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Market Power and Duopoly despite Regulation  
*An Analysis of the Market Structure and Economic Conditions of the National Mobile Wireless Telecommunications Market*

The Federal Communications Commission acknowledges four national mobile wireless corporations in its 15<sup>th</sup> *Annual Mobile Wireless Competition Report*; Verizon Wireless, AT&T, Sprint Nextel, and T-Mobile (Report 2011, p.7). The market structure and conditions produced by the activity of these four firms is the subject and scope of this paper. This paper seeks to assess the general tendency of the national mobile wireless telecommunications market toward a particular market structure, monopoly, based on the market activity up to the time of writing, as well as provide a critique of the economics literature in the scope of the subject. After analyzing the market conditions as best indicated by the data provided by the Federal Communications Commission's 15<sup>th</sup> *Annual Mobile Wireless Competition Report*, it is apparent that market power is present to an extent within this market, and with the passage of time has not become primarily concentrated in one firm, but in two. It is evident that this market has not trended toward monopoly, but oligopoly at least, and duopoly at best, thus exposing weaknesses in arguments and analysis within the economics literature.

The possible trend of the national mobile wireless telecommunications market toward a monopolistic market structure is a reflection of the American telecommunications industry's past, which on average has been more monopolistic than competitive. In 1907, Theodore Vail, president of American Telephone and Telegraph Company, perfectly captured the market structure of the telephone industry through his popular advertising slogan, "One System, One Policy, Universal Service" (Mueller 1997, p.4). What began as a patent based monopoly on

telephony in 1877, the Bell Telephone Company, later renamed AT&T, dominated an industry commonly characterized by its monopolistic market structure and the government regulation that aided in creating it (King 2011, p.42).

Since the United States entered World War I in 1917, the American telephone industry has been subject to and heavily influenced by regulation, and the government of the United States has influenced the extent of competition present within this market. As a part of its national mobilization in 1917, the United States government nationalized the telephone industry, and allowed AT&T to emerge as a regulated monopoly (King 2011, p.45). The government sought to provide the benefits of a universal service provider, while “avoiding the abuses of unregulated monopolists” (King 2011, p.46). In order to accomplish its regulatory objectives, the government established the Federal Communications Commission through the Telecommunications Act of 1934 and intended it to regulate common carrier communications and broadcasting (King 2011, p.46). The Telecommunications Act of 1934 also gave the FCC jurisdiction over radio spectrum and the power to regulate access to this spectrum (King 2011, pp.49-50). The effects of this jurisdiction are especially pertinent to the national mobile wireless telecommunications market. By the end of World War II in 1945, individual households and many public places had access to a unified telephone service controlled and provided by a regulated monopoly (King 2011, 48).

AT&T’s regulated monopoly and its goal of universal service played a prominent role in American life until it came to an end in 1984, when the government broke-up AT&T as a result of a seven year anti-trust case filed by the U.S. Department of Justice (Viscusi et al. 2005, p.540). The DOJ accused AT&T of violating §2 of the Sherman Act for “attempting to monopolize the telecommunications industry,” by utilizing its dominant position in three

components of the industry: local exchange, long distance, and terminal equipment (Viscusi et al. 2005 p.550). The ruling of this case required that AT&T operate exclusively in competitive markets (Viscusi et al. 2005, p.540). Although the government brought an end to AT&T's regulated monopoly, AT&T remained under government regulation, as the FCC feared the anti-competitive consequences that would result from an unconstrained, dominant firm (Viscusi et al. 2005, p.541). Since the telephone industry was highly concentrated, the United States government could not fully deregulate AT&T and continued to regulate its rates and oversee its market activity (Viscusi et al. 2005, p.541).<sup>1</sup>

Technological innovation in the 1990s required revisions to the Telecommunications Act of 1934, which took their form in the Telecommunications Act of 1996. Under this new telecommunications act, the United States government made the FCC the “key arbiter of competition” and primary regulatory body of the telecommunications industry (Viscusi et al. 2005, p. 545). Today, in the scope of the national mobile wireless telecommunications market, the goal of the FCC is “to promote access to services, providing consumers the ability to choose among multiple reliable and affordable services in a pro-competitive and universal access environment” (FCC 2012). Along with promoting competition, the FCC also regulates the use of electromagnetic spectrum and is responsible for licensing the use of spectrum to commercial and non-commercial users (FCC 2012).

