problem and Prof. Armstrong have gone wrong is to miss the non-substitutable nature of the party receiving the call. In the usual two-sided market situation that I discussed before where women receive a "subsidy" to attend the bar/dance, a high degree of substitution exists among

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[87] Note that the latter group may contain some early adopters that have churned to Optus from other networks.
[88] Our data set did not contain any subscribers with a tenure of less than 19 months.

women who would attend.[89] Similarly, if one more store signs up to accept a given credit card or a debit card the extra store will typically have a higher degree of substitution with other stores that have already agreed to accept the cards.[90] Thus, in many two-sided markets significant substitution exists on one side of the market. In CPP situations this result does not hold true. For example, if I want to reach my research assistant at MIT, I typically cannot substitute a call to another person. When (s)he subscribes to a mobile service, I receive a large amount of consumer surplus because I have the ability to call at any time to see how our research is proceeding.[91] This "new good" quality of FTM and MTM calls is what sets this situation apart from the usual two-sided market situation in terms of estimating consumers' economic welfare.[92]

76. I conclude that the proposed ACCC regulatory setting would harm FTM calling parties. The ACCC has not taken into account the extra consumers surplus (economic welfare) that arises to calling parties from their ability to reach individuals who subscribe to mobile telephony in a more convenient and timely manner. Thus, the proposed ACCC regulatory policy would harm the LTIE.

D. Possible ACCC Responses

77. The ACCC can reject this economic analysis under either of two assumptions: (1) mobile companies will not increase prices if they achieve lower revenue on FTM

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[89] In situations where a high degree of substitution does not exist, one partner invites the other partner to attend as a "date." Similarly, some parents will pay for a mobile subscription for their children or a firm will pay for its employees' mobile subscriptions, but the usual situation is that a calling party does not have a sufficiently close relationship with the called party to subsidize the mobile subscription.

[90] When a high degree of substitution does not exist in the U.S., e.g. WalMart, the store typically receives significantly lower rates from the credit card or debit card provider.

[91] I receive additional consumers surplus from the "option value" of being able to reach my research assistant at almost any time, beyond the consumers surplus I receive from actual calls made. I have not taken account of the option value in my calculations of consumers surplus.

[92] The quotation that the ACCC uses from Armstrong (Report, p. 150), "…total welfare is not maximised since the interests of fixed network callers are not taken into account when the quantity of fixed-to-mobile calls…is chosen [and implicitly, the price of mobile termination services is set]. Welfare would be increased [if the number of fixed-to-mobile calls] were increased, i.e., if the implicit price for calling mobile subscribers from the fixed network were reduced to below the unregulated equilibrium level." is incorrect because Prof. Armstrong has not recognized the non-substitutable nature of FTM calls to particular individuals. He is implicitly assuming that an FTM call to a given mobile subscriber is a near perfect substitute to a mobile call to a different mobile subscriber. This assumption is incorrect and the ACCC policy would harm fixed network callers who could no longer each people who did not subscribe to mobile telephony.

calls or (2) customers do not make subscription decisions based on price. I consider these assumptions. The ACCC analysis depends on the assumption that fixed carriers will pass on lower charges from the mobile carriers to retail FTM call prices. Since Telstra has approximately 60% share of the retail FTM calls, this assumption is crucial. Otherwise, the ACCC will have harmed VOD, Hutch, and Optus who have the incentive to develop 3G mobile to compete with fixed networks and provide platform competition with the dominant Telstra wireline network.[93] Economic analysis demonstrates that even a monopolist (absent regulation) has an economic incentive to pass on part of a decrease in input costs. The amount that a firm passes on depends and the shape of the demand curve and the amount of competition; see J. Hausman and G. Leonard (1999).[94] The greater the amount of competition, holding other factors equal, the higher the proportion of the cost decrease that is passed on to final consumers.

78. However, it would be an extremely inconsistent position for the ACCC to assume that Telstra and other FTM retail providers will pass on some portion of lower costs and yet to assume that competitive mobile providers such as Hutch and VOD (and Optus and Telstra) will not decrease the amount of their handset subsidies or increase their outgoing call price when their FTM call prices are decreased due to regulation. Even if Hutch and VOD were earning supra-normal profits today (which they are not according to the ACCC's own analysis), they would not be acting in their shareholders' interests if they did not decrease handset subsidies or increases outgoing call prices when their FTM revenue decreased from their customers.[95] Indeed, since competition is quite high for

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[93] See J. Hausman, "From 2G to 3G: Wireless Competition for Internet-Related Services," R. Crandall and J. Alleman ed., Broadband, Brookings, 2002 and "Mobile, 3G, Broadband and WiFi", Shann Memorial Lecture, University of Western Australia, March 2003, published in R. Cooper R and G. Madden (eds.) (2004) Frontiers of Broadband, Electronic and Mobile Commerce. Physica-Verlag, where I discuss the use of 3G to provide platform competition to wireline networks. Most economists conclude that this form of competition will create much larger consumer welfare gains than "regulated competition" that arises from unbundled loops that do not provide a competing technology platform.

