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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

January 21, 1994

93-252

Mr. Reed Hundt
Chairman
Federal Communications Commission
1919 M Street, N.W.
Washington, D.C. 20554

Dear Mr. Chairman:

The issue of market power in the cellular industry is extremely important in the rulemaking proceeding on the regulatory treatment of mobile services.¹ The issue has a direct bearing on the Commission's statutory ability to exempt cellular carriers from Section 203 of the Communications Act (tariffing) and, in broader terms, should serve to guide the Commission in establishing a structural framework for the commercial mobile services industry.

The National Cellular Resellers Association has consistently maintained that cellular carriers do indeed possess market power and that, as a result, there is little relationship between rates charged subscribers and resellers for cellular service and the cost incurred by carriers to provide the service. Simply put, NCRA believes that cellular's duopoly market structure produces excessively high service prices which violate the "just and reasonable" provisions of the Communications Act.

In our comments on the rulemaking proceeding referenced above, NCRA cited an especially thorough study of cellular market power performed last year by Dr. Thomas Hazlett, an associate professor at the University of California, Davis and submitted to the Commission in August, 1993, by Time Warner Telecommunications as part of the rulemaking proceeding on personal communications services.² Dr. Hazlett's report, entitled Market Power in the Cellular Telephone Duopoly, makes a powerful case in support of the proposition that licensed cellular carriers possess market power and generally charge subscribers supracompetitive prices.

In September, 1993, Bell Atlantic Corporation, in an effort to discredit Dr. Hazlett's conclusions, filed a critique of the Hazlett report by John Haring and Charles L. Jackson.³ NCRA has asked Dr. Hazlett to respond to the Haring/Jackson paper. Dr. Hazlett's response, which is enclosed,

¹ GN Docket 93-252 ✓

² GN Docket 90-314

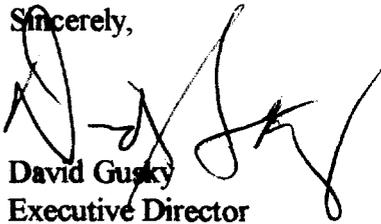
³ Errors in Hazlett's Analysis of Cellular Rents, John Haring and Charles L. Jackson, Strategic Policy Research (undated).

should remove all reasonable doubts about the existence of market power in the cellular industry.

We hope the economic factors that exist in the cellular industry and verified through rigorous analysis will persuade the Commission to move decisively in the current rulemaking to end the excessive control licensed carriers have over the cellular industry. As NCRA recommended in its comments, the Commission should require licensed carriers to interconnect at just and reasonable rates with cellular resellers. This would restrict the carriers' control of bottleneck services and shape a highly competitive retail cellular market and fair rates for consumers. Moreover, in as much as the proposal stimulates competition and minimizes if not eliminates market power in the cellular industry, it will over time give the Commission greater flexibility to rely on market forces to achieve just and reasonable rates without imposing Section 203 tariff requirements on cellular carriers.

We appreciate your interest in this important issue. Please do not hesitate to contact us if you have questions or need additional information with regard to this letter or enclosed report, which we request be made part of the record and given due consideration in GN Docket 93-252.

Sincerely,

A handwritten signature in black ink, appearing to read "David Gusky", is written over the typed name and title.

David Gusky
Executive Director

cc: Attached List

Enclosure: Errors in the Haring & Jackson Analysis of Cellular Rents,
Thomas W. Hazlett, Ph.D., January, 1994

ERRORS IN THE HARING & JACKSON ANALYSIS OF CELLULAR RENTS

Thomas W. Hazlett, Ph.D.*

January 1994

***Associate Professor, University of California, Davis, and Director, Program on Telecommunications Policy, Institute of Governmental Affairs, University of California, Davis. This paper reflects solely the views of the author.**

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1 Introduction.

In August 1993 I wrote a paper entitled, "Market Power in the Cellular Telephone Duopoly," which was submitted to the Federal Communications Commission in its Personal Communications Services rulemaking proceedings.¹ In September 1993, Bell Atlantic submitted comments on my paper written by John Haring and Charles L. Jackson of Strategic Policy Research, Inc.² Their paper displays severe flaws in its economic analysis both theoretically and empirically.

In its discussion of economic theory, the Haring & Jackson paper errs in describing the duopoly pricing literature, and ends with conclusions that are simply misstatements of fact. Further, it mischaracterizes rents as opportunity costs, and ends up "proving" a definitional straw man: Under the Haring & Jackson deconstruction, all rents are *defined* as costs and market power is everywhere (automatically) absent.

Empirically, Haring & Jackson are energetic in attacking statistical evidence of market power which -- while attributed to my "playing with numbers" -- comes from government sources. Moreover, these government sources agree with my analysis that duopoly market structure does lead to output restriction in cellular telephony. Even more interestingly, Haring & Jackson decry use of the very same analytical methods which they have employed in previous investigations of market power in both cable TV and cellular telephony; bravely, Mr. Jackson now attacks some of the *precise numbers* he has personally used in past reports. In the end, the authors attempt to escape responsibility for assertions clearly contradicted by marketplace evi-

1 Thomas W. Hazlett, "Market Power in the Cellular Telephone Duopoly," (Report prepared for Time Warner Telecommunications; August 1993) [hereinafter "Hazlett 1993"].