A historical examination of the American telecommunications industry displays and explains the unique tension created by regulatory and free market forces that is present in the market under consideration. While the government cannot coerce its citizens to subscribe to one

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<sup>1</sup> For further reading and analysis on the economic effects of the break-up of AT&T and the impact of government regulation after the break-up, read W. Kip Viscusi, Joseph E. Harrington, Jr. and John M. Vernon's book *Economics of Regulation and Antitrust*. Their retrospective analysis of this event demonstrates that regulation after the break-up was unnecessary (2005, p.543).

firm's services or place a limit on the number of subscribers to one firm, it has the power to regulate and determine what firms acquire necessary factors of production and approve or decline mergers and acquisitions. The national mobile wireless telecommunications market is not under government control to an absolute extent, but the regulatory measures in place distort expected market outcomes that would occur under free market conditions. This paper therefore examines the national mobile wireless telecommunications market and its structure in light of its industry's regulatory history and the extent of regulation currently in place. The FCC seeks to create and enhance competition within the national mobile wireless telecommunications market through regulation, but it is evident that market power and duopoly have emerged over time, despite the regulatory forces in place.

According to David L. Kaserman and John W. Mayo, the most significant factor in defining monopoly is a firm's ability to charge a monopoly price, which is a direct product of a firm possessing significant market power (1995, p. 98). The extent of market power, along with the number of firms that possess market power in a particular market, defines the market's structure. They note that a monopoly is the possession of market power by a single firm (1995, p. 98). Kaserman and Mayo define market power as the ability of a firm to "raise the price of its product above the marginal cost without losing so many sales that the above- marginal-cost price is unprofitable," and acknowledge that a firm acquiring market power to this extent requires both a large market share and the presence of significant barriers to entry (1995, p.98). Determining the extent of market power, according to these two criteria, and the number of firms that possess this market power is the standard by which this paper will define the market structure of the national mobile wireless telecommunications market and critique the arguments of the current economics literature.

Fritz Machlup also includes the possession of market power in his definitions of oligopoly and duopoly. In *The Economics of Sellers' Competition*, he writes:

Thus sellers who are not monopolists in the sense of this model analysis nevertheless have 'monopoly power.' The market position of an oligopolist as well as some of his business practices may be called 'monopolistic;' and we may speak of the 'degree of monopoly' that is expressed in the pricing and selling policies of the oligopolist. (Machlup 1952, p. 350)

It is evident that an oligopoly market structure shares the characteristic of market power with a monopoly market structure. However, an oligopoly contrasts with a monopoly in the number of sellers and the attitude of the sellers. According to Machlup, an oligopoly has few sellers (meaning more than two) and the sellers within the oligopoly possess "the consciousness of possible reactions of rivals" (1952, p. 351). This entails that each member of the oligopoly is aware of the actions of other members and acts based on this knowledge. Machlup notes this contrasts with a monopoly because the seller in a monopoly "believes that he does not have to care about what other sellers might do in reaction to what he does because what they sell is too different from what he sells" (1952, p. 351). Finally, a duopoly is a market in which only two firms offer a good or service (Machlup 1952, p. 371). These two firms possess a degree of control over the price of their product, and therefore possess market power to an extent (Machlup 1952, p. 377). Based on these definitions of monopoly, oligopoly, and duopoly, a determination of the market structure that this market has trended toward up to this point depends on the presence of market power and the number of sellers which possess it.

The economics literature contains certain limitations when applied to the analysis of this potential economic trend. Since the probability of this market trending toward monopoly has become most apparent from 2000 to 2010, the economics literature is limited in the number of articles available that analyze this particular market and the extent to which they do so.

However, after surveying the literature, two opposing perspectives emerge that directly apply to the condition of the national mobile wireless telecommunications market and its market structure in the scope of this particular trend.<sup>2</sup> Each of the perspectives includes the extent to which government regulation aids in defining the market structure.

The first perspective that emerges in the economics literature postulates the market structure of the national mobile wireless telecommunications market in the absence of government regulation. As best exemplified by Gerald R. Faulhaber and Christiaan Hogendorn in their article, “The Market Structure of Broadband Telecommunications,” this perspective argues that the national mobile wireless telecommunications market is not trending toward a natural monopoly under free market conditions. Rather, in the complete absence of government regulation, this market would be competitive<sup>3</sup> in nature due to a growth in demand over time of this market’s service. Robert W. Crandall in his article, “The Remedy for the ‘Bottleneck Monopoly’ in Telecom: Isolate it, Share, or Ignore it?,” agrees that regulation is not necessary to generate competition and that competition will develop over time as this industry grows through innovation and development (2005). While Faulhaber and Hogendorn primarily focus on the broadband telecommunications market, the extent of consumer demand and government regulation present within this market parallels the wireless telecommunications market and makes their analysis valid and applicable. The broadband market, like the national mobile