[94] J. Hausman and G. Leonard, "Efficiencies from the Consumer Viewpoint," George Mason Law Review, 7, 1999.

[95] Most antitrust authorities do their analysis under the assumption that firms act in the best interest of their shareholders. For example, the U.S. Department of Justice and Federal Trade Commission Horizontal Merger Guidelines state, "Throughout the Guidelines, the analysis is focused on whether consumers or

these carriers I would expect the reduction in revenue to be passed on in reduced handset subsidies and higher prices to mobile subscribers.[96] I note that all economists in the ACCC review proceeding have agreed that the mobile carriers are using (at least part) of the revenues from FTM calls to lower subscription prices or to subsidize handsets.

79. The ACCC report examines mobile penetration in the UK after the regulatory imposition of reduced termination rates. However, the ACCC Report never examines what has happened to mobile prices in the UK. Prices form a much better indication of the effects of regulation since economic analysis makes direct predictions about mobile prices. To examine the effect on prices I gathered data from the Ofcom website, "The Communications Market" report and used the appendices for August and October 2004. The data begins in Q1 of 2003 and goes to Q2 of 2004. I indexed the data to Q1 of 2003. Note that the regulated reduction in UK mobile termination prices occurred in July of 2003.

80. I present the results in Figure 1:

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producers 'likely would' take certain actions, that is, whether the action is in the actor's economic interest," (MG, ¶ 0.1). I demonstrate in the appendix that subscription prices will increase.

[96] The profit maximizing conditions under imperfect competition with fixed costs state that marginal revenue equals marginal cost. If the ACCC regulates FTM prices, marginal revenue from customers will decrease so mobile carriers will reduce their marginal costs by decreasing handset subsidies or increase their marginal revenue by increasing outgoing call prices.

Figure 1: Comparison of Indexed Wireless Prices for U.S. and U.K
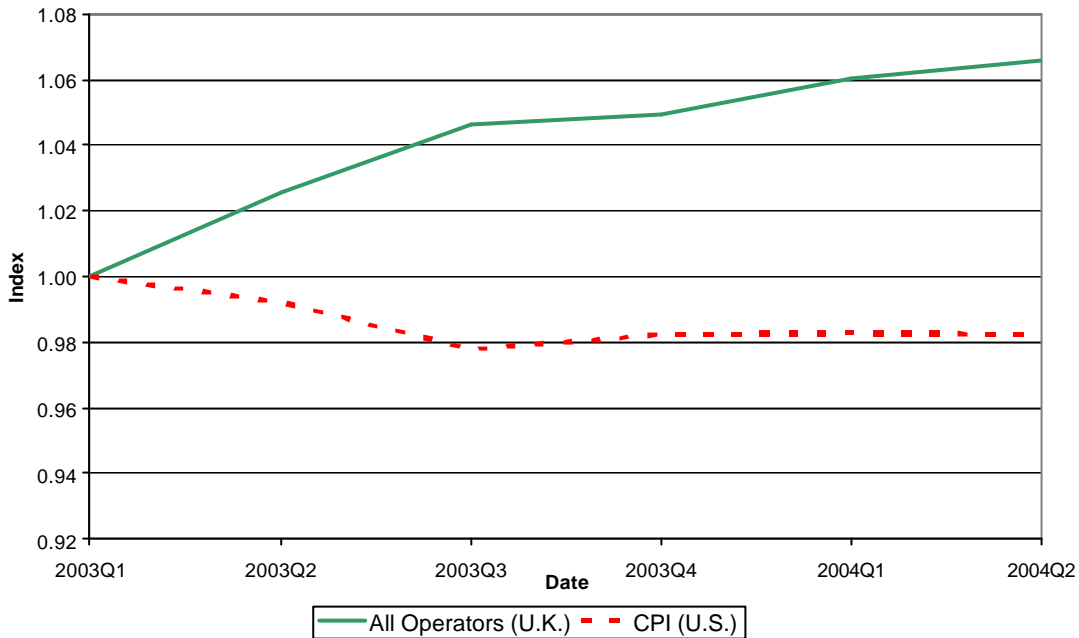
As Figure 1 indicates mobile price began to increase at the time of the regulatory imposed change in mobile termination prices and has continued to increase, although at a slower rate.[97] As a comparison I used the US Bureau of Labor Statistics (BLS) CPI for wireless telephone services (CUUR0000SEED03).[98] Note that the US BLS CPI decreased by approximately 2% over the same period. Thus, UK services mobile prices increased by 8.4% more than US mobile services prices over the same period. Given that the handset and network markets are international and that 3 of the top 5 US carriers use the same technology as the UK operators, the price data indicate that the prediction of my economic analysis has been confirmed by actual real world market experience.

