23. For ten of those markets,[20] I examined the wireless local service plans for the incumbent landline operator as of the fourth quarter 1998 and the first quarter 2001. For example, the incumbent landline operator in Chattanooga, Tennessee is BellSouth, while the incumbent landline operator in Tulsa, Oklahoma is SBC. Conditional on the market being in the top 100 metropolitan statistical areas (MSAs), pricing plan data for fourth quarter 1998 was available from Kagan Associates.[21] Pricing plan data for first-quarter 2001 was obtained from company web sites during the last week of March 2001. I computed the percent decrease in the price of a 1000-minute local wireless plan—somewhat less than the average MOU of Leap customers—for each incumbent landline operator.[22] My hypothesis is that, because Leap offers a service that competes directly with landline telephony, the presence of Leap induces a large wireless price reduction among landline operators. Table 2 shows the results.

TABLE 2: PRICE DECLINE FOR 1000-MINUTE LOCAL WIRELESS PLAN IN LEAP MARKETS

Market Name	*Original Plan*	*Current Plan*	*Q4--1998 Price*	*Q1--2001 Price*	*Percent Change*
Nashville, TN	BellSouth	Cingular	$95.00	$69.99	-26.3%
Chattanooga, TN	BellSouth	Cingular	$137.50	$69.99	-49.1%
Tucson, AZ	AirTouch (US West)	Qwest	$121.95	$74.99	-38.5%
Tulsa, OK	SBC	Cingular	$162.45	$87.49	-46.1%
Little Rock, AR	SBC	Cingular	$202.50	$87.49	-56.8%
Greensboro, NC	GTE	Verizon	$102.00	$75.00	-26.5%
Salt Lake City-Ogden, UT	AirTouch (US West)	Qwest	$120.00	$74.99	-37.5%
Memphis, TN	BellSouth	Cingular	$95.00	$69.99	-26.3%
Charlotte-Gastonia, NC	Bell Atlantic	Verizon	$144.99	$89.99	-37.9%
Knoxville, TN	GTE	Verizon	$102.00	$72.50	-28.9%
AVERAGE					**-37.4%**

19. *Id.*

20. Pre-2001 pricing data was available only for ten of the 14 markets that Leap entered in 1999 and 2000. I therefore used only those markets in my comparison. Because the smaller market excluded from my comparison tended to have fewer competitors prior to Leaps entry, the exclusion of these markets would if anything tend to understate the "Leap Effect."

21. KAGAN ASSOCIATES, COMPETITIVE WIRELESS RATES 1999 (released February 1999). Note that Kagan Associates did not compile pricing plans by license area in 2000 or 2001.

22. I assumed that 75 percent of the minutes in the plan were used during peak hours.

As Table 2 shows, the average price decrease in the Leap markets during the 18-month study period for a 1000-minute wireless plan offer by a landline operator was 37.4 percent.

24. Because the spectrum cap enables Leap to acquire spectrum in the secondary market, removal of the spectrum cap would risk eliminating the price effect created by Leap when it enters a market. Stated differently, the spectrum cap prevents a few dominant carriers from precluding (by acquiring all the available spectrum) Leap's entry into a market. Likewise the spectrum cap facilitates entry at the margins: by eliminating certain incumbents that are at or near the limit from competing for spectrum in the secondary market, the spectrum cap lowers the expected price that Leap would pay for spectrum on the secondary market, and hence facilitates its entry in those markets. The Commission must determine whether consumers would be better off when an incumbent carrier expands its in-region spectrum holdings beyond 45 MHz, or when new carriers such as Leap enter the market, offer innovative services, and exert pricing pressures.

B. By Facilitating Entry, the Spectrum Cap Instills Price Discipline for Both Nationwide and Local Wireless Services

25. A first principle of microeconomics is that entry drives prices toward average costs.[23] The early oligopoly models of competition were subsequently reinforced by game-theoretic models, which consider the interactive decision-making among individual firms. The newer models of competition offer a better understanding of how entry undermines coordinated pricing, and hence lowers prices relative to the monopoly price.[24] Whether old-fashioned or

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23. *See, e.g.*, PAUL A. SAMUELSON & WILLIAM D. NORDHAUS, ECONOMICS 170-75 (Irwin McGraw-Hill 16th ed. 1998).

24. *See, e.g.*, ROBERT GIBBONS, GAME THEORY FOR APPLIED ECONOMISTS 20-21 (Princeton University 1992). For a specific application, see Richard Selten, *A Simple Model of Imperfect Competition, Where 4 Are Few and 6 are Many*, INTL. J. GAME THEORY 141-201 (1973).

high-tech, economic theory predicts that prices of a particular service are inversely related to the number of suppliers of that service.

26. In addition to established theory, new empirical investigation documents the effect of entry on prices in mobile telephony. By analyzing panel data of mobile telephony prices in 23 countries from 1991 through 1997, Drs. Oliver Boylaud and Giuseppe Nicoletti of the Organisation for Economic Co-operation and Development (OECD) determine that a 10 percent increase in the market share of new entrants reduces mobile prices by 8.6 percent when controlling for all other factors that may influence mobile prices.[25] Stated differently, a country that encourages entry will enjoy lower wireless prices than will a country that protects its wireless incumbents.

27. The inverse relationship between prices and number of operators is borne out by the statistical evidence in the wireless industry *within* the United States as well. According to the *Fifth Report*, as the number of operational carriers in each market (BTA) increased on average from 2.2 to 4.5, wireless prices declined 11.3 percent in 2000 and 20 percent in 1999.[26] In fact, the Commission subscribes to the theory that entry in the wireless market has lowered wireless prices: "However, a number of reports and other available data indicate that the entrance of new competitors into this market continues to reduce prices."[27] The Commission concludes that "competition is continuing to make mobile telephone services more affordable for all Americans."[28] I believe that the Commission was correct in its assessment.

