Angeles discount plans appear to be structured to encourage greater cellular phone use.

Los Angeles Cellular Telephone Company - Best Rates

Minutes of Use	60	120	480
1989	1.16	0.79	0.51
1993	1.16	0.71	0.42

Los Angeles SMSA - Best Rates

Minutes of Use	60	120	480
1989	1.16	0.79	0.51
1993	1.16	0.71	0.42

Source: Carrier responses to CPUC and tariffs filed with the CPUC

While basic rates in San Francisco-Oakland-San Jose have begun to diverge, the best rate has remained close. The best blended rates for GTE and BACTC for low and medium users are within $0.001 per minute of each other.

Rate Comparisons - San Francisco MSA

Minutes of Use	60	120	480
Basic Plan			
BACTC	1.07	0.73	0.48
GTE	1.15	0.78	0.49
Best Rate			
BACTC	1.03	0.70	0.45
GTE	1.03	0.70	0.38

Carriers appear to affix a high value to the length of the contract. For example, US West's two year contract plan access fees are $18, $17 per month less than its one year contract plan. This suggests that it is very important for US West to lock in customers.

California's cellular carriers have launched initiatives explicitly aimed at placing consumers in long-term contract plans in part to prevent them from switching to alternate technologies. This strategy harms consumers and competition. The contract plans raise the costs for consumers to choose among wireless providers. The high termination fees raise the transaction costs for consumers to switch carriers when they find alternates that have lower prices or superior service. This procedure is detrimental to new entrants because many potential consumers are locked into contract plans and cannot easily and without cost shift to new ESMR or PCS offerings.

REDACTED

E. Comparison of Rates for Cellular Service in California With Cellular Rates in Other States

Cellular rates of major California carriers remain among the highest in the

nation.[25] The National Cellular Resellers Association found an average 32 percent increase in cellular rates among the 30 largest carriers between 1988-1994.[26] Nevertheless, the presence of regulation in California has probably prevented rates from being even higher and certainly has not contributed to higher rates.[27] For example,in 1992 Sacramento had among the nation's lowest cellular rates while Philadelphia had among the nation's highest, in an unregulated environment.[28]

F. Earnings and Market Power

1. Rates of Return

Another measure of a firm's market power is the comparison of its costs of service relative to prices it charges in the marketplace. To the extent a cellular carrier can keep its prices high relative to costs, it can command a more lucrative profit on invested capital. If a cellular firm earns returns consistently above competitive levels, this is an indicator of market power.

Cellular carriers have asserted to the CPUC in the past that earnings data are

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[25] U.S. General Accounting Office, Telecommunications Cellular Service Competition, Testimony before the Senate Committee on Energy and Public Utilities, Legislature of the State of California, January 12, 1993, p.7.

[26] National Cellular Resellers Association, Comparison of Cellular Service Prices in the 30 Largest Markets for Personal Safety and Convenience Use: January 1988 - January 1994, January 24, 1994.

[27]According to Alfred Kahn, the recent American Enterprise Institute study on cellular rates and regulation suggests that the threat of rate regulation puts downward pressure on rates. PBS Nightly Business Report, July 28. 1994.

[28]CPUC Division of Ratepayer Advocates Comments in I.93-12-007, February 25, 1994, Attachment B.

not a meaningful indicator of market power. While the CPUC agrees the earnings data *alone* are not indicative of market power, we believe that earnings data, in conjunction with the other factors discussed herein, are relevant in assessing the market power of cellular carriers. The CPUC stated in D.93-02-010:

> Instead of ignoring the rates of return, we believe that they are reliable indicators of a competitive market, especially if there are consistent patterns in earnings over time, and are viewed in tandem with other measurements of market power.

The returns earned by carriers in the largest metropolitan areas representing the majority of California consumers have been consistently high during the period studied. The CPUC recognizes that the total earnings of any given carrier can vary significantly from one MSA to another. In the rural areas, earnings are low; this may be due to small customer bases and slow growth rates relative to large fixed costs.[29]

For example, in some years net deficits have been reported for US West and Santa Barbara. In the case of US West the losses have been attributed to extraordinarily high and questionable administrative and general expenses in 1991 and 1992. In these two years in which US West reported a negative ROR, the company reported $15.3 and $15.4 million, respectively, in A&G expenses, up from $5.1 in 1989. If US West was to roll back its 1992 A&G expenses by this

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[29]See Appendix F, After-Tax Rates of Return.