2 John Haring and Charles L. Jackson, "Errors in Hazlett's Analysis of Cellular Rents," (Bethesda, MD: Strategic Policy Research, undated) [hereinafter "Haring & Jackson"].

dence with a curious "burden of proof" argument under which others must prove their case but they must only state one. Even under this inexplicably lopsided test, their case against market power in cellular telephony fails.

The Haring & Jackson analysis cannot explain why virtually every independent study of cellular markets -- including those conducted by the Federal Communications Commission -- has concluded that market power restricts output. Despite the cloud of dust raised by the Haring & Jackson paper, this is a position which even cellular telephone companies have themselves argued -- a fact which their paper entirely ignores.

2 The Theory of Duopoly Pricing.

2.1 The Haring & Jackson Bertrand-Cournot Confusion.

Apparently Jackson & Haring have read my paper a little too quickly, or read their duopoly theory a little too quickly. They gleefully report of my paper that, "The theoretical model he propounds actually leads to the conclusion that rents in cellular telephony can only reflect scarcity of spectrum rather than market power."³ Wrong.

The model I presented was the standard Cournot model of duopoly pricing.⁴ It appears as a baseline analysis in economic textbooks, and was actually the model used by FCC policy analysts in addressing the issue of market power in just this context.⁵ It does not require

3 Haring & Jackson, p. 1.

4 This is referred to as "Traditional Cournot analysis" in Jean Tirole, *The Theory of Industrial Organization* (Cambridge, MA: MIT Press; 1989) [hereinafter "Tirole 1989"], p. 218.

5 In other words, analyzing the market power exercised by two cellular telephone providers. "We will use the Cournot model, one of the oldest and simplest models, to illustrate the effect on price of increasing the number of firms in a market from two to three. As with other models of noncooperative oligopoly, it predicts that monopoly equilibrium when there is a single firm and the competitive equilibrium when there are large numbers of firms. With small numbers of firms it predicts a price lower than under monopoly, but greater than competition" (Evan R. Kwerel and John R. Williams, "Changing Channels: Voluntary Reallocation of UHF Television Spectrum," [Washington, D.C.: Federal Communications Commission, OPP Working Paper No. 27; November 1992] [hereinafter "Kwerel & Williams 1992"], p. 81).

collusion between suppliers for output to be restricted from competitive levels.⁶ The key to every duopoly pricing model is the assumption made by one firm about the other firm's reaction to its price/quantity decision. Firm A has some belief about what Firm B will do when Firm A makes its production and pricing decisions. These two are necessarily *simultaneous* decisions (*i.e.*, the choice of either one determines the other), because consumer demand will only permit one price to be charged for a given output.

The Cournot model makes the assumption that each firm makes its decisions assuming that the other firm's *output* is fixed; the Bertrand model assumes that each firm acts believing the other firm's *price* is fixed. As the firms act sequentially until an equilibrium is reached,⁷ the Bertrand model sees each firm lowering its price -- each time assuming that the other firm will not change its price -- to take away customers. The end game occurs where price is just equal to marginal cost, as the profit incentive (to lower price and increase output) disappears. Indeed, profits are zero, and a competitive equilibrium is achieved with only two firms. As

Tirole comments:

We call this the Bertrand paradox because it is hard to believe that firms in industries with few firms never succeed in manipulating the market price to make profits... Bertrand competition is interesting because it depicts a polar case. It represents what we have in mind when we think of sharp small-number competition. In general, of course, oligopoly pricing will lead to an outcome intermediate between the Bertrand one and the outcome of the other polar case (the monopoly situation).⁸

⁶ For some reason, Haring & Jackson criticize me for "offer[ing] no behavioral evidence that cellular duopolists collude to restrict output" (p. 1). This is a theoretical *non sequitur*; a Cournot solution requires no collusive behavior.

⁷ Static oligopoly pricing models such as Cournot and Bertrand are actually equilibrium concepts, and are not intended to describe how firms behave in disequilibrium. Indeed, all "action" takes place in an instant. Describing sequential behavior, then, is simply a way of making the equilibrium result intuitively accessible.

⁸ Tirole 1989, pp. 210-11; 212 (footnote omitted, emphasis in original).

The Cournot model defines a seemingly more realistic situation than that suggested by the "Bertrand paradox": duopoly price and output typically end up somewhere between the polar extremes of perfect monopoly and perfect competition. Importantly -- because my paper is entirely miscast by Haring & Jackson -- I described this model as one in which each firm assumes "that the other firm's output will not change as a consequence of its actions."⁹ This is exactly correct: as described by Tirole, "each firm maximizes its profit given the quantity chosen by the other firm."¹⁰

Apparently Jackson & Haring are confused by the fact that I go on to say that each firm -- after assuming the other's quantity to remain fixed -- selects a profit-maximizing price, and believe that this gets us to Bertrand's price competition model. This is specious. The difference in the models lies in their assumptions about the competitor's behavior; in either model, firms select their own prices at the same instant they select their own quantity of output (and *vice versa*).¹¹

⁹ Hazlett 1993, p. 5.