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25. Oliver Boylaud & Giuseppe Nicoletti, *Regulation, Market Structure and Performance in Telecommunications*, OECD Economics Department Working Paper No. 237 (released Apr. 21, 2000).
26. FIFTH REPORT, *supra* note 17, at 4.
27. *Id.* at 18.
28. *Id.* at 18.

28. There are two major types of plans that are offered by wireless carriers: nationwide one-rate plans and local plans. In the sections that follow, I demonstrate that the price of each rate plan is inversely related to the number of carriers offering that plan. To the extent that the spectrum cap would reduce the number of distinct carriers in a given market, removal of the plan would result in higher prices.

1. The Price of Nationwide Plans Is Inversely Related to the Number of Distinct Carriers Offering Nationwide Plans

29. One major rate plan offered by a handful of wireless providers is the nationwide one-rate plan. AT&T was first to offer this plan in May 1998, and was followed by Verizon (September 1998), SprintPCS (September 1998), VoiceStream (March 2000), and SBC (June 2000). The nationwide one-rate plan allows customers to make long-distance calls and to roam outside of their home territory at no additional charges. According to the *Fifth Report*, the two most prominent mobile telephone mergers announced during 1999—Vodafone-AirTouch and Bell Atlantic-GTE—involved "large regional operators seeking to create nationwide footprints in order to compete effectively with existing operators offering attractive nationwide pricing plans."[29]

30. Because the price of the nationwide one-rate plans do not vary across local markets, those prices are more likely to depend on the number of carriers offering nationwide one-rate plans across the country. The price effect of entry by carriers offering nationwide one-rate plans has been substantial. When AT&T originally introduced its nationwide plan in May 1998, the minimum commitment required from customers was $89 per month. By mid 2000, consumers wishing to subscribe to a nationwide plan only needed to commit to $19 per month

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29. *Id.* at 4.

with Sprint PCS's or $35 per month with Verizon Wireless.[30] The Commission itself recognized that "there is some evidence that the addition of new nationwide operators already may be contributing to decreasing prices."[31]

31. By limiting spectrum aggregation at the local level, the spectrum cap facilitates carriers that are trying to establish a nationwide footprint. Suppose, for example, that a carrier's spectrum holdings covers the entire nation except for one major BTA such as New York or Los Angeles. The spectrum cap prevents established nationwide one-rate providers from acquiring all the spectrum in one or more critical markets, such that they deny access to a carrier (for example, Cingular or VoiceStream) that needs to fill a crucial hole in its nationwide footprint. Likewise, the spectrum cap facilitates entry at the margins, by reducing the number of potential spectrum buyers among established providers, and thereby lowering the price of spectrum to new entrants.

32. It is interesting to note the effect of the second, third, fourth, and fifth nationwide service provider on AT&T's nationwide one-rate pricing plan. Figure 1 plots the monthly price that AT&T charged for 650, 1100, and 1500 minutes since it introduced its nationwide one-rate plan in May 1998.

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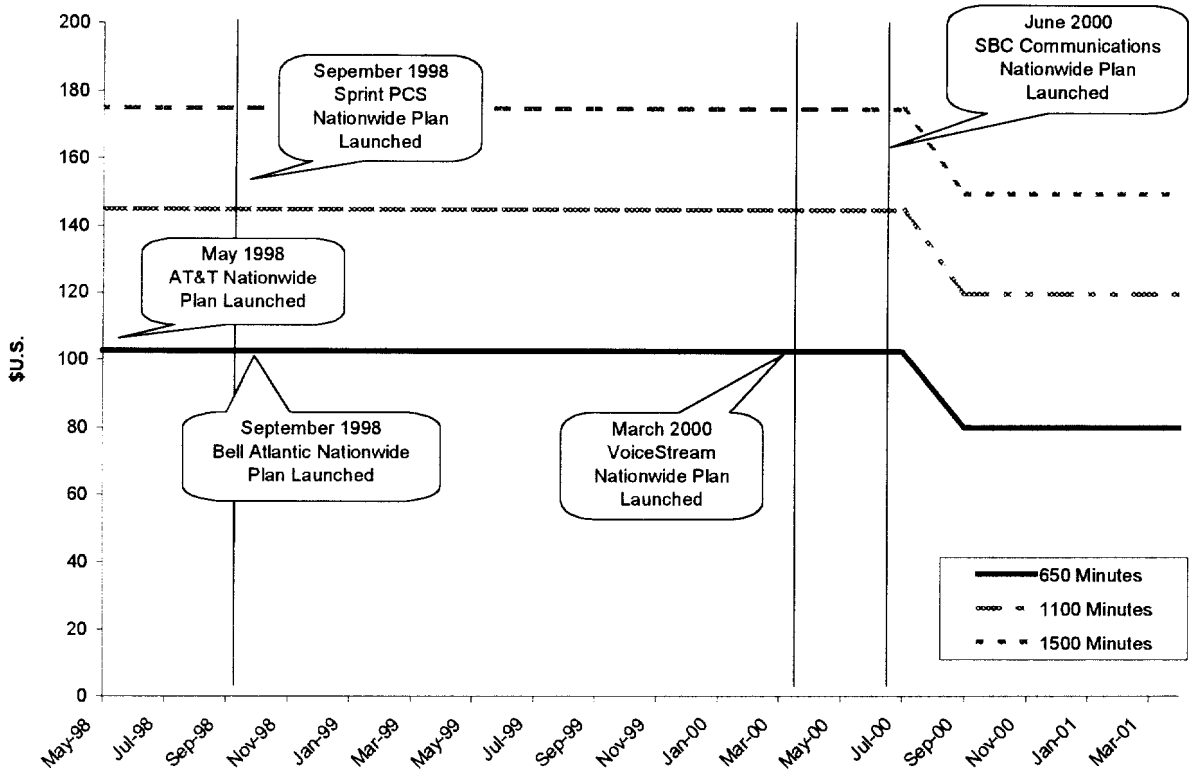
30. Verizon Wireless, Inc., *SingleRate* (visited June 5, 2000) <http://www.verizonwireless.com/ver_five_plans.html>. Sprint PCS, *Sprint PCS Free & Clear Plans* (visited June 5, 2000) <http://s2.sprintpcs.com/store/cc_Pricing.asp>. Free & Clear customers must remain on Sprint PCS's nearly-nationwide network in order to avoid roaming and long distance charges.