$10 million, the return would be about 14 percent.[30] The Santa Barbara market apparently took years to mature and produced gradually higher returns as the market matured and more customers were added to the system.[31]

As a basis for our findings, the CPUC has considered the financial data submitted to us between 1989 and 1993 by cellular carriers in their annual reports. Differences in earnings between carriers and in different markets can be attributed to a variety of factors including population density and mobility, commuter traffic, geographic factors, management quality, and changing technology. Another factor, particularly in earlier years, is the age of the carrier and how much time it has had to establish itself in the market. Not surprisingly, the highest returns tend to be earned in those MSAs with the greatest population density. And, as discussed, structural barriers to entry prevent new entrants from entering the market and bidding down prices, and lowering earnings.

We note that while the returns earned by firms are generally expected to be commensurate with the level of risk of doing business in the market, we found no evidence that the risk faced by cellular carriers justifies returns as high as those earned in the major metropolitan markets. For example, Los Angeles Cellular Telephone Company, which serves the largest MSA in California, has earned an average annual after-tax accounting rate of return of 56.2 percent for the last five

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[30]Opening Comments of Cellular Resellers Association, Inc. in I.93-12-007, p. 14.

[31]Ibid., Appendix G, Santa Barbara Growth Rate and Revenue Growth Rate for Santa Barbara.

years.[32] The second carrier in Los Angeles, Los Angeles SMSA , earned 37.9 percent annually on average over the same period. Bay Area Cellular Telephone Company in the San Francisco MSA had earnings that ranged from 31.1 percent in 1992 to 49.5 percent in 1993, with an annual average of 43.2 percent for the five years. AirTouch Communications in San Diego has earned an average of 28.3 percent per year for the last five years. These returns occurred during the worst recession in recent California history.

Other studies support our findings that high returns are the result of undue market power. Based on operating cost data provided by the Congressional Budget Office,[33] the fixed cost of establishing a cellular system at current technology is estimated at $10 per person per month.[34] The variable operating cost of providing cellular service to a subscriber is $10 a month. Marketing cost is estimated at $300 per new customer. The lowest monthly customer bill for a subscriber who uses 120 minutes per month, considered average, for the Los Angeles and San Francisco MSAs combined, is about $95.[35] Based on these cost estimates, the cellular carrier would earn $75 in operating profit for each new customer.

A similar study conducted for the FCC by Kwerel & Williams in 1992 also

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[32] See Appendix F.

[33] Congressional Budget Office, Auctioning Radio Spectrum Licenses, March 1992.

[34] The $10 is monthly fixed cost amortized over 10 years at 10 percent.

[35] Assumed at 80 percent peak and 20 percent off-peak use.

indicates a profit margin (revenue less expenses as a percentage of revenue) of over 50 percent. The existence of such profit margins is attributed to the lack of perfect substitutes, and the fact that potential entrants into the market have been excluded because of license barriers. Under these conditions, incumbent duopolists should not be expected to reduce price down to the level of unit cost.[36] The Congressional Budget Office also has stated that unless the cellular carriers' rates are checked, carriers could increase their earnings anywhere between 40 and 100 percent because of their market power and lack of competition.[37]

Hazlett similarly concludes:

> Given that the mobile telephone market does not face substitutes, and that potential entrants are blocked by license barriers, there is no expectation that incumbent duopolists will price down to the level of unit costs.[38]

In D.90-06-025, the CPUC addressed what constitutes excessive returns, an indicator of the improper use of market power. The CPUC observed that prices charged above marginal costs were not per se improper to the extent that cellular carriers used the profits to expand capacity and increase service availability to the public. On the other hand, the CPUC distinguished "profits due solely to a failure to compete in a duopolistic market" as improper. We stated that there is no incentive for carriers to compete vigorously when new entrants cannot join the

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[36]Thomas W. Hazlett, Market Power In The Cellular Telephone Duopoly, A Report Prepared for Time Warner Telecommunications, August 1993, pp. 10-11.