¹⁰ Tirole 1989, p. 218. The Haring & Jackson paper backhandedly concedes that I have described a Cournot duopoly equilibrium on page 3: "The variant of the Cournot model Kwerel and Williams utilize (and the one Hazlett presumably has in mind, although misstates)..." But the error is all theirs, as their footnote reveals: "Hazlett has firms setting prices given outputs. In the Cournot model firms choose output levels given output levels; in the Bertrand variant of the Cournot model, they set prices given prices. When price is the decision variable, Cournot and Competitive equilibria converge." False. As noted above, firms select price and output simultaneously, given their beliefs about the other firm's reaction.

¹¹ In either model, Cournot or Bertrand, each duopolist acts so as to maximize the profit it can obtain from serving a *residual* demand curve (*i.e.*, the market demand minus the other firm's output). When selecting profit-maximizing price on a demand curve, residual or otherwise, there is but one quantity demanded; when selecting quantity, there is but one demand price. The difference in the models is in constructing the residual demand curve, which is where conjectures about the other firm's behavior enter the analysis.

Having saddled my analysis with a misconstrued duopoly theory, Haring & Jackson go on to belittle the Cournot model, quoting from various critics of "mechanistic" economic models. The Bertrand model, which they use as their *sole* evidence that all cellular license rents are actually a result of spectrum scarcity, is guilty of all the "mechanistic" criticism which they level at the traditional Cournot analysis. How stupid can two competitors be to naively lower prices, relentlessly price-cutting round after price-cutting round, only to end up earning nothing? As Tirole notes:

Another paradox of the [Bertrand] model is that one wonders why firms bother to enter at all if they do not make any profit. Along the same lines, suppose that the firms face a fixed cost of entering the market. Then, if one firm enters, the other firm will not follow suit, however small the fixed cost. Thus, if one believes in the existence of at least a small fixed cost of production or of entry, the market is likely to yield a monopoly.¹²

One suspects that there are some fixed costs to entering the cellular telephone market; certainly Haring & Jackson argue strenuously that those costs are high. Hence, they cannot both trumpet the Bertrand competitive equilibrium as descriptive and maintain their empirical arguments.

In fact, given their empirical assertions, the Bertrand model does *not* achieve a competitively priced equilibrium. A further application of the model is that, in markets where capacity constraints exist, sequential price cutting will *not* settle where price equals marginal cost as Haring & Jackson erroneously allege. Price-cutting will continue only until capacity is exhausted by one of the firms, and then sequential price *increases* will obtain, raising prices to supra-competitive levels. As noted by Dennis Carlton and Jeff Perloff, the Bertrand competitive price result

12 Tirole 1989, p. 211 (footnote).

... depends on a number of strong assumptions: the output is homogeneous, the market lasts for only one period, and any firm can produce as much as it wants at constant marginal cost. If any of these assumptions are relaxed, the Bertrand price does not equal marginal cost.¹³

Where capacity constraints exist, marginal costs will increase (if only to ration scarce spectrum space) and the resulting Bertrand suppliers will restrict output and raise price above marginal cost. Since Haring & Jackson argue laboriously that spectrum scarcity is effectively constraining output in cellular telephone service markets, the equilibrium they describe cannot obtain, even assuming the most competitive pricing model of duopoly markets.

2.2 The Theory is Not Determinative.

In my previous paper, I was careful to point out that duopoly pricing theory can only be suggestive, not determinative. The real evidence for output-restricting behavior must be seen in the context of actual markets. As I wrote:

The level of prices charged when two firms compete in a market is generally estimated to fall between monopoly, on the high side, and competition, on the low... Even in the classic duopoly case, where entry barriers constrain competition to two firms which can affect market price, duopoly pricing is still not determinative.¹⁴

This is important in that the whole case made by Haring & Jackson that cellular telephone markets evidence no sign of duopolistic output restriction is advanced only by their

13 Dennis W. Carlton and Jeffrey M. Perloff, *Modern Industrial Organization*, Second Edition (New York: HarperCollins, 1994), p. 247.

14 Hazlett 1993, pp. 4-5.

theoretical argument, one which they (inaccurately) claim to dredge from my analysis. As they underscore with italics: "To state the matter bluntly: *If cellular firms behave according to the theory propounded by Hazlett, the fully competitive equilibrium results.*"¹⁵

Not only is the theory I "propounded" entirely misconstrued, one cannot conclude that any particular set of prices prevail simply by examining the theory of duopoly pricing. What we can learn from theory is something about the likelihood of various outcomes, which is informative background before going on to examine the evidence. What we do learn from duopoly theory is that the "evidence" which Haring & Jackson trumpet is no more than a "paradoxical" special case, which would not logically apply in markets boasting the fixed costs or capacity constraints claimed by Haring & Jackson. Hence, their appeal to theory to obtain a competitive price result in duopoly cellular markets results in a detour into the null set.