81. The other possible assumption that the ACCC could make is to assume that a decrease in handset subsidies or an increase in outgoing mobile call prices will not affect mobile penetration. This assumption would be equivalent to assuming that demand curves do not slope downwards. The assumption would also be

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[97] Among carriers, the minimum increase is 5.0% higher in the last period, Q2 of 2004, than in the first period.

[98] The U.S. is the only country that I know of that publishes a separate price index for mobile telephone services.

inconsistent with my previous academic research and other academic research noted above, that finds a significant own price elasticity for mobile penetration with respect to the price of handsets and mobile calls. Indeed, since "high consumer surplus" customers would on average be the early adopters of mobile, more recent customers are likely to be more price sensitive because they do not receive as high a value from their mobile subscriptions. Thus, their price elasticity would be expected to be higher than previous econometric estimates have found. However, I note that this does not decrease the value of an FTM call to a new mobile subscriber because in a two-sided market, potential callers typically do not have a direct mechanism to cause individuals to become mobile subscribers.[99] Thus, the assumption that mobile subscriber are not sensitive to the price of mobile subscriptions would neglect two centuries of economics and substantial empirical evidence to the contrary.

V. Better Alternatives to ACCC Proposed Regulation

82. As I demonstrated above, the ACCC proposed regulation will, in an economic sense, harm the LTIE. Alternative regulatory policy exists which does not create the economic distortions that are present in the proposed ACCC policy. The ACCC goes on at great length about the information problem of fixed callers because they are unaware of prices they will be charged. To the extent this problem exists, I proposed a solution in 2001 when the ACCC first considered regulation of FTM charges. Over 10 years ago in the U.S. where a similar problem existed that callers from pay phones did not know which long distance network would carry the call and prices varied greatly, AT&T (and other carriers) began to identify its network with a distinctive sound and the message "This is the AT&T network."

83. A similar approach could be used in Australia, and the FTM provider could give the message that "This call will be charged at x cents per minute." The fixed line customer would have full information and would make an informed decision over

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[99] In some instances an employer may subsidize a mobile subscription or a parent will pay the subscription for a child. However, in the large majority of situation a potential FTM caller has no way to cause a potential mobile subscriber to actually subscribe to the service.

whether to make the call. Both fixed line providers and mobile providers could be affected by consumer choice. A fixed line customer could switch to another fixed line provider if charges were lower on competing fixed line carrier. Given number portability, few if any switching costs exist. Similarly, mobile customers could easily switch to competing mobile provides while keeping their current mobile number. Mobile customers would have an incentive to switch carriers if their current carrier's mobile termination price was sufficiently high that it reduced the number of calls they received holding other factors equal. As always, only a small number of marginal customers need to switch either fixed line carriers or mobile carriers to cause competitive prices since the fixed costs of either network are a large proportion of total costs.

84. A two-part tariff, consisting of a fixed charge and a usage charge, could alleviate a perceived regulatory problem as I stated in my 2001 testimony at the ACCC hearing on mobile termination. This alternative would consist of a monthly fixed charge and a decreased per minute usage rate. If the monthly fixed charge is set correctly and the reduced per minute charge is reflected in lower retail FTM prices, FTM calls will increase because of the lower price while the mobile penetration rate will not decrease since mobile providers will continue to compete for mobile subscribers.

85. Optus has advanced two pricing options for its mobile termination service. The first option, "Option 1," has decreasing prices from $0.1925 in 2005 to $0.17 in 2007. This approach is the typical price structure in CPP situation (and indeed in most of telecommunications). However, Optus proposes to give access seekers an option to choose a two-part tariff. In "Option 2" the fixed monthly charge is usage invariant and the charges will be $x for each service offered by the access seeker. The fixed monthly charge will be set so that together with a lower usage charge, the total charge to the access seeker based on 2004 traffic amounts will be "revenue neutral" compared to the amount paid under Option 1. Under Option 2 the charge per minute will decrease from $0.1425 to $0.12 per minute in 2007.

86. Economists typically find the structure of two-part tariffs to be favorable because the lower per minute charge will encourage additional FTM calling, to the extent

that fixed providers decrease their prices accordingly. If the per monthly charge is set to be "revenue neutral" the mobile providers will not increase their monthly subscription rate so that mobile penetration will not decrease, as it likely will under the ACCC regulatory proposal. If FTM calling expands under a two-part tariff, competition among mobile providers may lead to somewhat reduced mobile subscription prices and greater mobile penetration. This outcome leads to an increase in FTM calls and an increase in mobile penetration and thus an increase in the LTIE.