[37]CBO, op. cit.

[38]Ibid., p.11

market to undercut monopoly-type prices. We concluded that evidence of such improper pricing would be the pricing of cellular services so high as to discourage full utilization of the system, or failure to invest in system expansion when it is economically justified.

2. Capacity Utilization

There are many technological options cellular carriers can employ to increase their effective capacity. If cellular carriers' pricing policies were a result of spectrum scarcity alone, this would imply they are already serving at maximum capacity, given the scarce FCC spectrum which they are licensed to use. If prices were further reduced below the level associated with maximum capacity demand, then demand could be overstimulated beyond the available supply of calling capacity. Thus, to avoid a rationing of service, or risk of service interruptions, it would be appropriate for cellular carriers to keep profits resulting from pricing service to attract demand up to the limits of available capacity.

In gathering data for this petition, the CPUC did not find that carriers are serving at maximum capacity. For example, in 1993 , percent of cell sectors in the Los Angeles MSA were underutilized, with a capacity utilization rate of less than 80 percent.[39] One would expect carriers in Los Angeles to have reached full capacity because it is the most populous region of the state.

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[39]Currently, only parts of the LA [Los Angeles] market are capacity constrained and will need significant investments in order to expand their services. See Appendix M for capacity utilization rates.

For the San Francisco Bay Area MSA, the wireline carrier, GTE Mobilnet, provided capacity utilization data which showed that in 1990, a utilization rate of about percent of its "cell faces"[40] fell into the "low use" category, with an average percent capacity utilization rate (CUR).[41] In other words, percent was unused capacity. In 1993, the used capacity remained essentially the same at percent of total cell faces, although the total number of cell faces increased in 1993 to , compared to in 1990.

For BACTC, the non-wireline carrier in the San Francisco Area, the capacity utilization data are as follows. In 1990, percent of BACTC's cell sectors were classified as low use, with an average CUR of percent. In 1993, the

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[40] GTE defines "cell face" as the sector or side of a cell site that is equipped with radio channels and is configured to transmit and receive signals in a specific direction.

[41] For purposes of analyzing the rate of utilization of cell sites and the rate of cell site growth in the major California markets we asked cellular carriers to provide us with data related to capacity utilization rates. Based in part on definitions of capacity developed in workshops that were held in a previous investigation (Phase II of I.88-11-040) and discussions with selected industry and other experts, we defined capacity utilization rate ("CUR") as the percentage of average peak demand in Erlangs to the maximum designed capacity of the cell site in Erlangs. These experts also indicated that a reasonable breakdown of "low use," "medium use,." and "high use" is represented by the following CUR ranges: 0-65 percent, 65-90 percent, and 90-100 percent, respectively. Mathematically:

CUR = (Average Peak Demand in Erlangs/ Maximum Designed Capacity of a Cell Site in Erlangs) * 100%

Erlang is a dimensionless unit of "traffic" intensity used to express the average number of calls underway or the number of devices in use. One Erlang corresponds to the continuous occupancy of one traffic path. (See "O'Sullivans Outlook," Telecommunications Glossary of Acronyms, Abbreviations, Definitions and Terms, November 1987.)

percentage of low use cell sectors declined to percent, while during the same time BACTC almost doubled its total number of cell sectors. Similar to the Los Angeles MSA, in the San Francisco MSA, percent of cell sectors are underutilized, with a capacity utilization rate of less than 80 percent.

These numbers indicate that GTE and BACTC have had widely differing available capacities in the last four years. GTE has maintained unused capacity in excess of 50 percent during the last four years, while BACTC has operated with a relatively low available capacity during these four years. Basic economic principles dictate that when excess capacity exists, prices in a competitive market should drop. Price comparisons between GTE and BACTC do not conform to this principle.