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<sup>2</sup> A third perspective is present in the literature that argues for government induced anticompetitive market structures in the regional mobile wireless telecommunications market and the spectrum market. Philip M. Parker and Lars-Hendrick Röller in their article “Collusive Conduct in Duopolies: Multimarket Contact and Cross-Ownership in the Mobile Telephone Industry,” analyze the creation of a monopoly followed by a duopoly market structure in the regional mobile wireless telecommunications market in the early 1980s through government regulation. They argue that government regulation induced a collusive duopoly and lead to noncompetitive pricing in this market (Parker and Röller 1997, p. 321). Eli Noam, in an article titled “Spectrum Auctions: Yesterday’s Heresy, Today’s Orthodoxy, Tomorrow’s Anarchism. Taking the Next Step to Open Spectrum Acquisition,” discusses the anti-competitive effects of governmentally regulated spectrum acquisition, and posits the possibility of a government induced oligopoly in this market (1998, pp. 776-777).

<sup>3</sup> The terms “competitive” and “competition” within this paper refer to rivalrous competition and not the neo-classical perfect competition model.

wireless service market, also utilizes spectrum to provide service to consumers. In commenting on the nature of the broadband telecommunications market structure, Faulhaber and Hogendorn write:

[D]uring the period of growth, it is likely to appear that the market is characterized by natural monopoly, and that some form of government intervention is needed. Indeed, if demand growth caps at, say, 140% of today's demand level, then this may well be the case. If, however, demand continues to grow, eventually approaching or exceeding that realized by cable TV today, then the market is likely to evolve to a more competitive outcome, provided government intervention at an earlier stage does not preclude the market from functioning. This suggests that some patience and regulatory forbearance may be required before concluding that broadband infrastructure is a natural monopoly. (2000, p. 323)

As evidenced in this passage, Faulhaber and Hogendorn argue that a market which possesses a high level of demand and is capable of future growth is more likely to result in a competitive, rather than a monopolistic, outcome. They therefore argue that under free market conditions and the absence of regulation, this type of market, which is characteristic of the national mobile wireless telecommunications market, would be competitive in nature, rendering government regulation unnecessary.

The inverse of this first perspective is the argument presented by Peter Cramton, Evan Kwerel, Gregory Rosston, and Andrzej Skzypacz in their article "Using Spectrum Auctions to Enhance Competition in Wireless Services." Throughout this article, the authors argue that under free market conditions, monopolistic characteristics would emerge without the government creating competition and competitive economic conditions through regulation. Government regulation is necessary to enhance and maintain a competitive market, and a possible consequence of the absence of government regulation would be monopoly. In order to properly address the "problem of monopoly," the authors argue that regulating spectrum markets through

instruments such as set-asides<sup>4</sup>, bidding credits, spectrum caps, and antitrust and merger review policy will efficiently enhance competition (Cramton et al. 2011, p.168). They assert the dangers of a regulation free spectrum market by acknowledging a potential market failure when allocating spectrum to the highest bidder. The authors write, “[P]art of the willingness to pay for the incumbent in the auction comes from the value of deterring new entry, which is bad for overall efficiency for the standard market power reasons... Competition policy seeks to address this potential market failure by encouraging competition in the provision of wireless services” (Cramton et al. 2011, p. 169). As evidenced in this quotation, the authors argue that a free market, one devoid of regulation, would produce anti-competitive behavior, and the presence of market power is a negative consequence rendering competition policy a necessity to encourage a competitive economic atmosphere in the spectrum market.

Moreover, the authors allude to the possibility of natural monopoly specifically when they posit the possibility of a firm earning enough profits to bid for and consequently obtain two identical licenses that would secure monopoly power in the market (Cramton et al. 2011, p. 172). After noting this example, the authors immediately outline the inefficiency and detrimental consequences produced by this degree of market power, thus further building their case for the necessity of regulation in order ensure a competitive market (Cramton et al. 2011, p. 173). These authors formulate a contrary argument to the first perspective introduced by crediting regulation with creating competition, not the market itself.