31. FIFTH REPORT, *supra* note 17, at 11.

FIGURE 1: AT&T'S MONTHLY NATIONWIDE ONE-RATE PRICES ARE INVERSELY RELATED TO THE NUMBER OF NATIONWIDE CARRIERS



Source: AT&T Launches First National One-Rate Wireless Service Plan, Company Press Release, AT&T Corp., May 7, 1998; AT&T Digital One Rate Benefits Extended Into Canada, Company Press Release, AT&T Corp., Nov. 23, 1998; L.A. Cellular Becomes AT&T and Brings Popular AT&T Digital One Rate to Southern California, Company Press Release, AT&T Corp., Mar. 1, 1999; AT&T Wireless Improves The Nation's Most Popular Pricing Plan, Company Press Release, AT&T Corp., Aug. 31, 2000; AT&T's current rate plan can be downloaded from its web site at http://www.attws.com/personal/explore/select_rate_plan_explore.jsp; Ted Sickinger, *Flat-rate Wireless Plans Offered by Southwestern Bell Mobile*, Kansas City Star, June 10, 2000, at C7. VoiceStream Wireless, Company Customer Care Representative, available at 1-800-937-8997.

Note that AT&T did not reduce its nationwide one-rate pricing plan when Bell Atlantic (the second entrant) and Sprint PCS (the third entrant) offered competing plans in September 1998. AT&T again found it unnecessary to reduce the price of its nationwide one-rate plan when VoiceStream (the fourth entrant) offered its version of a nationwide plan in March 2000. Not until SBC (the fifth entrant) entered the nationwide pricing arena in June 2000 did AT&T finally reduce its nationwide pricing plan by 22 percent (for 650 minutes) and by 14 percent (for 1,500

minutes). This finding suggests that, if the number of nationwide carriers were reduced to two or three—a result that would obtain if the spectrum cap were removed—the rate of decline in the price of nationwide plans would slow or potentially reverse.

2. The Price of Local Wireless Plans Is Inversely Related to the Number of Distinct Carriers in Each Geographic Market

33. A second type of rate plan offered by wireless providers is local rate plans. For a significant segment of the population, local service plans are preferred to nationwide plans. For example, for a family with low-income or an individual that seldom travels or a teenager that desires a separate phone line, the value of roaming is small, and thus a local plan would suffice. This notion is supported by the fact that every major wireless carrier offers a local service plan. Hence, it is erroneous to suggest that consolidation in one particular geographic location would not affect wireless prices—while *nationwide* pricing plans might be unaffected by the local consolidation, *local* pricing plans would certainly adjust upward.

34. To track the decline in local wireless prices, the Commission relies on the cellular telephone services component of the Consumer Price Index ("Cellular CPI") produced by the U.S. Department of Labor's Bureau of Labor Statistics.[32] Because the Cellular CPI is based on local calling plans,[33] it is possible to examine the correlation between entry at the local level and local pricing. Figure 2 shows the decline in the Cellular CPI from December 1997 through December 2000, and the increase in the average number of local operators over the same period.

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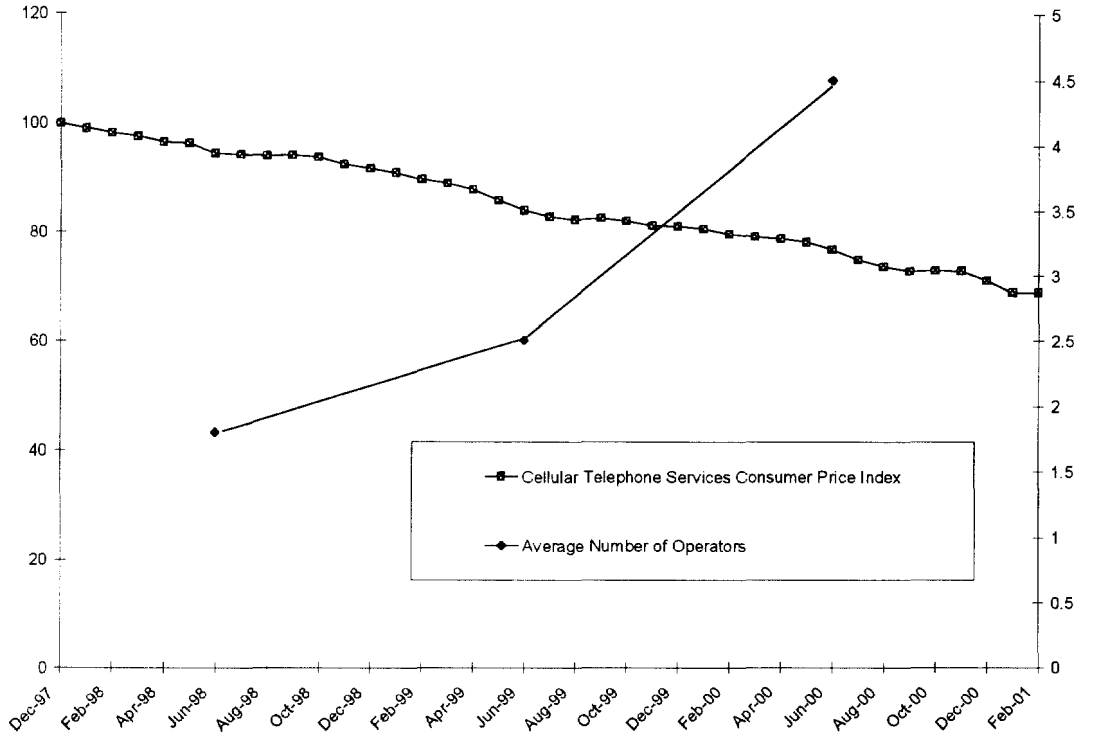
32. FIFTH REPORT, *supra* note 17, at 20.

