MARKET POWER IN U.S. BROADBAND SERVICES

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Abstract

The U.S. telecommunications industry has come under scrutiny amid concerns that regulatory policies have been too permissive. These concerns are perhaps most prominent in the residential broadband market where there is a perception that the "duopoly" between telephone carriers (DSL suppliers) and cable TV operators (cable modem services) has given rise to anti-competitive behavior. The presence of market power is a testable hypothesis that cannot be deduced solely from market shares or price-cost margins. We develop an economic analysis that incorporates both static and dynamic factors to examine the extant marketplace evidence. The data suggest that "duopoly" broadband providers do not generate supra-competitive returns. Public policies to regulate broadband providers should be informed by these market conditions.

I. Introduction

The title of this paper reflects an age-old tension in the economics and political economy

literature—the nexus between static and dynamic efficiency. In many ways, this tension

was (and in some sense continues to be) the central theme that played out in the

controversial and litigious implementation of the 1996 Telecommunications Act. To wit,

pervasive network unbundling may reduce retail price-to-cost margins, thereby increasing

static efficiency, while simultaneously discouraging efficient investment in the

underlying telecommunications infrastructure, thereby decreasing dynamic innovation.[1]

In regulating residential broadband markets, the initial question faced by the FCC

was "open access."[2] Should cable broadband Internet service providers be required to

lease to independent Internet service providers ("ISPs") access to their networks? Much

to the chagrin of some local communities that sought to force such access, the FCC took

the position that cable operators could not be required to provide access to their "pipes"

because the cable operators were not common carriers. The Supreme Court concurred

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[1] See Kahn et. al. (1999), Hazlett and Havenner (2003) and Robinson and Weisman (2008).
[2] FCC (1999) and Lessig (2001).

with that position.[3] This produced a somewhat awkward differential treatment between cable service providers and telephone carriers because the latter were originally required to provide such nondiscriminatory access (via DSL facilities) to independent ISPs. The FCC recognized the disparity and removed the access obligation from telecom carriers in a series of reforms, 2003-2005.[4]

While traveling a crooked, obstacle-strewn pathway, the FCC's current policy framework for broadband can be seen as owing much to Joseph Schumpeter.[5] The FCC highlights concerns about reduced investment in broadband networks should network sharing mandates be imposed (or continued).[6] In fact, the FCC relies upon Section 706 of the Act which directs it to "encourage the deployment of . . . advanced telecommunications capability . . . by utilizing . . . other regulating methods that remove barriers to infrastructure investment."

The tradeoffs between static (allocative and productive) efficiency and dynamic efficiency loom large in this debate.[7] Dynamic efficiency is concerned with optimal investment over time, resulting in capital formation, cost-reducing innovation and product innovation. This aspect of economic coordination is particularly critical in

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[3] National Cable & Telecommunications Ass'n v. Brand X Internet Services, 545 U.S. 967 (2005).
[4] See Hazlett and Caliskan (2008); Time Warner Telecom, Inc. v. FCC, 507 F.3d 205 (3d Cir. 2007), aff'g, Appropriate Framework for Broadband Access to the Internet over Wireline Facilities, 20 F.C.C.R.14853 (2005)("Wireline Broadband Order").
[5] At Id.., paragraph 89, the FCC observes that:

   Our primary goal in this proceeding is to facilitate broadband deployment in the manner that best promotes wireline broadband investment and innovation, and maximizes the incentives of all providers to deploy broadband.

[6] See, for example, Id, paragraphs 19, 44, 68 and 86.
[7] Allocative efficiency refers to the relationship between the price of the service and marginal cost given a certain complement of technology and fixed investment at a given point in time. Productive (technical) efficiency is concerned with production at the lowest possible cost at a given point in time. A firm is technically efficient if it (i) uses the minimum possible amount of inputs to produce its output; or, equivalently, (ii) produces the maximum possible amount of output from any given quantity of inputs.

infrastructure industries that serve as key drivers of economic growth. Professor James Bonbright explained the relationship decades ago:

> Under unregulated competition, the price system is supposed to function in two ways with respect to the relationship between the price of the product and the cost of production. In the first place, the rate of output of any commodity will so adjust itself to the demand that the market price will tend to come into accord with production costs. But in the second place, competition will impel rival producers to strive to reduce their own production costs in order to maximize profits and even in order to survive in the struggle for markets. This latter, dynamic effect of competition has been regarded by modern economists as far more important and far more beneficent than any tendency of "atomistic" forms of competition to bring costs and prices into close alignment at any given point of time.[8]

Professor Joseph Schumpeter had struck a similar chord in rebuking economists who focused exclusively on price rivalry, ignoring dynamic efficiencies: "[T]he competition that matters arises not from additional shops of the same type . . ."[9] In the marketplace, economic growth was driven by "imperfect" competition:

> [I]n capitalist reality as distinguished from its textbook picture, it is not that kind of competition which counts, but the competition from the new commodity, the new technology, the new source of supply, the new type of organization . . . competition which commands a decisive cost or quality advantage and which strikes not at the margins of the profits and the outputs of the existing firms but at their foundations and their very lives.[10]

In enacting the 1996 Telecommunications Act, Congress stated that the purpose of the Act was "To promote competition and reduce regulation in order to secure lower prices and higher quality services for American telecommunications consumers and encourage the rapid deployment of new telecommunications technologies."[11]

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[8] Bonbright (1961, p. 53).
[9] Schumpeter (1975, p. 85).
[10] *Id.,* p. 84.
[11] Preamble, 1996 Telecommunications Act of 1996. Pub. L. No. 104-104, 110 Stat. 56 (codified as amended in scattered sections of 47 U.S.C.)