A general assumption present in the literature in regard to a monopoly market structure is the postulation that competition is optimal and efficient, so a natural monopoly is economically

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<sup>4</sup> Ian Ayres and Peter Cramton further discuss how these instruments enhance competition in the spectrum market in their article, “Deficit Reduction Through Diversity: How Affirmative Action at the FCC Increased Auction Competition.”



inefficient because it is not competitive in nature. Both perspectives presented support this supposition, which is the first weakness in their arguments. The presence of natural monopoly demonstrates economic efficiency according to David L. Kaserman and John W. Mayo, and does not eliminate competition. In *Government and Business: The Economics of Antitrust and Regulation*, Kaserman and Mayo write, “The provision of total market supply by a single firm, however, is not undesirable in this case...an industry is said to constitute a natural monopoly if, for the industry output level that satisfies total market demand, the product can be produced most efficiently by a single firm” (Kaserman and Mayo 1995, p.415). This quotation demonstrates that natural monopolies are economically efficient, as they can satisfy total market demand at the lowest cost. Moreover, Kaserman and Mayo note that natural monopolies do not contain significant barriers to entry, and all firms “have access to the same demand and production technology” (1995, p.429). Therefore, natural monopolies do not eliminate competition and are not a source of economic inefficiency, revealing the first weakness in both of the presented arguments.

The strengths and weaknesses of these two perspectives in the economics literature are further revealed through an analysis of the national mobile wireless telecommunications market conditions as best presented by the Federal Communication Commission’s 15<sup>th</sup> Annual *Mobile Wireless Competition Report*. The data presented in the *Report* aids in assessing the validity of these two arguments and the credibility of their accompanying analysis. An analysis of the data reveals the presence of market power according to the criteria presented by David L. Kaserman and John W. Mayo and appears to be concentrated in two firms: Verizon Wireless and AT&T.

Gerald R. Faulhaber and Christiaan Hogendorn’s argument for competition in the absence of government regulation due to an increase in demand over time is valid to an extent

when applied to the conditions of the national mobile wireless telecommunications market up to this point. The extent of demand that exists in the market validates Faulhaber and Hogendorn's argument that the demand for this service will grow over time. As evident in *Figure 1*, the number of mobile wireless subscribers and connections has grown consistently from 2001 to 2009. Furthermore, *Figure 2* shows that the number of subscribers has grown in all four of the nationwide firms and in each of the regional firms listed. The evident growth in demand of national mobile wireless services over two years justifies the apparent growth and possibility of growth over time that these authors posit.

Mobile Wireless Subscribers and Connections								
Year	Mobile Wireless Connections				Mobile Telephone Subscribers		Mobile Internet Access Subscribers	
	NRUF (millions)		CTIA (millions)		Form 477* (millions)		Form 477 (millions)	
	Total	Net Adds	Total	Net Adds	Total	Net Adds	Total	Net Adds
2001	128.5	n/a	128.4	18.9	124.0	23.0		
2002	141.8	13.3	140.9	12.4	138.9	14.9		
2003	160.6	18.8	158.7	18	157.0	18.1		
2004	184.7	24.1	182.1	23.4	181.1	24.1		
2005	213.0	28.3	207.9	25.8	203.7	22.6		
2006	241.8	28.8	233.0	25.1	229.6	25.9		
2007	263.0	21.2	255.4	22.4	249.3	19.7		
2008	279.6	16.6	270.3	14.9	261.3	12.0	26.5	
2009	290.7	11.1	285.6	15.3	274.3	13.0	55.8	29.3

*Figure 1 Source: Report 2011, p. 9.*

**Top 14 Facilities –Based Mobile Wireless Service Providers by Subscribers**  
(based on publicly-available subscriber counts, in thousands)

	Service Provider	Year-End 2008	Year-End 2009	Year-End 2010
1	AT&T	77,009	85,120	95,536
2	Verizon Wireless	72,056	91,249	94,135
3	Sprint Nextel	48,338	48,133	49,910
4	T-Mobile	32,758	33,790	33,734
5	MetroPCS	5,367	6,640	8,155
6	US Cellular	6,196	6,141	6,072
7	Leap	3,845	4,954	5,518
8	Clearwire	475	688	4,345
9	América Móvil/Claro	686	826	
10	Cellular South	800	≈800	
11	Cincinnati Bell Wireless	551	533	509
12	Ntelos	435	439	438
13	Pocket Comm.	300	320	
14	SouthernLINC	*	≈220	

*Figure 2 Source: Report 2011, p. 34.*

However, this data also challenges Gerald R. Faulhaber and Christiaan Hogendorn's argument that this growth in demand will result in a competitive outcome. While growth in demand is not concentrated in one firm, thereby precluding the emergence of a possible monopoly during this time, growth in demand appears to be concentrated in two firms. AT&T and Verizon Wireless possess the largest increase in subscribers and the largest number of subscribers after this two year period. Moreover, both of these firms possess the largest share of subscribers as evident in *Figure 3*. Although this set of data is from the end of 2009, it is implicit from the growth in the number of subscribers experienced by both of these firms in 2010 that the share of subscribers either remained the same or increased for both of these firms. Since growth in demand is most apparent and to the greatest extent in the service provided by two firms, Verizon Wireless and AT&T, rather than in many firms, it is evident that a growth in