If prices were further reduced below the level associated with maximum capacity demand, as in the case of BACTC, then demand could be overstimulated beyond the available supply of calling capacity. To avoid service rationing or risk of service interruptions, it would be expected that BACTC would expand at an even higher rate. If GTE responded to competitive market conditions, it too would reduce prices to stimulate demand and use the relatively large available capacity it maintains.

Moreover, on a national basis, the national average density of systems, measured by subscribers per cell site, rose from 372 in December 1985 to 962 in

June 1992.[42] This increasing density does not indicate that capacity was constrained or that potential demand fully served through this period. Instead, these data indicate that additional customers could have been added to cellular systems had prices been lower. Accordingly, excess earnings cannot be explained away by spectrum scarcity or avoidance of service rationing.

The CPUC submits that the proliferation of "discount" plans, including volume discounts, is additional evidence that the carriers are not using their allocated spectrum to maximum capacity. Putting aside the question of whether discount plans truly provide discounts, it is obvious that the carriers are actively seeking to increase usage of existing spectrum capacity.

3. Spectrum Value

The high earnings of cellular carriers cannot be justified by virtue of the costs incurred for a FCC cellular license franchise. The CPUC concludes that the FCC license value, particularly for the larger California cellular markets, cannot be attributed merely to inherent scarcity of spectrum. The FCC license conveys the exclusive right to utilize particular frequencies of spectrum to sell cellular telecommunications services in a prescribed area. The license has a value to market traders at a level approximating the discounted present value of the rents flowing from entering the restricted market. The fact that cellular license values

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[42]National Telecommunications Industry Association, U.S. Spectrum Management Policy, 1991, Appendix D-6, note 17. As quoted in Congressional Budget Office, Auctioning Radio Spectrum Licenses, March 1992, p. 37.

reflect more than scarcity of spectrum is evidenced by comparison with the license value of other spectrum allocations. If spectrum scarcity was the only or primary determinant of license value, we would expect the value per-MHz of licensed spectrum to be roughly equivalent when compared nationally.

A 1991 report by the National Telecommunications and Information Administration ("NTIA") deduced the present value of duopoly profits for cellular licenses, as established by the financial markets, at $80 billion.[43] As a point of comparison, the aggregate value of cellular licenses utilizing 50 MHz of nationwide spectrum space is over 7 times the transaction value for all the licenses utilizing the 400 MHz of spectrum space allocated to radio and television broadcasting, for a market price differential of 62 times greater (on a per-MHz basis). Stated otherwise, the NTIA study indicates that it costs 62 times more to buy 1 MHz of cellular spectrum than it does to buy 1 MHz of broadcast spectrum. Given that competitive alternatives exist for broadcasting (e.g., cable), the only reasonable explanation for the substantial premium afforded cellular spectrum is cellular's ability to garner excessive profits because of the lack of viable competitive alternatives to cellular service.[44] Similarly, the CBO estimates of $7.2 billion for PCS licenses to use 120 MHz of spectrum are dwarfed by the $80 billion value of

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[43]NTIA Report, op. cit.

[44]In contrast, several broadcasting networks compete against each other, and face additional competition from the cable industry. Hence, the value of broadcast spectrum is less because the profits derived from broadcasting are less than those derived from cellular.

cellular licenses to use only 50 MHz of spectrum.

Although the reported returns of cellular carriers in annual reports filed with the CPUC do not include the capitalized value of FCC licenses, it is wrong to simply include the full license value in the investment base as an opportunity cost of market entry to reduce apparent profit return in assessing market power. Otherwise, any entry barrier can be erased as a source of duopoly profits and simply turned into a "cost of doing business" through reclassification as a capitalized investment. Such reclassification masks the duopoly profits we are seeking to identify. Accordingly, the rate of return calculations for carriers such as LACTC, which computes a 1992 return of only 7.2 percent (instead of a reported return of 51.6 percent), are unrealistic in assuming that the full market valuation of a license should be capitalized for assessing market power profitability.