33. *How BLS Measures Price Change for Cellular Telephone Service in the Consumer Price Index*, downloaded from BLS web site at http://stats.bls.gov/cpifactc.htm ("The weight for cellular telephone services reflects monthly consumer expenditures for *local* cellular services received from telephone companies.") To the extent that the more recent wireless prices in this survey include any nationwide pricing data—that is, data derived from plans that actually offer a superior product—the survey's estimate of the price for local cellular services in 2000 are actually upwardly biased, and thus would tend to substantiate the claim that local prices are falling with entry at the local level.

FIGURE 2: LOCAL PRICES ARE INVERSELY RELATED TO THE NUMBER OF LOCAL CARRIERS



Source: Local prices downloaded from Bureau of Labor Statistics web site at http://146.142.4.24/labjava/outside.jsp?survey=ap. Average number of wireless operators across BTAs was obtained from Commission's Third, Fourth, and Fifth Report on the State of Wireless Competition.

As Figure 2 shows, the Cellular CPI steadily declined since December 1997. Over the same time period, the average number of wireless carriers across all basic trading areas (BTAs) has been rising. According to the *Third Report*, there were on average 1.8 wireless operators across all BTAs as of mid-year 1998.[34] According to the *Fourth Report*, there were on average 2.2 wireless operators across all BTAs as of mid-year 1998.[35] According to the *Fifth Report*, there were on

34. In re Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions With Respect to Commercial Mobile Services, Federal Communications Commission, Third Report, FCC 98-91 (released June 11, 1998) at Table 3A, B-4.

35. FOURTH REPORT, *supra* note 16, at Table 2A, B-3.

average 4.5 wireless operators across all BTAs as of mid-year 2000.[36] As Figure 2 shows, the *rate of decrease* in the price of local-calling plans has not slowed with the entry of the third or fourth carrier. Because the spectrum cap ensures the existence of a third and fourth local provider in each local service area, removal of the cap would slow the rate of decline in local service prices or potentially cause a reversal in the decline altogether.

C. The Spectrum Cap is the Only Suitable Response to Excessive Concentration in an Ascending Auction

35. If concentration is viewed as a potential problem going into an auction, then spectrum caps, rather than case-by-case review, must be used, because only caps can provide an instantaneous determination of what is allowed and what is not. Such a rapid response is essential in a simultaneous ascending auction. Bids must be binding commitments until they are topped. Hence, at every point in the auction, the bidders must know what is allowed and what is not. Only a spectrum cap can provide this immediate certainty.

36. Suppose that instead of spectrum caps, the Commission were to employ an *ex ante* declaratory ruling over the legitimacy of certain post-auction allocations. Clearly such a scheme would be futile because bidders would have to reveal their bidding strategy to opponents in order to gain approval to compete in specific geographic market. Moreover, the ruling would be subject to intense lobbying by petitioners that could delay the allocation, which would translate into losses in consumer welfare.

37. Other schemes to alleviate concentration after the auction—such as allowing a winning bidder to renege on its bids in the event that the post-auction market is overly concentrated—would also undermine the integrity of the auction. The beauty of the FCC's

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36. FIFTH REPORT, *supra* note 17, at Table 2B, B-3.

simultaneous ascending auction is the price discovery that it allows. Price discovery is destroyed if bids can later be reneged on. Bids must represent binding commitments by bidders. A single reneged bid can alter numerous prices and, and hence undermine the efficiency of the process. Hence, in my opinion, the spectrum cap is the only suitable response to excessive concentration in an ascending auction.

D. The Spectrum Cap Encourages the Efficient Use of Spectrum

38. The amount of spectrum required by a carrier can vary largely depending on the technology and architecture of its network. Some technologies deliver far higher system capacity than others. According to Mark Kelly, the Chief Technical Officer of Leap, the same capacity that could be served using 10 MHz of spectrum on a CDMA2000 1X system (available fall, 2001) would theoretically require 16 MHz of spectrum on a CDMA 95 A/E VRC system (the most advanced current (2000-2001) technology available), 32 MHz of spectrum on a CDMA 95 system, or TDMA system, 78 MHz of spectrum on a GSM system, and 164 MHz of spectrum on an AMPS system.[37] Hence, a carrier's need for spectrum is largely dependent upon the technology it uses.

39. Markets can generally be relied upon to induce the efficient use of inputs. For example, if firm A can use an input more efficiently than the current owner, firm B, of that input, then a transfer of the that input from firm B to firm A will typically occur. But if inefficient usage of that input stymies entry by all competitors and thereby artificially inflates the profits of firm B, then the market might not guarantee a socially desirable outcome. Only if firm B is prevented, through competition, from extracting an anticompetitive profit can the market be relied upon to force the efficient use of resources. Thus, competition among rivals drives

operators to use inputs such as spectrum efficiently. Drs. Boylaud and Nicoletti of the OECD find that entry and the development of competition leads to higher productivity and greater service quality across the 23 countries in their sample.[38] To the extent that removal of the spectrum cap would lower competition, incumbent carriers would have a smaller incentive to use spectrum efficiently.