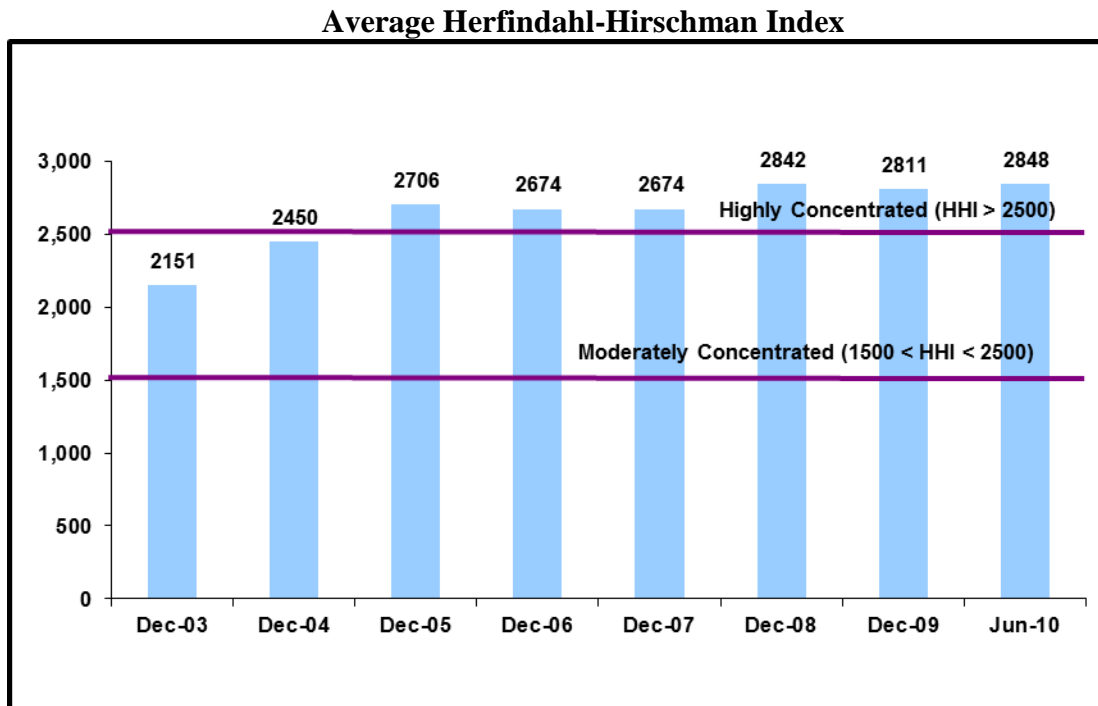
demand has not produced greater competition among firms, but has strengthened and contributed to the market share of two firms. While it is evident that Faulhaber and Hogendorn’s argument is correct in asserting this growth in demand has not contributed to the development of a natural monopoly in this particular market, a growth in demand did not necessarily provide a more competitive outcome.

**Service Provider Share of Subscribers and Revenues (Year-End 2009)**

<b>Year End 2009</b>	<b>Percent of Subscribers (%)</b>	<b>Percent of Revenues (%)</b>
Verizon Wireless	31.94	33.82
AT&T	29.80	30.70
Sprint Nextel	16.85	16.58
T-Mobile	11.83	12.13
Metro PCS	2.32	1.98
US Cellular	2.15	2.48
Leap Wireless	1.73	1.36
Other	3.37	0.95

*Figure 3 Source: Report 2011, p.35.*

Furthermore, it is evident that as demand, displayed through an increase in the number of mobile connections and subscribers, has increased over time, market concentration has also increased, further displaying the weak applicability of Faulhaber and Hogendorn’s analysis to the market conditions under consideration. As displayed in *Figure 4*, the average Herfindahl-Hirschman index, which measures market concentration, experienced evident growth from 2003 to 2010, and in 2008 to 2010, reached its highest levels. Moreover, the index classifies these levels as portraying high concentration. Rather than a more competitive outcome which a lower market concentration would reflect, the Herfindahl-Hirschman index displays that a positive relationship exists between market concentration and an increase in demand. This exposes the weakness in the Faulhaber and Hogendorn’s argument as it does not support the positive correlation they postulate between demand and greater competition. This market concentration is most evident in the share of revenues earned by each of the nationwide service providers.