As noted by Hazlett, cellular carriers do not "own" the airwaves as a resource cost. Rather, the airwaves are public property held in trust by the federal government. The Communications Act of 1934 made the federal government responsible for management of the radio spectrum through the issuance of licenses for its private use. These licenses were to convey merely the right to use the radio spectrum consistent with the public interest. Accordingly, the mere fact that a carrier has paid substantial sums for a cellular license does not entitle the carrier to unrestricted opportunity to recover excessive prices from consumers to compensate for premium priced licenses.

The question is: what range of returns would be associated with cellular

carriers assuming their earnings were constrained by a competitive marketplace? The CPUC concluded in D.90-06-025 that the cost structure of the cellular industry does not lend itself to uniform measures of expected earnings levels.[45] While the CPUC has recognized that there is a scarcity value related to the limited amount of spectrum available for cellular transmission, and that some portion of cellular profits can be attributed to this scarcity factor, it is not appropriate to impute a spectrum value.

Imputing a spectrum value implies that cellular companies should earn returns on investments that, in most cases, they did not make. Even in those situations where companies purchased their FCC licenses from another carrier, it is not possible to separate the value of the spectrum from the value of the protected duopoly structure. We believe that the lack of competition in the cellular industry is one of the factors that makes it so lucrative and attractive to investors. The protections afforded under the duopoly market structure are an inherent part of access to the spectrum, and certainly increase greatly the amount of money that companies are willing to pay for cellular spectrum licenses. The difficulty in quantifying spectrum value is one of the reasons the CPUC has declined to adopt a cost-of-service regulatory structure for the cellular industry.

Further, investors expect a high rate of return from cellular companies, and are interested in companies that are leveraging opportunities in the cellular market and the emerging technologies markets. As higher spectrum value is imputed,

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[45]CPUC D.90-06-025, pp. 93-94.

rates of return drop precipitously. When analysts attribute a high per POP spectrum value, it is due to expected future earnings, not just the present return used for rate of return calculations. We do not think investors would be interested in cellular companies if expected rates of return were low.

The fact that cellular licenses incorporate duopoly rents in excess of scarcity value is further borne out by the independent opinion of Wall Street analysts. As a 1991 Morgan Stanley report advised investors:

> Investing $170-$200 per POP, or more - a valuation that many analysts suggest is warranted - in a business that requires hard assets of less than $20 per POP is justified only if there are enormous returns, and such returns are possible only in an unregulated monopoly or shared-monopoly business. [46]

Likewise, in a separate proceeding before the California State Board of Equalization, LACTC opposed imputing a spectrum value to earnings, and acknowledged that the high profits underlying its license value are indicative of market power:

> [C]ompanies in a competitive industry have no particular or material license value. If the market for cellular telephone services was perfectly competitive, it would be open to all sellers willing to make the required investment...Under competitive circumstances, therefore, any license value would be essentially zero.
>
> The...cellular telephone [market]...is a special form of monopoly or oligopoly called a duopoly. The situation is the result of the FCC limiting to two the number of cellular telephone companies [sellers] in each SMSA...From the licensee's point of view, a license is valuable

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[46] Edward M. Greenberg and Catherine M. Lloyd, "Telecommunications Services, POP Out: The Changing Dynamics of the Cellular Telephone Industry," New York, Morgan Stanley, April 1991. (Cited in Hazlett, op. cit., p. 15.)

because it gives the holder some control over its market.

> It is necessary to understand how the bidder would determine the price or the recipient would determine the value of the FCC license being acquired. In either case, one would calculate the earnings from the business which can be generated under the monopoly condition. These earnings would be greater than...under the competitive market structure and...associated solely with the ownership of the FCC license.[47]

Assuming that it is proper to impute spectrum value into earnings, McCaw disputes claims that cellular carriers' earnings are excessive, Mc Caw presents pro forma earnings which purport to show that California cellular carriers' pre-tax rates of return would be below 25 percent if the investment base were increased to include a valuation for cellular spectrum at levels shown in its hypothetical scenarios. The CPUC finds McCaw's hypothetical earnings calculations to be based on a number of unproven, questionable assumptions that fail to show that excess earnings are not primarily attributable to market power and to spectrum scarcity.