3 Confusing Rents as Costs.

3.1 Spectrum Scarcity vs. License Scarcity.

The easiest means of discerning the supra-competitive profits being earned in the cellular industry is by examining the high dollar value attributed to cellular license rights. As these can be seen in market transactions where cellular systems are bought and sold, various analysts have subtracted out the cost of physical assets to estimate the present discounted value of excess returns (economic profits) anticipated by the market. In summing these capitalized supra-competitive returns associated with cellular telephone license rights for all 305

¹⁵ Haring & Jackson, p. 3 (emphasis in original). Curiously, they also appear to be taking issue with me when they state: "The characteristics of market equilibrium when few firms compete are indeterminate." (*Ibid.*, p. 2) This is what I had stated.

Metropolitan Service Areas (covering about 80% of the U.S. population), the National Telecommunications and Information Administration came up with an estimate very close to \$80 billion.¹⁶

A key part of my report was the existence of such high license values as evidence of supra-competitive returns. The rejoinder to this approach by Haring & Jackson is critical to understanding their dismissal of duopoly rents in the cellular industry. They argue that

- a. Cellular licenses do not convey *monopoly* power because two are issued rather than one;
- b. The opportunity cost of spectrum accounts for the high level of rents, and that ignoring the resource cost of airwaves is tantamount to analyzing a real estate developer's profitability while leaving out the cost of real estate.

The first point is a silly one of semantics: Yes, the FCC cellular license has limited entry to two firms, and two firms do not constitute a monopoly, because a monopoly is one firm. Yet, economists routinely refer to supra-competitive profits as constituting "monopoly profits," and a firm with market power (which still competes with other firms at *some* level) is often labeled a "monopolist." This knowledge is so standard that I will leave the textbook citations to others.

The second point is too clever by half. It turns out that the FCC-licensed cellular system neither owns nor leases a resource; the spectrum is owned by the public. What the FCC license conveys is a right to operate equipment which utilizes particular frequencies for particular purposes with particular capital equipment, with spectrum inputs priced at *zero*. Hence, the license is a *use permit*. As such, it is a classic intangible right.

16 See Hazlett 1993, p. 16.

Any intangible right which creates a barrier to entry will become valued by market traders at a level approximating the present discounted value of the rents flowing from entering the restricted market. If the capitalized value of such rents are identified as a *cost* of entering, rather than as a return on physical investments, then *any* barrier to entry can be erased as a source of monopoly (duopoly!) profits and turned into a "cost of doing business." Indeed, Harold Demsetz shows clearly that the classic policy-imposed entry barrier, taxi medallions in New York City, can be *theoretically* considered a cost of doing business and not telltale evidence of a monopolistic entry barrier.¹⁷

Haring & Jackson argue that cellular license rights include payments for the use of a scarce resource, but so do taxis: access to the streets cannot be granted without limit.¹⁸ The reason we attribute the rents to a monopolistic (cartelistic!) restriction is that -- in the most technically correct sense -- the license itself is not the purchase of a resource, but is literally an operating permit. We are not selling street space or frequencies, which would force buyers to make cost/benefit calculations based on the alternative uses of the resource. Rather, we actually are allocating operating licenses enabling only certain privileged firms to serve

¹⁷ Harold Demsetz, "Barriers to Entry," *American Economic Review* 72 (March 1982), pp. 47-57. Demsetz goes on to explain that "The reader will have recognized that what I have done is to use medallions as if they were scarce land, treating taxi owners as farmers who rent or buy 'acres of' medallions..." (*Ibid.*, p. 48). This is precisely what Haring & Jackson go on to do with cellular licenses, of course, and it is key that Demsetz underscores the fact that inefficient restriction of output (market power) is still, quite obviously, exercised in the taxi services market despite this theoretical twist used to explain away rents as costs.

¹⁸ Demsetz notes explicitly that taxi medallions also ration scarce city resources: "a barrier to the provision of low-cost, low-quality taxi services might seem desirable to those concerned about street congestion and dishonest drivers..." (*Ibid.*) Hence, the existence of some positive level of scarcity value for a resource associated with the government-issued license is far from sufficient to explain away the monopolistic impact of entry barriers.

customers, using a scarce input at zero price. Prices paid for these rights do not reflect the opportunity cost of spectrum (or street space) but solely the supra-competitive profits available from operating such a business.

Proof: Even if a particular wireless service would earn insufficient profits to compensate for (or "cover") the opportunity cost of the spectrum it utilizes, licenses for such service will still fetch a price equal to the present discounted value of such profits (*without payment for spectrum*). In that the licensee is not permitted to sell (or internally convert) the licensed spectrum space into an alternative use, the private cost of spectrum is driven to zero. Hence, the license value is exceeded by the resource cost of spectrum. Therefore, the price of the licensee's rights cannot be said to "include" payment for the scarce resource, and the "opportunity cost of spectrum" -- which the licensee never faces -- cannot be included in the firm's "cost of physical capital."