*Figure 4 Source: Report 2011, p.17.*

Despite the growth of demand experienced across all firms, both Verizon Wireless and AT&T possessed the greatest share of revenues, according to *Figure 3*. The percentage of subscribers and revenue shared by Verizon Wireless and AT&T is significantly higher than the two other members of the national market, Sprint Nextel and T-Mobile, and displays that both of these firms possess the greatest market share in the national mobile wireless telecommunications market. Individually, Verizon Wireless and AT&T generated approximately the same percentage of revenue, around 30%, but together, Verizon Wireless and AT&T generated 64.52% of this market's revenues in 2009. This degree of market share among both firms satisfies Kaserman and Mayo's first criterion for market power. Rather than trending toward more competition or monopoly, a propensity toward market power by two firms displays that this market has most likely trended toward duopoly, rather than the competitive outcome that

Faulhaber and Hogendon posit. With demand increasing over time, along with market concentration and market power, the first perspective among the economics literature does not hold true with the passage of time. Therefore, the considered market conditions do not justify the competitive outcome argument, even despite the presence of regulation meant to enhance competition.

The arguments presented by the second group of economics literature also contain weaknesses when applying their perspective to the considered market conditions of the national mobile wireless telecommunications market. These authors argue that government regulation is necessary to maintain a competitive market. However, it is apparent that market power is emerging despite the regulation that is in place. Although the Federal Communications Commission seeks to “promote competition,” and support “the nation’s economy by ensuring an appropriate competitive framework,” through regulatory measures, an extent of market power is evident both in the high market share concentration of Verizon Wireless and AT&T, and in the presence of barriers to entry within the national mobile wireless telecommunications market (FCC 2012). The presence of barriers to entry satisfies Kaserman and Mayo’s second criterion for market power and therefore qualifies this market structure as trending toward something other than competitive.

The Federal Communication Commission defines barriers to entry within the mobile wireless services industry as “access to spectrum, tower siting policies, large sunk costs for network deployment, and the magnitude of marketing and advertising expenditures on brands and services” (Seeks Comment 2011, p. 5). Amidst these four barriers to entry, the magnitude of advertising expenditures and spectrum acquisition are the most empirically evident barriers and most clearly display the trend toward oligopoly or possible duopoly.

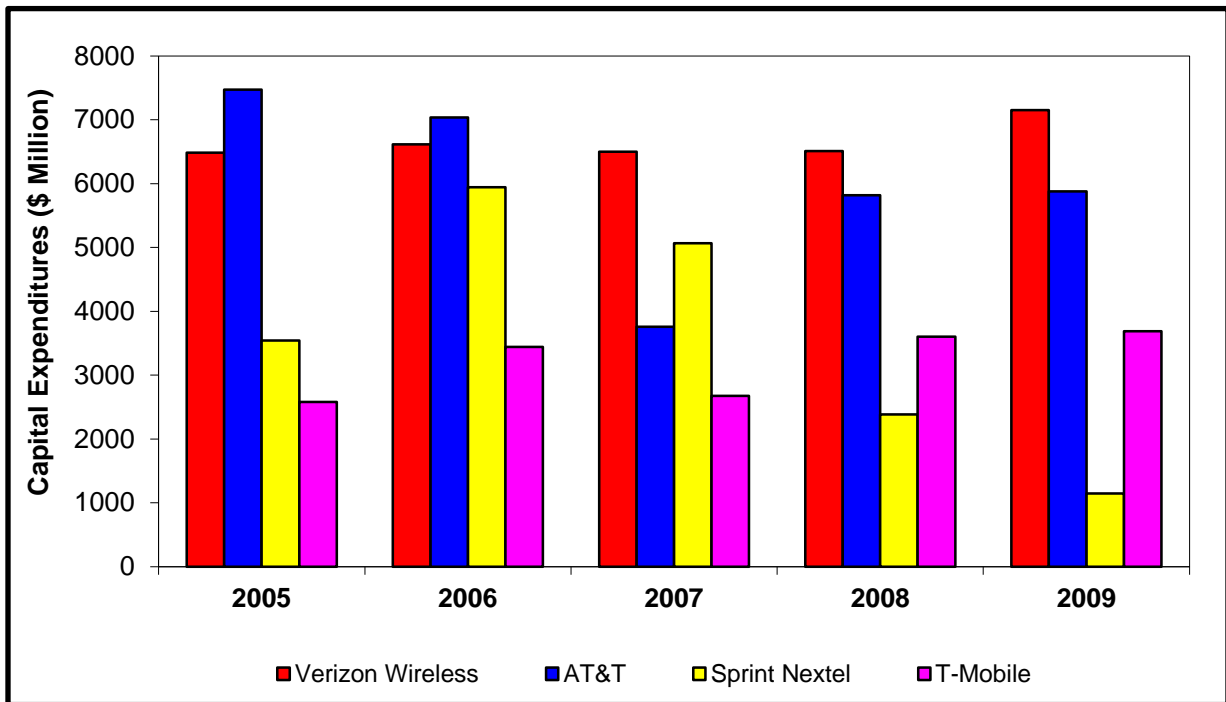
First, the extent of money spent on advertising by these four firms, and the reason for doing so, displays the oligopolistic consciousness of other firms as rival firms that Kaserman and Mayo describe. This supports a possible oligopolistic market structure for the national mobile wireless telecommunications market. According to the *Report*, Sprint Nextel increased its ad spending by 30% in 2009 to \$1.23 billion dollars in order to continue its “bid to restore its brand” (Report 2011 p.86). An increase in Sprint Nextel’s advertising expenditure reflects the rivalry it experienced with other firms since this was necessary to increase consumer demand for its services in lieu of AT&T and Verizon Wireless’s much greater advertising expenditures. In 2009, Verizon Wireless and AT&T were the second and fourth largest advertisers in the United States, respectively, and spent \$2.2 billion, and \$1.904 billion on advertising (Report 2011 p. 85). This is almost double what Sprint Nextel spent on advertising, despite its 30% increase in expenditure. Great expenditure on advertising reflects the significance of advertisement and marketing within this industry. The rivalry that exists among these four firms is evident in the extent of expenditure on advertising that is necessary to effectively compete, and characterizes this market as trending toward oligopoly.