One of the premises assumed in McCaw's calculations is that the cost paid to acquire SMR spectrum provides an equivalent measure of "uncontaminated" cellular license value free of excess profits due to market power. McCaw derives a value for SMR spectrum inferred from the acquisition by MCI of a 17 percent interest in Nextel, assuming this is a correct proxy for "uncontaminated" cellular spectrum value. However, before meaningful conclusions can be drawn regarding

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[47]"Declaration of Arthur A. Schoenwald in Opposition to Defendant's Motion for Summary Judgement and Adjudication of Issues," in Los Angeles Cellular Telephone Company vs. California State Board of Equalization, et. al., No. 509737 Superior Court, Sacramento, California.

"uncontaminated" spectrum value based on pro forma cellular rates of return adjusted for SMR proxy spectrum values, a much more involved analysis of the factors underlying cellular spectrum value would be required. The difficulty in quantifying a proper value for cellular spectrum and the impetus not to undertake such a resource-intensive study is one of the reasons the CPUC rejects cost-of-service regulation as a viable option for cellular carriers.

Moreover, even if the prices paid for SMR spectrum were assumed to constitute a correct reference point for "uncontaminated" cellular spectrum, it is not clear that McCaw's representation of a value of $42 per POP is necessarily ascribable only to SMR spectrum, as discussed earlier. Without further analysis of the terms and conditions of the MCI transaction, the CPUC cannot confirm whether there may be other intangible strategic benefits implied in the value paid by MCI for its ownership interest. For example, while McCaw states that MCI paid no control premium with only a 17 percent interest, MCI may have expected to realize some strategic advantage relative to later investors and incorporated this into its payment premium.

McCaw's adjustment of the SMR value of $42 per POP up to $100 per POP for the equivalent cellular spectrum is likewise questionable. McCaw bases this adjustment on the premise Nextel typically holds less than half the bandwidth of a cellular carrier. Yet, as discussed previously, the CPUC has concluded that control of a certain bandwidth frequency is not necessarily an accurate criterion for defining a carrier's market dominance. Many factors affect the price per POP

besides band width, including the use to which the spectrum is to be put and market conditions.

McCaw also bases its rate of return calculations on the annual reports filed with the CPUC by cellular carriers. Yet, the returns computed in these reports are simply predicated on the invested partnership capital as reported. Such reported returns fail to account for the financing source of the underlying partnership capital contributions. To the extent the corporate partners use leveraged funds to finance the cellular partnership, the actual equity funds invested would be only a fraction of the total partnership capital. This means that the actual leveraged return realized by the individual partners would be greater than the reported return in the annual reports. McCaw fails to account for this in its calculations.

In sum, even if the CPUC agreed conceptually with McCaw's analysis (which it does not), the CPUC does not accept McCaw's hypothetical pro forma earnings calculations as evidence that no excess earnings exist due to cellular carriers' protected market status. Rather, we find the disparity between the $100 per POP value resulting from McCaw's own calculations of "uncontaminated" spectrum value and the $200 per POP market value actually paid for cellular spectrum, if anything, to support a finding of excess cellular profits relative to SMR.

4. Q-Ratio Analysis

The ability of cellular carriers to price above cost is also reflected in the characteristics of the capital market. Investors' interest in a particular firm is indicative of the attractiveness of that firm's market. Investors' behavior reveals the earnings potential attributed to the firm by the market. Hazlett asserts that the high profitability of cellular carriers in general is indicative of market power and lack of serious competition.[48] He refers to the capital investment market as one of the most compelling indicators that the relatively high level of earnings enjoyed by the cellular duopolists with respect to those of competitive industries are results of market power. Hazlett derives a "Q-Ratio," which he defines as the ratio between a firm's market price to the replacement cost of its assets as a measure of market power.[49] For an industry, the Q-Ratio is the mean of the Q-Ratios of all firms in that industry. For a competitive market the ratio is one or near one. When the market's Q-Ratio significantly exceeds one, it strongly suggests the presence of market power, with assets valued higher than the replacement cost of the assets because prices are above competitive levels. Hazlett argues that the strength of the Q Ratio lies in the fact that the ratio is defined in the real market by the investors who consider all factors that affect their investment including demand, substitutes, costs, and risks.