The foremost right included in a license is, of course, an implicit or explicit protection from competitive entry. If holders of FCC "spectrum licenses" could compete freely with one another, the "law of one price" would begin to assert itself and voluntary reallocation would break out all along the dial.¹⁹ The aggregate transaction value of cellular licenses utilizing 50 MHz of nationwide spectrum space are *over 7 times* the transaction value for all the licenses utilizing the 400 MHz of spectrum space allocated to radio and television

¹⁹ The free market equilibrium would not imply that all spectrum bands would be priced equally. In fact, price differentials would result from distinct technical qualities and the availability (or cost) of complementary capital equipment, as well as from geographic differences attributable to varying levels of consumer demand. But there is a unanimity of opinion amongst economists that the huge differentials between license prices in different bands would fall precipitously if cross-band competition -- i.e., free entry by existing license-holders -- were allowed. See, e.g., Kwerel & Williams 1992.

broadcasting, for a market price differential of *62 times* (on a per-MHz basis).²⁰ Why is the opportunity cost of "spectrum" so low in one market and so high in another? Because we are not looking at *spectrum* values, but at *license* values.

It is true that the very limited issuance of FCC licenses for cellular service has driven up their value far above the opportunity cost of spectrum, and that releasing more spectrum via a number of new licenses would drive down license values. This is explained in my previous paper as evidence of the restriction of output in the cellular telephone service market, and of the attendant monopoly (duopoly!) value of FCC licenses. To say that the scarcity value of spectrum accounts for this because the FCC has created the scarcity by historically limiting cellular service to but two licensees accessing just 25 MHz apiece is not to contradict my analysis at all: The rents embodied in the cellular license rights stem from *both* the restriction of spectrum and the restriction of competitors, as will be seen below. What is technically important to understand in calculating the cost of physical company assets, however, is that license rights will not be included because the company does not bid spectrum away from a competing use. It owns physical assets which are privileged to utilize particular frequencies at zero price, and those special rights form the intangible property which economists refer to when they estimate "license values."

In truth, the FCC licensee doesn't hold a spectrum license at all. It holds a permit to provide defined services in regulated ways. This should be straight-forward to the Commission, which since its inception has insisted it was not awarding a private property right to spectrum. Instead, the FCC assigns permits which are, literally, "Radio Station Authorizations." The fact that the license is restricted, and that firms are not able to freely

20 CBO 1992, p. 37.

purchase spectrum and divert it to its highest valued use has been a huge issue to economists and policy analysts who have argued that the FCC *should* be issuing a different sort of property right. As explained by the late Harvey Levin, a pioneer in this area of economic analysis:

[B]ecause different users within the same services or in different services cannot at present compete for spectrum in any organized market, there is no readily available market valuation of frequencies in alternative uses. Nor is there any market-type constraint to guarantee that spectral inputs will be combined optimally with other factor inputs by any or all Government and non-Government users, in ways, that is, that would maximize their contribution to Gross National Product.²¹

The whole case being made for spectrum policy reform is that users of spectrum -- licensees -- *don't* bid spectrum away from alternative uses and thereby do not incur the "opportunity cost of spectrum" in their production decisions. That this problem has not been solved in the intervening quarter-century since Levin wrote is seen by the recent conclusion of the National Telecommunications and Information Administration:

A strong theoretical case has been made for greater reliance on market principles in spectrum management. A market for spectrum licenses or rights, if properly structured, can maximize both "allocative efficiency" (i.e., prices bid for spectrum reflect the costs to society of spectrum use) and "distributive efficiency" (i.e., total costs are minimized for a given level of production or output). At least for commercial users, a spectrum market also would be equitable in the most basic sense -- users would pay for using a valuable resource. Any spectrum user denies someone else the use of the spectrum, that is, a user causes an "opportunity cost" to society. It is eminently equitable for commercial users to pay for these opportunity costs, and the easiest way to determine those costs is through a market in which other prospective users can compete for the spectrum.²²

²¹ Harvey Levin, "The Radio Spectrum Resource," *Journal of Law & Economics* XI (October 1968), p. 435.

²² National Telecommunications and Information Administration, *U.S. Spectrum Management Policy: Agenda for the Future* (Washington, D.C.: Department of Commerce, NTIA Special Publication 91-23; February 1991) [hereinafter "NTIA 1991"], pp. 98-9; footnotes omitted.

Since the licensee uses spectrum without paying its social opportunity cost, the developer analogy employed by Haring & Jackson fails. They assert that the land purchased (or leased) by the developer carries a scarcity value precisely such as the cellular telephone license. That is false as a matter of law and as a matter of economics. It is literally the case that the developer purchases land or the use of land, bidding the resource out of an alternative use. Those are both his/her real estate costs, and the social opportunity cost of land. The cellular license does *not* convey any spectrum (or other physical property) to the licensee. In a more efficient regulatory environment, this would be different -- but that's not the world we live in. As explained by FCC policy analysts Evan Kwerel and John Williams:

Ideally, entrepreneurs with ideas for new radio services or technologies should be able to purchase spectrum rights in the private market in much the same way as they purchase inputs such as land or steel. That would... ensure that each new spectrum use is at least as privately beneficial as the other uses it displaces. Under the current system, however, the proponents of new radio technologies or services must generally come to the government for spectrum.²³

The developer's costs which are analogous to the purchase price of an FCC license are the purchase of zoning rights, permits to construct (and to operate) physical capital. That these rights are generally held by the same entity as the owner of the real estate has apparently confused Haring & Jackson. If a piece of real estate is extremely valuable because, say, only two parcels in the entire region have been zoned to operate a particular sort of business, the sales price of the land is properly *not* included in the cost of physical assets.²⁴ The

²³ Evan R. Kwerel and John R. Williams, "Moving Toward a Market for Spectrum," *16 Regulation* 53 (No. 2, 1993), p. 54.