40. By contrast, retention of the spectrum cap will induce carriers to use spectrum more efficiently. In particular, carriers will more likely convert outdated equipment more rapidly, and invest in capacity-enhancing technologies early. The benefits of efficient use of spectrum and capacity-enhancing technologies will be passed on to consumers in the form of lower prices, greater coverage, and more services. Because spectrum is scarce, it is vital that every MHz of spectrum be used efficiently—the spectrum cap promotes the efficient use of spectrum by wireless carriers.

E. The Spectrum Cap Can Increase Auction Revenues by Encouraging Greater Participation Among Entrants

41. Spectrum caps are often thought to lower auction revenues because they limit the participation of *incumbent* bidders. Although it may seem counter-intuitive, a spectrum cap can actually increase auction revenues by encouraging greater participation in the auction among *entrants*. In particular, when incumbent bidders have an advantage—for example, lower incremental cost to build out a network or greater brand name recognition—a spectrum cap may actually increase revenues and promote efficiency. Because the incumbent would be likely to win under those conditions, removal of the spectrum cap may induce non-incumbents to never participate in the auction, knowing that their participation (which is costly in terms of

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37. Declaration of Mark Kelley on behalf of Leap Wireless (filed Apr. 13, 2001).

management resources) would be futile. As a result, only incumbents participate in the auction, competition is lessened, and the incumbents split the licenses up among themselves at low prices.

42. With the introduction of a spectrum cap, a non-incumbent bidder knows that *some* non-incumbents will win licenses, which provides the incentive and ability to secure the needed financing from capital markets. The result is a competitive auction with market-determined prices. Although this situation may seem special, I believe it is a realistic case. Empirical examples are seen in the European 3G auctions. For example, the U.K. auction achieved such remarkable revenues precisely because it was known that at least one new entrant would be successful. Nine new entrants competed vigorously for the license set aside for new entrants. In contrast, in the Dutch 3G auction, there were five incumbents and five licenses. Prices were only a small fraction of the U.K. prices, because no strong new entrant bid in the auction. This phenomenon of depressed prices also has occurred in some U.S. auctions, where the new entrants have been rationally pessimistic about their chance of success. In other U.S. auctions, where entrants believe there is a reasonable chance of securing the needed spectrum, entry is robust and auction prices reflect market values.

F. The Spectrum Cap Is the Best Available Policy for Achieving the Diversity Goals Set Forth in the Telecommunications Act

43. On balance, the best policy for achieving the diversity goals of the Telecommunications Act is the use of spectrum caps to guarantee new entry where desirable. Less attractive alternatives to spectrum caps include the use of bidding credits, set-asides, or installment payments. My reason for this conclusion has to do with the practical difficulties of effectively implementing favors for designated entities.

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38. Boylaud & Nicol, *supra* note 25, at 19.

44. The spectrum cap leads to greater diversity in *service plans* for every geographic area by limiting the amount of spectrum any traditional wireless carrier can aggregate. Wireless consumers benefit when the set of wireless choices expands. Moreover, as wireless products become more differentiated, any attempt by incumbent wireless carriers to coordinate on wireless prices is undermined.[39] Unlike most affirmative action policies, the spectrum cap achieves the diversity objective without conditioning outcomes on a carrier's business characteristics.

45. The Commission has used bidding credits, set-asides, and installment payments to encourage the participation and success of designated entities. The favored treatment can serve to "level the playing field," and thereby foster innovation and intensify competition. Although this is a valid point, and has empirical support,[40] the *theory* of promoting diversity through favored treatment of certain entities has proven difficult in its *implementation*. A vivid example is seen in the initial C-block broadband PCS auction. (Other disappointing auctions were IVDS and WCS, but none have involved the economic loss incurred in the C-block auction.) That auction failed largely because of overly attractive installment payments—namely, 10 percent downpayment and 6-year interest-only at the risk-free 10-year Treasury rate. The payment plan encouraged speculative bidding, which led to each major bidders defaulting and declaring bankruptcy. Installment payments were a bad idea, because they favored the bidders with the most speculative business plans. In addition, installment payments put the Commission in the role of

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39. The Department of Justices identifies "the extent of firm and product heterogeneity" as a key factor in determining the anticompetitive effects of a merger. See Department of Justice and Federal Trade Commission Horizontal Merger Guidelines 1992, at §2.1.

40. *See, e.g.*, Ian Ayres & Peter Cramton, *Deficit Reduction through Diversity*, 48 STANFORD L. J. 761-815 (1996).

banker, an activity for which it has no comparative advantage. Since the C-block experience, the Commission no longer offers installment payments.

46. The two other instruments to favor designated entities—set-asides and bidding credits—may be desirable but also are difficult to administer. The typical situation is one where the government is attempting to encourage competition in the auction and the post-auction market for wireless services. By leveling the playing field between incumbents and new entrants, competition may be enhanced. Still, set-asides and bidding credits have potential problems in their implementation. Gauging the right level of set-asides or bidding credits is extremely difficult. In addition, the creation of fronts, carefully constructed to satisfy the rules but circumvent their intent, has been a constant problem in the U.S. spectrum auctions.

47. To summarize, the spectrum cap is the easiest diversity program to administer because it represents a bright-line test that can be evaluated in an objective fashion before the auction. Moreover, the spectrum cap achieves the diversity objectives outlined by Congress in the Telecommunications Act without conditioning spectrum allocations on a carrier's business characteristics.