Furthermore, an analysis of this market displays that advertising expenditure is a plausible barrier to entry, as the extent of advertising expenditure in addition to capital expenditure exhibits the great financial requirements a firm would have to meet in order to enter this market and effectively compete with this market’s four current members. According to the Federal Communications Commission, the requirements for entry into the national mobile wireless telecommunications market include raising financial capital, acquiring the necessary spectrum rights, deploying the mobile wireless network, and acquiring a customer base (Report 2011, p.55). Moreover, the *Report* notes that acquiring new technology and upgrading the

existing network infrastructure requires “significant capital expenditure” (Report 2011, p.55). While the *Report* does not provide precise monetary values for these various entry requirements, it is evident from the annual capital expenditures of the four firms within the market that the extent of financial capital necessary to successfully enter and effectively compete is substantial. As displayed in *Figure 5*, Verizon Wireless spent about \$6.5 billion in capital expenditures in 2005 and about \$7 billion in 2009. While Sprint Nextel spent significantly less than Verizon Wireless, about \$1 billion in 2009, it is evident that it did not earn the same extent of profit or experience the same increase in subscribers as Verizon Wireless in that year. In 2009, Verizon Wireless earned \$16.34 per subscriber, per month in profit, and Sprint Nextel earned \$7.03 per subscriber, per month (Report 2011, p.135). Moreover, Verizon Wireless experienced an increase of 19.1 million subscribers from year end of 2008 to year end of 2009, while Sprint Nextel experienced a decrease of 205,000 subscribers over the same time period (Report 2011, p.34). Clearly, a positive correlation exists between capital expenditure and profitability, and capital expenditure and the number of subscribers. Even if a new firm was able to match Sprint Nextel’s capital expenditure, it still would be unable to effectively compete with Verizon Wireless, a leader in the market. This demonstrates the significant capital requirements a firm would have to meet aside from advertising expenditure in order to enter the market.



### Capital Expenditures by Service Provider



*Figure 5 Source: Report 2011, p.132.*

While one may argue that it is possible for a new firm to acquire the necessary financial capital in order to enter this market, it would be a challenge to acquire this magnitude of capital and spend an additional significant amount advertising its service. Since advertising is a significant component of this market due to the extent of rivalry, the magnitude of advertising expenditure a firm must incur in addition to substantial capital expenditure may deter entry. Acquiring the magnitude of financial capital that would allow for this extent of capital and advertising expenditure is not directly feasible for a new firm and is therefore a plausible barrier to entry.