The Q-ratio analysis of cellular earnings presented in Hazlett's paper offers

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[48] Hazlett, op. cit., p. 1.

[49] Ibid.

additional evidence that cellular profits far exceed any reasonable expectations of a competitive industry. Even allowing for the potential for error in Hazlett's specific calculations, the sheer magnitude of the difference between the cellular industry and other investments is enough to dramatize the point. As Hazlett notes, no industry examined in a recent Brookings Institute study of 20 U.S. industries was found to exhibit a Q ratio of 3.32 during the 1961-85 period. By comparison, the cellular telephone industry ranged between 6.68 for small firms up to 13.52 for large firms. Although the sampling included cellular firms throughout the U.S., we consider the statistics relevant to our study of California firms, particularly for the L.A. and S.F. markets, whose Q-ratios are among the highest in the nation.

For all of these reasons, we conclude that the earning levels enjoyed by facilities-based carriers in the major markets are indicative of the failure of market conditions to discipline firms to compete.

G. Potential for Market Substitutes from PCS and ESMR

In this section we will define a substitute for cellular service and evaluate the potential for ESMR and PCS to become substitutes. Currently, there are no substitutes for cellular service in California. We anticipate that ESMR and broadband PCS may eventually become substitutes; however, California consumers currently and in the near future will not have access to alternatives to cellular service, as neither technology is available in California.

The CPUC believes that once substitutes to cellular service emerge,

competition will bring down prices for wireless communications. However, substitutes to the existing cellular duopoly are a necessary condition for price competition. Until substitutes emerge and are widely deployed and available, it will be necessary to protect cellular consumers from unjust and unreasonable rates.

The existing duopoly market structure, with its formidable barriers to entry, has insulated incumbent cellular carriers from competition, according to federal research. Research on the cellular market has found that rates are in excess of competitive levels and that they are consistent with non-competitive duopoly behavior.[50] Using the Cournot model of duopoly pricing, the FCC study estimates that the inclusion of an additional firm will lead to a 25 percent reduction in prices.[51] The same study concludes that the social benefits of providing additional spectrum to a third cellular carrier in the Los Angeles area would exceed the social costs of allocating spectrum to the existing duopolists by $763.[52]

1. Definition of Cellular Service

A substitute for cellular services must possess the following characteristics:

(1) Be offered to individual members of the public, i.e., it must be available to individuals, not just fleets, upon request;
(2) Be integrated into the public switched telephone network;
(3) Provide similar quality two-way voice communication;

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[50] Congressional Budget Office, Auctioning Radio Spectrum Licenses, March 1992, p. 27.

[51] Federal Communications Commission, Changing Channels: Voluntary Reallocation of UHF Television Spectrum, November 1992, p. 83.

[52] Ibid., p. 84.

(4) Have sufficient signal to serve at least two-thirds of the population of its service area and must be available in all service areas in California;
(5) Be portable;
(6) Be mobile, i.e., consumers can use at driving speeds;
(7) Provide roaming, i.e., it is useable outside the customer's serving area.

2. Evaluation of Potential Substitutes

There are opportunities for new providers to offer competing services in the form of PCS and ESMR. However, potential entrants face formidable legal barriers to entry and must overcome technical and economic obstacles before they can offer a substitute to cellular service. Once an entrant overcomes the principal legal barrier to entry by obtaining a radio frequency license, it will not immediately be competitive with the incumbent cellular firms. Potential PCS and ESMR entrants must resolve a variety of technical and economic problems before they can effectively compete with cellular carriers for the wireless market.