G. The Spectrum Cap Undermines the Ability of Incumbent Carriers to Warehouse Spectrum

48. Incumbent carriers can acquire spectrum for pro-competitive and anti-competitive reasons. Pro-competitive reasons for acquiring spectrum include the desire to use it immediately, or the option value of using that spectrum if and when future demand requires it. For example, a carrier with 30 MHz in a license area that is currently using 20 MHz of spectrum could acquire an additional 10 MHz if it believed that demand for bandwidth in that license area would increase by more than 50 percent.

49. An anti-competitive reason for acquiring spectrum is to realize the incremental profit by denying entry of a new carrier in the license area.[41] Because that incremental profit derived from foreclosing competition is shared across all incumbent carriers in that license area, the gains from warehousing for anti-competitive reasons would be shared across carriers in proportion to their share of subscribers in that region. Hence, an incumbent carrier with only 10 percent of the subscribers in the license area would be less willing to engage in warehousing for anti-competitive reasons than would an incumbent with 50 percent of the subscribers in the license area. But a carrier with a significant share of the market might stand to gain sufficient "rents" to offset and overshadow its opportunity cost from holding the fallow spectrum. In fact, such "strategic" considerations may have motivated some bidding behavior in Auction #35.[42] Moreover, an incumbent carrier may be reluctant to incur large switching costs to make its network more efficient. If the gains from *not* upgrading the network (equal to the out-of-pocket costs of upgrading the network plus the increased pro-rata share of rents from less competition) exceed the gains from upgrading the network (from greater capacity), then the incumbent carrier is not likely to use the most efficient technology. Because incumbent carriers are limited in their ability to warehouse spectrum by the spectrum cap, removal of the spectrum cap would only exacerbate this problem.

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41. I have previously demonstrated in this declaration that maintaining fewer competitors allows the realization of anticompetitive profits.

42. *See, e.g.*, Steve Labaton, *Big Companies Prove Winners in Airwave Bids*, N.Y. TIMES, Jan. 28, 2001, at A1 ("'But if you look at the long-term *strategic* value of having a lot of spectrum in New York, that's a different thing. If they have the money to do it, it may be the right move as a longer-term investment," quoting Eric Kintz, a partner at Roland Berger). See also Mark Wigfield, *FCC Auction of Wireless Licenses Raises a Record $17 Billion So Far* , WALL ST. J., Jan. 25, 2001, at B5 ("Indeed, Verizon's aggressive stance apparently drove most of the competition out of the New York bidding, including Cingular Wireless, the joint venture of SBC Communications Inc. and BellSouth Corp.")

II. THE ALLEGED BENEFITS OF REMOVING THE SPECTRUM CAP

50. In this Part of my declaration, I examine the alleged gains associated with the removal of the spectrum cap. In particular, I examine the claims of capacity constraints imposed by the cap and arguments based on economic nationalism. I conclude that neither claim deserves serious consideration, and even if they did, would not offset the gains associated with retaining the cap.

A. The Claim That Removal of the Spectrum Cap Would Alleviate the Incumbent Carriers' Capacity Constraint Is Vastly Overstated

51. Some incumbent carriers claim that they require additional spectrum to support wireless data applications. This claimed benefit of removing the spectrum cap is likely to be overstated for at least two reasons. *First*, holding the amount of spectrum fixed, wireless operators can increase capacity by investing in equipment.

52. *Second*, the data applications in question use a scant amount of spectrum compared to voice calls. Mobile wireless data applications deployed during the past 2-3 years around the world include short message services (SMS) and Wireless Application Protocol (WAP) text browsing. Some carriers allow full Internet access of all available content (such as the i-mode service from DoCoMo in Japan). According to Mark Kelley, the Chief Technical Officer of Leap, a typical phone call requires the transmission of the equivalent of about 400 text messages, but even the heaviest SMS users send approximately 5 to 10 messages per hour during periods of peak usage.[43] With respect to the spectrum demands caused by wireless Internet, Kelley reports that DoCoMo's i-mode technology uses a 9.6 kbps data speed. Because a voice telephone call using a standard digital handset requires about 4 kbps, Kelley explains, system

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43. Kelley Declaration, *supra* note 37, at 5.

capacity required by DoCoMo's Internet application is only slightly more than the capacity required by two simultaneous phone calls.[44]

53. With respect to future data applications, Kelley demonstrates that a 2-minute video clip or a 3-minute MP3 quality song each will take about 3 Mbits of data. A single 3-sector site will supply 12 Mbps in each 5 MHz of spectrum, which is sufficient to supply 400 simultaneous users of streaming content at 30 kbps. Hence over 70 percent of the population in the coverage area simultaneously could use high bandwidth applications.[45] Based on those calculations, I conclude that the incumbents' claims of spectrum shortage for data applications are probably exaggerated.

B. The Claim That Removal of the Spectrum Cap Would Restore the United States' Position as World Leader of the Wireless Industry Is Illusory

54. Opponents of the spectrum cap also justify their position by appealing to arguments of economic nationalism. For example, Tom Wheeler, President and CEO of the Cellular Telecommunications Industry Association, incorrectly believes that the United State's prosperity depends on its "competitiveness" on world markets:

> Our international competitors know how to use government to create a competitive advantage. For instance, in the 1960's Charles DeGaulle determined to make the French railway and subway industry into a world leader. His means of accomplishing this was to pour government dollars into rebuilding the Paris metro. It worked, and the French soon dominated the world market.
>
> Our European and Asian competitor countries are doing something similar, today. This time, instead of tracks and tunnels, it's spectrum. By making spectrum available they are priming the pump for the entrepreneurs at a time when the world leader, the U.S., is just beginning to recognize the well might be running dry.