87. Optus has asked me to comment on the CRA report and its estimation of LRIC. I have significant experience in LRIC as I have written a number of academic papers on LRIC in telecommunications. I have also been involved in applications of LRIC, and I have provided testimony before the US FCC and the California Public Utility Commission and gave an invited presentation at an ACCC conference in 1997. I have read the CRA report, "The Long Run Incremental Cost of Mobile Termination." I agree with the general approach of calculating a forward looking measure of LRIC in the CRA report. Overall, CRA appears to have made reasonable choices in its cost modeling approach.

88. I would have two suggestions for changes in the CRA approach. First, I would recommend the use of economic depreciation for reasons I have discussed in my previous academic articles. CRA discusses their choice in Section 3.4.1 and have adopted the lower cost alternative. I would also suggest that the WACC as computed, consistent with previous ACCC decisions and described in Section 3.4.2 is probably too low. A better approach is to use a project specific cost of capital. Given the very fast pace of technical change in the mobile and more generally in the wireless industry, e.g. the introduction of 3G and the advent or competitive technologies such as WiMax, I believe the risk related to Optus' mobile network is very likely higher than Optus' overall company risk. A more refined calculation would likely lead to a higher WACC and thus higher calculated termination costs. Since both of my suggested changes would lead to higher cost estimates, the CRA approach can be taken to be conservative along these dimensions.

Appendix

89. I consider a profit function for a mobile provider which does not provide fixed line service:

(A1) $\Pi(m, a_1, a_2) = x(m, a_1)(m - c_0) + q_1(a_1, x) * (a_1 - c_1) + q_2(a_2, x) * (a_2 - c_2)$

m = monthly subscription price
    a_1 = per call outgoing charge
    a_2 = per call terminating charge
        (assume fixed part is either regulated or competitive)
    $x(m, a_1, a_2)$ = number of mobile subscribers ($x_1 < 0$, $x_2 < 0$, $x_3 < 0$)
    $q_1(a_1, x)$ = number of originating calls ($q_{11} < 0$, $q_{12} > 0$)
    $q_2(a_2, x)$ = number of terminating calls ($q_{21} < 0$, $q_{22} > 0$)
    c_0 = monthly cost of phone subsidy
    c_1 = marginal cost of outgoing calls
    c_2 = marginal cost of incoming calls

First Order Conditions (FOC) for Profit Maximization:

(A2) $\quad \dfrac{\partial \Pi}{\partial m} = x + \dfrac{\partial x}{\partial m}[(m - c_0) + \dfrac{\partial q_1}{\partial x}(a_1 - c_1) + \dfrac{\partial q_2}{\partial x}(a_2 - c_2)]$

Thus, the monthly subscription price m is lower of the positive margin on outgoing and incoming calls. If the mobile provider did not take account of the margin on incoming calls, the subscription price will be higher and mobile penetration will be lower.

    G. I demonstrate that subscription prices will increase if regulation forces down the mobile termination prices. From the FOC for profit maximization for equation (A2):

(A3) $\quad 0 = x + \dfrac{\partial x}{\partial m}[(m - c_0) + \dfrac{\partial q_1}{\partial x}(a_1 - c_1) + \dfrac{\partial q_2}{\partial x}(a_2 - c_2)]$

I assume that for small changes in the mobile termination, price, a_2, that the derivatives $\frac{\partial q_1}{\partial x}$, $\frac{\partial q_2}{\partial x}$, and $\frac{\partial x}{\partial m}$ remain constant.[100] Holding a_1, c_1, and c_2, constant, I totally differentiate equation (A3):

(A4)

$$0 = \frac{\partial x}{\partial m}dm + \frac{\partial^2 x}{\partial m^2}[(m-c_0) + \frac{\partial q_1}{\partial x}(a_1-c_1) + \frac{\partial q_2}{\partial x}(a_2-c_2)]dm + \frac{\partial x}{\partial m}dm + \frac{\partial x}{\partial m}\frac{\partial q_2}{\partial x}da_2 + \frac{\partial x}{\partial a_2}da_2$$

Solving, I find:

(A5)

$$\frac{dm}{da_2} = -\{\frac{\partial x}{\partial m}\frac{\partial q_2}{\partial x} + \frac{\partial x}{\partial a_2}\} \bigg/ \{2\frac{\partial x}{\partial m} + \frac{\partial^2 x}{\partial m^2}[(m-c_0) + \frac{\partial q_1}{\partial x}(a_1-c_1) + \frac{\partial q_2}{\partial x}(a_2-c_2)]\} < 0$$

which follows because the numerator is negative and the denominator is negative by the second order conditions of profit maximization.[101] Thus, equation (A5) demonstrates that if a_2 decreases then m will increase.

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[100] This assumption may be relaxed and the results will not change because of the concavity of the profit function with respect to prices.
[101] This result follows from the concavity of the profit function with respect to prices.