²⁴ The actual opportunity cost of land should be included. This would be the price of land without such zoning restrictions. Since no one is able to bid on spectrum in unrestricted (flexible-use) parcels, it is difficult to judge what that opportunity cost would be. In any event, there is no reason to arbitrarily set it equal to the market value of a particular airwave license.

intangible right to be a duopolist -- while attached to the real estate rights as a practical matter -- should not be allowed to disappear, folded into the "scarcity value of land." Particularly when the two tracts of land sell for 62 times neighboring parcels, on a per-acre basis. This is the analogy which Haring & Jackson were searching for.

3.2 Haring & Jackson Commit the "Sunk Cost Fallacy."

When a cellular system is purchased, its license rights convey the opportunity to do one thing: supply cellular telephone service. Hence, the opportunity cost of spectrum to the licensee is zero. While the opportunity cost of spectrum use to *society* may be high, this cost is irrelevant to the cellular licensee which does not face such opportunities and, hence, does not internalize any such opportunity cost.²⁵ The Haring & Jackson assertion that the license's market value represents the resource cost of spectrum is only (coincidentally) true in the special case where the government has allocated spectrum licenses precisely as would the marketplace, or has allocated spectrum so as to maximize social value.²⁶

Their error is glaring in Footnote 14, where they state: "Cellular firms obviously do control a highly scarce factor of production, the spectrum they utilize, and this provides an obvious explanation for high q -ratios." Cellular firms may "control" their license, but the use

25 That these social costs are not internalized is the market failure which Ronald Coase and other critics of licensing are concerned with. See Ronald Coase, "The Federal Communications Commission," *Journal of Law & Economics II* (October 1959), pp. 1-40; Harvey Levin, *The Invisible Resource* (Washington, D.C.: Resources for the Future; 1971).

26 The evidence that the government pointedly does not do this is found in numerous studies including the Coase 1959, Levin 1971, Itihel de Sola Pool, *Technologies of Freedom* (Cambridge: Harvard University Press; 1983), and Thomas W. Hazlett, "The Rationality of U.S. Regulation of the Broadcast Spectrum," *Journal of Law & Economics XXXIII*, 133 (April 1990). Supporting evidence is supplied also by Jeffrey H. Rohlfs, Charles L. Jackson, and Tracey E. Kelly, "Estimate of the Loss to the United States Caused by the FCC's Delay in Licensing Cellular Telecommunications," (Washington, D.C.: NERA; 8 November, 1991) [hereinafter "NERA Report"].

of spectrum is controlled by the Federal Communications Commission. What provides an "obvious explanation for the high q -ratios" is the intangible right to use that spectrum for a *pre-determined* use without much competition and with no direct threat of competitive entry.

Haring & Jackson appear to take Jerry Hausman down the same cul-de-sac. Citing their paper, Hausman writes of my paper:

Professor Hazlett has made a fundamental error in his economic analysis. His q -ratio evidence from which he infers that cellular companies have market power can be explained totally by the scarcity of spectrum for cellular telephony...

Indeed, according to Prof. Hazlett's reasoning when PCS spectrum is auctioned, the prices for the spectrum will prove that market power exists in PCS. The correct inference, however, is that the auction values reflect expected future rents to scarce spectrum.²⁷

Professor Hausman can be rebutted on his Q ratio interpretation just as can Haring & Jackson. It is interesting, however, that he is very careful in the first paragraph, claiming that "scarcity of spectrum for cellular telephony" can explain the high Q -ratios (*i.e.*, he does not say that the *opportunity cost of spectrum* is the culprit). He exposes the underlying analytical error in the second paragraph (which appears in a footnote), however, in assigning PCS license prices to "scarce spectrum." Those rents will have no direct relation to the scarcity of spectrum; rather, they reflect the scarcity of PCS *licenses*, as shown above.²⁸

²⁷ Affidavit of Professor Jerry A. Hausman, attached to "Reply Comments of the Bell Atlantic Companies," Federal Communications Commission, "Implementation of Sections 3(n) and 332 of the Communications Act: Regulatory Treatment of Mobile Services," GN Docket No. 93-252 (23 November, 1993), p. 7.

²⁸ The logic of this should be revealed by the fact that the CBO estimates that only \$7.2 billion will be raised for PCS licenses consuming 120 MHz, while the 50 MHz absorbed by cellular licenses has produced over \$80 billion in private market transaction value. (Administration and congressional estimates were somewhat higher.) See Nicholas W. Allard, "The New Spectrum Auction Law," *Seton Hall Legislative Journal* 18, 101 (1994), p. 102.

To think of the resource cost of spectrum to society as entering into the firm's cost of acquiring assets to provide cellular telephone service is to commit the "sunk cost fallacy." The payment for cellular license rights did *not* move any spectrum resource: that was fixed by regulation (FCC allocation). The payment simply moved the future rents available from providing the assigned service (cellular telephony) into a different bank account. Hence, the economics of the marginal decision-making reveal that when one firm acquires the capital necessary to provide cellular telephone access to the public, the spectrum costs have already been sunk by the FCC: the purchaser's payment for a license is simply to decide who gets to enjoy the proceeds. In other words, rent-seeking.