Furthermore, the economics literature acknowledges advertising as a barrier to entry due to its influence in earning profit and creating customer loyalty. In their article “Advertising

Market Structure and Performance,” William S. Comanor and Thomas A. Wilson conclude based on their empirical findings that industries with “high advertising outlays” earn profit at a rate which exceeds other industries “by nearly four percentage points” (1967, p.437). They assert that this differential “represents a 50 percent increase in profit rates” which is accounted for by the barriers to entry advertising expenditures create (Comanor and Wilson 1967, p.437). F.M. Scherer and David Ross further address the impact of advertising on entry in their book *Industrial Market Structure and Economic Performance*. They cite a study conducted by Robert Smiley which surveyed 293 product managers about possible strategies for deterring entry. The survey found that 32% of respondents cited “advertisement to cement customer loyalty” as one of the most commonly used strategies (Scherer and Ross 1990, p. 392).<sup>5</sup> As evidenced by the economics literature, advertising expenditure creates a plausible barrier to entry as it is positively correlated with a firm’s ability to earn profit and acquire a loyal customer base. In this particular market, this plausible barrier to entry further reflects the presence of market power and the dominance of Verizon Wireless and AT&T through their extent of expenditure relative to the other two firms in their market, thus supporting the trend toward possible duopoly.

Spectrum acquisition also creates a blatant barrier to entry and further displays the duopolistic tendencies of this market and presence of market power, despite the regulation that is in place. This further weakens the second argument presented by the economics literature that regulation enhances competition and is necessary to prevent market power and guard against its negative effects. Spectrum is “the government-controlled airwaves that companies license to transmit wireless signals” (Ovide 2011). Access to spectrum through a government license provided by the Federal Communications Commission is the prerequisite for providing mobile

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<sup>5</sup> These arguments have been contested by Richard Schmalensee in his article “Brand Loyalty and Barriers to Entry.”

wireless services and entering this market (Report 2011, p. 157). Moreover, the United States government controls the amount of spectrum that is available and decides when a greater supply of spectrum is necessary for promoting competition and innovation (Report 2011, p.157).

Finally, the extent of a firm's access to spectrum determines the scope of a "carrier's coverage, service quality, and data connection speed" (Ovide 2011). A firm's ability to compete in this industry is dependent to an extent on what spectrum and the amount of spectrum it acquires.

Spectrum acquisition is therefore a barrier to entry within this market.

Analyzing the extent of current spectrum possession and acquisition among firms displays the double standard that is present in regulating this industry because when the government asserts its control over who acquires spectrum, and what amount they possess, it is explicitly evident that Verizon Wireless and AT&T control a majority of the cellular spectrum in this market. The Federal Communications Commission acknowledges this in the *Report* when they write,

Most of the spectrum below 1 GHz suitable for the provision of mobile broadband is held by the two largest mobile wireless service providers. Verizon Wireless and AT&T together hold approximately 90 percent of Cellular spectrum based on megahertz-POPs (MHz-POPs), which was the first band to be licensed for commercial mobile services and has the most extensive network build out. (2011, p. 19)

Although other firms that provide cellular service possess spectrum on other wavelengths, the fact that two firms own 90% of the cellular spectrum which has the most network build out clearly displays that regulating this industry through controlling who acquires spectrum has not increased competition as defined by the second group of economics literature. Rather, it has created market power, especially among the two firms.

Moreover, in the absence of regulation, these two firms would possess an even greater share of spectrum as AT&T expected to merge with T-Mobile in March of 2011, eliminating one competitor in the national mobile wireless telecommunications market (Ovide, 2011). Although the Federal Communications Commission has not approved this acquisition, perhaps in an attempt to prevent a duopoly or monopoly, the presence of market power through spectrum ownership and the barrier to entry it creates displays that regulation does not enhance competition as the second group of literature argues (Mallor et al. 2012). Rather than market power becoming increasingly concentrated in one firm, as the second group of authors predict will happen in the absence of regulation, its concentration is increasingly in two despite the regulation, therefore displaying the weakness in the authors' argument when applied to this market.

With the presence of market power through the possession of a large market share by AT&T and Verizon Wireless, and barriers to entry through advertising expenditure and spectrum acquisition, it is evident that up to this point, the national mobile wireless telecommunications market has not been trending toward a more competitive market structure or monopoly, despite what the economics literature suggests. Rather, this market has trended toward duopoly, as two firms, AT&T and Verizon Wireless, exhibit evidence of possessing market power according to the criteria of David L. Kaserman and John W. Mayo. Unhampered or deregulated conditions would make this duopoly possible to an absolute extent, but the regulation and control by the Federal Communications Commission maintained a more oligopolistic outcome as it sought to preserve the presence of four firms, Verizon Wireless, AT&T, Sprint Nextel, and T-Mobile, within the market. Despite the regulatory controls it enforces, the government of the United States, acting through the Federal Communications Commission, cannot prevent the presence of

market power within the national mobile wireless telecommunications market and could not prevent its trend toward duopoly. This trend within the national mobile wireless telecommunications market is a testament to the power of the free market and reflects a force that the government can attempt to influence and distort, as it has throughout history, but ultimately cannot bring under its control.

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