One ESMR provider, Nextel, is on the verge of entering the California wireless telephony market. Nextel is currently working to convert its existing dispatch customers to ESMR technology. Thus far, it has succeeded in attracting 1500 dispatch customers to ESMR in Southern California; some of these also have cellular-like telephony service as an adjunct to their dispatch service. Nextel does not currently offer cellular-like mobile telephone service independent of dispatch service. It cannot offer stand-alone wireless telephony until 1995 because cellular-like handsets will not be delivered until then. Nextel has no ESMR customers of

any kind in Northern California.[53] Initially, Nextel does not intend to market itself as a provider of mobile telephone service.[54] Nextel will first encourage its own existing SMR customers to convert to the new digital service, then it will try to attract other dispatch and SMR users, and finally it will attempt to compete with cellular for the individual customer.[55]

Nextel's strategy for building infrastructure is to expand cell site build-out and implement a digital mobile network in a frequency reuse pattern configuration that will allow it to compete with cellular carriers as an ESMR providers. This digital-based technology will allow Nextel to offer mobile telephone service that will compete with cellular service and in addition allow it to provide digital dispatch and paging services. However, Nextel faces numerous hurdles in deploying its services to compete with cellular providers and challenge the market power of the duopoly carriers, including:

- Cellular carriers hold licenses for more spectrum, hence greater capacity. Digitalization may compensate for this deficiency, however, cellular carriers are also adopting digital technologies that will further increase their capacity.
- Cellular carriers offer nationwide roaming. Nextel cannot offer wide roaming capabilities for several years.

While Nextel's challenge to the cellular carriers is most desirable, the effect of its entry into the market should not be expected to produce significant competition in the cellular market in the near future.

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[53]Conversation with Counsel for Nextel, August 4, 1994.

[54] Salomon Brothers, Nextel Communications, March 16, 1994, pp. 9-10.

[55] Id.

The FCC itself has concluded that ESMR providers face significant competitive disadvantages vis a vis cellular. Among other things, the FCC indicated that substantially less spectrum is allocated to SMR, and that the spectrum is not contiguous and is shared with other licensed providers. The latter fact "inhibits use of technologies needing wider channel bandwidth."[56] The FCC also indicated that SMR subscriber equipment and marketing costs are higher than cellular.[57]

PCS has the potential to provide a fully competitive substitute for cellular service by the end of the decade. However, to date no PCS licenses have been granted. Auctions are not expected until the end of this year. Once licenses are granted, which is likely to be 1995 at the earliest,[58] we expect it to take three to five years for carriers to have infrastructure in place to serve two-thirds of California's population.[59]

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[56] FCC, Second Report and Order, slip op., at 59, n. 196

[57] Id., at n. 297. The FCC has further noted that as of December 1993, SMR's nationwide share was only 1.5 million customers compared to 13 million customers for cellular. Of the 1.5 million, only 425,000 were offered interconnected service. Nextel also confirms that its handset costs more than cellular phones, and that SMR equipment is heavier.

[58] "F.C.C. Is Revising Rules for Wireless Auction," New York Times, May 31, 1994, p. C1.

[59] The FCC requires that licensees of 30 MHz serve two-thirds of the population within seven years.

a. Regulatory Barriers

The primary regulatory barrier to entry faced by potential competitors is the inability to acquire radio spectrum licenses from the FCC. Without radio spectrum, competitors cannot provide wireless telephone services. The FCC has begun to address this problem by (1) allocating additional radio spectrum for a limited number of PCS licenses, and (2) allowing SMRs greater flexibility in using their spectrum.

PCS licenses are in the process of being issued. According to the FCC's latest licensing plan, three or possibly six new competitors to cellular may be licensed as early as this winter. Unfortunately, the PCS licensing process has been beset by delays and is fraught with controversy and, given the evolution of the process, any projection of the date on which licenses will be issued is speculative. Unlike cellular licenses, which were allocated by lottery, PCS licenses are being granted through an auction and through pioneer's preference. The allocation scheme, auction process and pioneer's preference have all proved controversial.

The allocation plan, initially announced in November of 1993,[60] was largely revised in June 1994. Although the industry has generally been more supportive of the new allocation plan,[61] the new decision will cause delays by forcing potential bidders to revise bidding plans.

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[60] FCC 93-451, Federal Register, November 8, 1993, 59174.

[61] "F.C.C. Plan is Praised by Industry," New York Times, June 9, 1994, p. C1.