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44. *Id.* at 6.
45. *Id.* at 6.

> Many called the 1980's the "American Decade" for wireless. The 90's, however, belonged to the Europeans. Now, the race is on to see which nation will lead the first decade of the 21st Century and reap the rewards.[46]

According to Mr. Wheeler, the world economy is characterized by win-lose competition, in which the success of any one country must come at another country's expense.

55. Different variations on this theme have been used by corporate lobbyists to promote a broad range of (ill-conceived) industrial policies including U.S. support for high-definition television, Japanese targeting of steel, European support of aircraft, and Japanese targeting of semi-conductors. Serious economic scholars have exposed the flaws in the "strategic trade theories."[47] *First*, growth in other countries not only increases competition for U.S. exports, but also increases domestic real income. *Second*, government assistance to one industry necessarily implies neglect (or taxation) of another and it is impossible to identify *ex ante* that some industries are more socially desirable than others. Even a "high-technology" industry such as mobile telephony might not justify strategic trade policy—the question of the appropriate level of subsidy depends on the expected size of the technological spillover, which is nearly impossible to estimate.

56. In summary, the objective of the Commission should *not* be to bolster our competitive position vis-à-vis the world wireless market. Furthermore, it is erroneous in any event to assert that the spectrum cap is restraining U.S. wireless service growth, innovation or competitiveness relative to other countries. To the contrary, retention of the cap fosters these goals by stimulating competition and the efficient use of the spectrum.

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46. Tom Wheeler, *Spectrum: The Next Generation of the Information Superhighway*, A Presentation to the New American Foundation, Feb. 13, 2001, at 6.

47. For a review of the strategic trade arguments, see PAUL R. KRUGMAN & MAURICE OBSTFELD, INTERNATIONAL ECONOMICS: THEORY & POLICY 278-281(Addison-Wesley 4th ed. 1997).

III. POLICY CONSIDERATIONS

A. The Potential Benefits of Maintaining the Spectrum Cap Outweigh the Potential Benefits of Removing It

57. I have outlined seven significant benefits associated with maintaining the spectrum cap. In addition, I have discredited the only two plausible benefits claimed by those who favor removing the cap. The Commission should perform a similar cost-benefit analysis. Only if the Commission believes that the benefits from removing the cap outweigh the benefits of maintaining the cap, should the Commission remove the spectrum cap. In my opinion, there is no question that the tangible, significant benefits of retaining the cap far outweigh the purported benefits of removing it. In the sections that follow, I explain related policy matters that the Commission should consider regardless of its ultimate decision on the spectrum cap.

B. The Commission Cannot Consider the Spectrum Cap in Isolation

1. The Use of Wireless Affiliates Can Circumvent the Spectrum Cap

58. The entire debate surrounding the cap is rendered meaningless so long as the Commission endorses a "soft" cap over a "hard" cap. Stated differently, so long as the Commission allows carriers to use fronts to aggregate spectrum beyond the spectrum cap, the spectrum cap is rendered meaningless. Although several carriers used fronts in Auction #35 to subvert the spectrum cap, no firm has perfected the art of subversion quite like AT&T. For each closed, set-aside license won by Alaska Native or DCC PCS in Auction #35 that overlaps with a cellular or PCS license owned directly by AT&T, I calculated the aggregate amount of spectrum controlled directly and indirectly by AT&T. *First*, I used mapping software to overlay AT&T's existing cellular and PCS footprint with the cellular and PCS footprints of American Cellular (a

joint-venture between AT&T and Dobson),[48] the combined Telecorp PCS and Tritel (23 percent of the equity owned by AT&T),[49] and Triton PCS.[50] *Next*, I overlay the footprint of AT&T and its affiliates with the closed PCS licenses won by Alaska Native and DCC PCS in Auction #35. For each overlap region, I calculate the amount of spectrum owned directly and indirectly by AT&T. Table 4 summarizes the results.

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48. Downloaded from Dobson's website at http://www.dobson.net/about_us/history_timeline.html.
49. AT&T Corp., 3rd Quarter SEC Form 10-Q (filed Aug. 14, 2000).
50. AT&T owns roughly 78 percent of the Series A Redeemable Preferred Stock authorized by Triton PCS. See Triton PCS Inc., 1999 SEC Form 10-K (filed Mar. 30, 2000).

TABLE 4: AT&T'S DIRECT AND INDIRECT SPECTRUM HOLDINGS IN AT&T-ALASKA NATIVE OVERLAP MARKETS

AT&T-Alaska Native Overlaps	MTA	Market Name	MHz Won in Auction	MHz Before Auction			Owned By	Total MHz
BTA				in BTA	in MTA	in MSA		
36	24	Bellingham, WA	10	10		25	AT&T Only	45
63	1	Burlington, VT	15	10			AT&T Only	25
81	18	Cincinnati, OH	10		30	25	AT&T and Affiliates	65
110	22	Denver, CO	10	10		25	AT&T Only	45
159	37	Gainesville, FL	10	10			Affiliates Only	20
212	37	Jacksonville, FL	10			25	AT&T Only	35
220	34	Joplin, MO-Miami, OK	10	10		25	AT&T and Affiliates	45
239	13	Lakeland-Winter Haven, FL	10			25	AT&T Only	35
261	30	Longview, WA	10	10		25	AT&T Only	45
262	2	Los Angeles, CA	10	10		25	AT&T Only	45
289	13	Melbourne-Titusville, FL	10	20		25	AT&T and Affiliates	55
298	12	Minneapolis-St. Paul, MN	10			25	AT&T Only	35
318	1	New Haven-Waterbury-Meriden, CT	10	20		25	AT&T Only	55
319	1	New London-Norwich, CT	10	20			AT&T Only	30
321	1	New York, NY	10	10		25	AT&T Only	45
331	24	Olympia-Centralia, WA	10	10		25	AT&T Only	45
336	13	Orlando, FL	10	20		25	AT&T and Affiliates	55
357	8	Portland-Brunswick, ME	10		30	25	AT&T and Affiliates	65
358	30	Portland, OR	10	10		25	AT&T Only	45
408	13	Sarasota-Bradenton, FL	20			25	AT&T Only	45
440	13	Tampa-St. Petersburg-Clearwater, FL	10	10		25	AT&T and Affiliates	45
241	5	Lansing, MI	10		30		AT&T Only	40
84	16	Cleveland-Akron, OH	10		30		AT&T Only	40
95	38	Columbus, OH	10		30		AT&T Only	40
174	6	Greensboro--Winston-Salem--High Point, NC	10		30		AT&T and Affiliates	40
368	6	Raleigh - Durham, NC	10		30		AT&T and Affiliates	40
74	6	Charlotte-Gastonia, NC	10		30		AT&T and Affiliates	40
480	8	Worcester - Fitchburg -Leominster, MA	10		30		AT&T and Affiliates	40