4 Empirical Evidence of Market Power

4.1 Q ratios.

Including intangible assets in replacement cost would be incorrect. Intangible assets consist primarily of goodwill, which is the accounting entry used to balance the books when a cable company (or other asset) is bought for more than book value. Goodwill often consists primarily of capitalized monopoly/monopsony profits of the purchased company. If goodwill is included in replacement costs, the q ratio can equal unity in equilibrium, even though the firm earns substantial monopoly/monopsony profits.²⁹

The Haring & Jackson paper criticizes my Q ratio analysis for excluding the value of cellular telephone licenses in calculating the replacement cost of capital³⁰: "calculating the q-ratio of a cellular firm excluding the value of its 'real estate' -- its radio licenses -- ignores

²⁹ Shooshan & Jackson, Inc., "Opening The Broadway Gateway, The Need for Telephone Company Entry Into the Video Services Marketplace: Rebuttal to Reply Comments of Telecommunications, Inc.," (20 January, 1988) [hereinafter "Shooshan & Jackson 1988"], pp. 11-12. In a footnote at the end of this passage, the authors write: "The excerpt from Professor Salinger's article... explicitly acknowledges that the q ratio should be based on the replacement cost of physical assets" (emphasis in original).

³⁰ As did the NTIA, for instance.

the most important element in the value of the firm."³¹ This is precisely the methodology that one of the authors, Charles Jackson, employed in analyzing the Q ratio in cable, going to great lengths to argue that only the cost of physical capital assets should be employed. It is fascinating to observe the analytical flip-flop.

Of course, the Haring & Jackson paper attempts to cast the intangible property -- and therefore Q ratios -- of cellular companies in an altogether different light from the intangible assets held by cable companies. But the effort is absurd. Apologists for cable market power have argued vociferously that the franchises granted cable companies -- which allow them to occupy scarce conduits and public rights of way -- constitute a valuable asset, and that when properly calculated the typical cable company is just making a normal (competitive) return. Including the market value of a key intangible asset in the replacement cost of capital can always eliminate monopoly returns by simply reclassifying them.³²

The manner in which Haring & Jackson attempt to differentiate cable's market power from cellular's market power is embodied in the following statement:

- "The local cable franchise with very few exceptions conveys an effective *monopoly*. An FCC cellular license does *not* convey a monopoly."³³

No, it conveys a duopoly. Let's turn this around and argue: "We have no theory that allows us to deduce from the observable degree of concentration in a particular market

31 Haring & Jackson, p. 8.

32 See Demsetz 1982, *supra*. Industries which restrict output could always mask their supra-competitive profits (and, hence, market power) by simply trading stock (or assets) at market prices, and then counting future profits as competitive returns given their (high-cost) asset base. This transforms one firm's rents into another firm's costs, and yields a Q ratio which *by definition* will equal one. But the market power problem remains unaffected.

33 Haring & Jackson, p. 5 (emphasis in original).

whether or not price and output are competitive,"³⁴ and we cannot predict which market will demonstrate the more severe restriction of output (and commensurate price increases) -- monopoly or duopoly.

- "The opportunity costs of the resources embodied in a cable monopoly franchise are quite small (*viz., e.g.,* foregone benefits from alternative use of rights of way). The opportunity costs of the resources embodied in an FCC cellular license or PCS license are huge, as the FCC's experience in finding spectrum for PCS confirms with a vengeance."³⁵

This bald assertion carries no empirical weight and demonstrates an astounding naivete concerning the causes of rent-seeking behavior. There are huge fights over cable franchises which perfectly mirror the FCC's heavily-pressured efforts to issue PCS licenses. In neither case are the intense lobbying efforts due much to the "opportunity cost of the resources embodied" in public rights-of-way (a symmetric concept applicable to either context, roadways or airwaves), but because both local governments and the FCC have restricted market competition. The resulting skirmish is to gain access to lucrative, monopolistic franchise rights -- a classic rent-seeking rivalry.³⁶ The jockeying for assignment of spectrum licenses is fierce not because the social costs of producing the rights (or re-allocating them from other

34 Quoting from Haring & Jackson, p. 4, who are, in turn, quoting from Harold Demsetz, "Why Regulate Utilities?" *Journal of Law & Economics XI* (April 1968), pp. 59-60.

35 Haring & Jackson, p. 5.

36 The opportunity cost of clearing enough spectrum for all the new PCS licensees by simply moving out all the incumbent users on 1850-1990MHz, for instance, was set at only about \$1 billion by both the FCC staff and by the incumbents themselves. This is about 0.5% the per-MHz cost of cellular licenses in the UHF band. See Thomas W. Hazlett, "The Political Economy of Radio Spectrum Auctions," Institute of Governmental Affairs, Program on Telecommunications Policy Working Paper (June 1993), p. 14.

markets) are high, but because the rents available from exploiting market positions protected from open competition are high, and many competing claimants would dearly love to enjoy the privilege.³⁷

The upshot is that there is no difference of economic substance between the intangible rights held by cable franchisees and the intangible rights held by cellular telephone companies. Both convey privileges not afforded potential competitors, thereby protecting licensees from rivalry, and allowing both prices and profits to be above competitive levels. This is, incidentally, why both cable companies and cellular telephone companies have Q ratios which reveal large degrees of monopoly profits.

4.2 The Haring & Jackson Attack On Government Numbers.

I am accused by Haring & Jackson of "play[ing] fast and loose with the numbers,"³⁸ and of a presentation which is "not candid;"³⁹ all of which leads to the outright condemnation: "Hazlett is, in truth, playing games."⁴⁰ I wish I were, but can assure the reader that I am fortunate to have discovered a host of more pleasurable recreational forms. The truly remarkable part of this broadside is that, so as to avoid controversy regarding the numbers, I used more conservative assumptions than the authors themselves have employed in Q ratio

37 The government could easily intensify competition for licenses by electing to award fewer licenses of a given size -- even if, by restricting the amount of spectrum allocated, it incurs *lower* "social opportunity costs" of spectrum. By creating less competitive conditions in the licensed market it excites rent-seeking behavior.

38 Haring & Jackson, p. 6.

39 *Ibid.*, p. 8.

40 *Ibid.*

analysis,⁴¹ and made use of official government statistics wherever possible (and cited them as such).⁴² These have now turned into "Hazlett's numbers," and I don't think the credit I am garnering is meant as a compliment.

For instance, Haring & Jackson write: "Hazlett estimates that cellular firms have a capital investment of \$500 per subscriber." They claim this is less than half the level of actual investment, based upon their reading of a Wall Street analyst's report.⁴³ My numbers were taken from, and cited to, the Congressional Budget Office report released in March 1992.⁴⁴

The CBO concluded, just as I did, that the evidence pointed to supra-competitive returns:

Currently, about 80 percent of subscribers are business customers who use an average of 175 minutes of service a month, which translates into an average monthly operating cost of under \$20. The \$60 differential between the monthly operations cost of service and

41 For instance, I didn't depreciate cellular capital costs when calculating the Q ratio. Since the "replacement cost of capital" is lowered if capital costs are (properly) depreciated, this raises the industry Q. In that Haring & Jackson claim that depreciation is rapid (and attack me for using a ten year capital depreciation schedule), this would serve to raise Q by a lot. Note that Shooshan & Jackson did deduct depreciation from the replacement cost of capital (which lowered the denominator of Q). Shooshan & Jackson, Inc., "Opening thhe Broadband Gateway: The Need for Telephone Company Entry Into the Video Services Marketplace," (October 1987) [hereinafter "Shooshan & Jackson 1987"], p. 11.

42 The situation reaches a *reductio ad absurdum* on page 7 of the Haring & Jackson paper. The table entitled, "Capital Investment in Cellular," boldly points out, "Note: Hazlett did not survey cellular systems to obtain information on capital investment." I plead guilty: I simply used the first set of official statistics I found. One might also note that if I had been trying to pad numbers, it is curious to note that when presenting the NTIA's numbers on cellular license rents (my Table 5, p. 16), I didn't even adjust them to include the RSA's, which contain over one-fifth of the U.S. population. (This would have increased the total cellular license rents about one-tenth.)

43 Haring & Jackson, p. 6.

44 Congressional Budget Office, Auctioning Radio Spectrum Licenses (March 1992) [hereinafter "CBO 1992"], p. 17.

*monthly revenue is by most accounts more than sufficient to cover fixed capital and marketing costs, and to account for very high profits.*⁴⁵

Moreover, just as I did, they attributed this to market power of the cellular duopolists:

*Financial analysts anticipate that cellular telephone companies will earn rates of return on investment in physical capital of 40 percent to almost 100 percent as they exploit the combination of a desirable service and the freedom from serious price competition permitted by the duopolistic market structure.*⁴⁶

The CBO estimates were themselves taken from a Wall Street analyst's report which the CBO found appropriate to use in its study. I chose to use CBO numbers, rather than produce independent estimates, precisely to avoid the charge of arbitrariness which Haring & Jackson levy but which -- by picking and choosing their own numbers -- should more accurately be leveled against them. Moreover, if investment in physical plant per subscriber is \$1,170, as suggested by Haring & Jackson (p. 7), it is curious that total "cumulative capital investment" in the cellular industry as of June 1993 is \$12.776 billion against a subscriber base of 13.067 million.⁴⁷ This means that the industry has spent less than \$1000 per subscriber *undepreciated*.

⁴⁵ *Ibid.*, p. 26; to which the footnote reads: "Even this rough estimate of \$60 a month difference is low. The monthly average cost of less than \$20 per month is based on the average business customer's use, while the average revenue figure includes residential customers who use cellular phones less."

⁴⁶ *Ibid.*, p. x.

⁴⁷ This comes out to about \$978 per subscriber (Cellular Telecommunications Industry Association, *Mid-Year Data Survey*). As of June 1992, which is the date for which Haring & Jackson list their numbers, the total accumulated capital per subscriber was \$1,043. In taking all accumulated capital expenditures and not figuring in depreciation, we bias the average capital cost upwards, of course.