Source: PCS licenses of AT&T and its affiliates are taken from RCR Wireless News, 2000 PCS Database (Fall 2000), available at http://www.rcrnews.com/inside/databases/index.php3. PCS licenses of DCC PCS and Alaska Native are taken from Federal Communications Commission, Public Notice, *C and F Block Broadband PCS Auction Closes; Winning Bidders Announced; Down Payments Due February 12, 2001, FCC Forms 601 and 602 Due February 12, 2001; Ten-Day Petition to Deny Period*, DA 01-211 (released Jan. 29, 2001) (downloaded at http://www.fcc.gov/wtb/auctions/ on Jan. 30, 2001).

As Table 4 shows, AT&T owns, either directly or indirectly, 65 MHz in Cincinnati (BTA 81) and Portland-Brunswick (BTA 357). AT&T owns, either directly or indirectly, 55 MHz in Melbourne, Florida (BTA 289), Orlando (BTA 336), and New Haven (BTA 318).

59. Ironically, the spectrum cap, intended to expand the set of wireless players, in fact created an extra incentive for the incumbent operators to form fronts. The fronts provide not only an entrepreneurial discount and access to the closed license, but also enable the incumbent operators to circumvent the spectrum cap. The result is a near absence of successful true entrepreneurs, as most of the closed spectrum went to fronts rather than true entrepreneurs. The

FCC should enforce both the spectrum cap and the designated entity rules to promote competition in the mobile wireless industry.

2. The Department of Justice Cannot Be Relied Upon to Prevent Any Merger that Would Reduce Potential Competition

60. Opponents of the spectrum cap might argue that issues of concentration in the mobile telephony market are better left to the Department of Justice (DoJ). While the DoJ may prevent mergers that reduce *actual* competition—that is, a merger that reduces the number of carriers that are actually offering service—the DoJ will typically allow mergers that reduce *potential* competition—that is, a merger that reduces the number of licensees. Hence, it is erroneous to claim that the antitrust laws will protect consumers from wireless consolidation in all circumstances.

61. There are currently several broadband PCS licensees that have yet to offer wireless service. For example, each license that was awarded in Auction #35 in February 2001 is a potential acquisition target of an incumbent wireless provider. If the spectrum cap were removed, there would be almost nothing to prevent the incumbent wireless providers from acquiring the set-aside properties (that were not already acquired through fronts).[51] The resulting degree of concentration would jeopardize the trend in lower wireless prices.

CONCLUSION

62. Leap is great evidence of the efficacy of the spectrum cap. Removal of the cap would eliminate Leap's chances of obtaining spectrum in the secondary spectrum market, and

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51. Because of the low standard associated with the construction requirement, I do not consider it to be a binding constraint in the transfer of the license from a designated entity to a non-designated entity. It is so low in

hence would deprive consumers in *every* market not yet served by Leap of the benefits of lower prices and greater choice. I have demonstrated that the benefits of maintaining the cap exceed the cost of removing the cap. Unless the Commission believes that innovative carriers such as Leap do not bring benefits to wireless consumers, it should not feel comfortable removing the spectrum cap.

I certify that the forgoing is true and correct, to the best of my knowledge, information, and belief.

Executed at Washington, D.C. on April 13, 2001.

Peter Cramton

Peter Cramton

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fact, that conditional on the construction requirement just being met, the DoJ might consider the acquisition to represent a loss of potential—not actual—competition.

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Before the
FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, D.C. 20554

In matter of

2000 Biennial Regulatory Review	)	
Spectrum Aggregation Limits	)	WT Docket No. 01-14
for Commercial Mobile Radio Services	)	

Declaration of Mark Kelley

I, Mark C. Kelley, hereby declare as follows:

1. My full name is Mark Christopher Kelley. I am the Chief Technical Officer of Leap Wireless International, Inc. I offer this declaration in support of the Comments of Leap Wireless International in the above-referenced docket.

I. Background and Qualifications

2. I have worked for twenty years in the communications and engineering field. I received my BS in electrical engineering from San Diego State University in 1983. Starting in 1981, I worked developing communication system link margin analysis programs for the U.S. Navy, WJ Schafer Associates and later Titan Corporation. Later, I spent six years as an engineer for a division of Hughes Electronics designing signal processing and sensor ASICs.

3. From 1989 through 1993, I worked for LCC Incorporated, a cellular communication consulting company based in the Washington, D.C. area. At the time, LCC was the leading firm involved in planning and designing wireless systems, using analog and digital technologies. The bulk of my design work there was done with GSM systems. My projects at LCC included leading the Dusseldorf design team for