It is reasonable to conclude that Congress harbored both static and dynamic efficiency objectives. But how should the law deal with these sometimes conflicting aims? As a thought experiment, consider the following policy: government regulators simply appropriate existing broadband networks, and then lease the existing conduits (with data delivery network facilities to route traffic) to all rivals at nominal price. It is deducible that retail prices would fall, and allocative efficiency would be said to increase. There would be no reason, with free entry, for retail prices to be set above the marginal costs for network access – lowered by regulatory fiat. This, alone, would increase consumer welfare. But the policy has other implications. Specifically, investment incentives would be seriously damaged, such that innovations – expanding network coverage, upgrading data speeds, deploying new and useful technologies – would be reduced.

Two considerations are instructive here. First, as Professor Bonbright indicates, there is a general consensus among economists that dynamic efficiencies generally trump static efficiencies in terms of consumer welfare.[12] Second, the tension between these various measures of efficiency is particularly acute in technologically-dynamic industries. By definition, improvements in consumer welfare are strongly associated with the introduction of improved methods, displacing existing products and production methods, in such markets. Moreover, the capital-intensive nature of many of these industries is such that relatively high price-cost margins may be necessary for cost recovery, which provides the forward-looking investor with the requisite incentives for new outlays to

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[12] As Professor Kahn observes: "[W]herever mandatory sharing, for the sake of jump-starting the entry of competitors, would interfere with the more creative and dynamic investment in facilities-based competitive entry and innovation by incumbents and challengers alike, it is the latter that must take primacy." Kahn (2001, p. 22). See also, Baxter (1984), Schmalensee (2000), Gilbert (2005), and Katz and Shelanski (2005).

promote further innovation.[13] These observations suggest that lighter regulation with respect to static efficiency will often promote dynamic efficiency.[14]

Current developments make this understanding increasingly important and, somewhat ironically, controversial. Policy makers in the U.S. are suggesting that antitrust enforcement may have been too lax in recent years, the importance of incentives for efficient innovation overstated. In her initial speech, Christine Varney, the new (2009) Assistant Attorney General for Antitrust, stated: "Americans have seen firms given room to run… It is clear to anyone who picks up a newspaper or watches the evening news that the country has been waiting for this 'self-correction,' spurred innovation, and enhanced consumer welfare. But these developments have not occurred." [15] Rejecting and rendering inoperative a Bush Administration policy statement from the Antitrust Division,[16] Varney announced a new direction in antitrust regulation. "We need to bring the focus of the economic discourse back to the basic and practical principle: when markets are competitive, the consumer 'wins.'"[17] This signals the renewed importance of determining when the consumer does, in fact, win with increases in static efficiency.

At the same time, the Obama Administration is committed to promoting increased broadband deployment, leveraging economic opportunities of the digital economy. This goal has been made increasingly urgent with claims that the United States has fallen behind many other countries in broadband build-out and data speeds.[18] Overall, there is a

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[13] See Antitrust Modernization Commission, Report and Recommendations, Washington D.C. 2007, pp. 40 - 41. ("For these reasons, firms with low marginal costs but large fixed costs, for research and development and other innovative activity, for instance, often need to price significantly above marginal costs simply to earn a competitive return in the long run.")

[14] See, for example, Prieger and Heil (2008).

[15] Varney (2009), p. 4.

[16] DOJ (2008).

[17] Varney (2009), p. 17.

[18] Hazlett (2009).

pronounced shift towards a more prominent role for the government in broadband markets and a reexamination of the very same questions that recently appeared settled.

A key reality is that the presence of market power in broadband markets does not necessarily imply that government intervention is pro-consumer, nor does the absence of market power necessarily imply that government intervention is anti-consumer. This paper attempts to steer clear of the logical trap commonly placed beneath an economic analysis of markets. A finding of "market failure" does not, *ipso facto*, create a case for new regulatory rules. Rather, the case for policy reforms must be made on evidence of their incremental value: if they deliver net social benefits they are presumptively efficient. As Ronald Coase discovered in his seminal treatment of social costs, the relevant and *symmetric* policy choice is between imperfect competition and imperfect regulation.[19]

The outline for the remainder of this paper is as follows. The cost structure for wireline telecommunications is examined in Section II to foreshadow the discussion of market power metrics in Section III. Section IV provides our empirical findings regarding market power in broadband markets. Despite the concentrated structure of residential broadband markets, supra-competitive returns are not found. This is inconsistent with the conclusion that market power is restraining choices for consumers. A brief policy discussion and conclusion are provided in Section V.

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[19] Coase (1960). See also Harold Demsetz' (1969) explanation of the Nirvana Fallacy, and Wolf (1988).

II. The Cost Structure for Wireline Telecommunications

We first discuss the cost structure for wireline telecommunications providers. Understanding the financial characteristics of production within the industry is necessary to inform our discussion of market power metrics in the following sections.

Let the output for the n-product firm be given by $q = \langle q_1, ..., q_n \rangle$. In addition, let $q_{-i} = \langle q_1, .., q_{i-1}, .., q_{i+1}, .., q_n \rangle$. The variable cost of producing product i be given by $c^i(q_i, q_{-i}, F)$, where F denotes fixed costs. The firm's unconstrained optimization problem is therefore to choose a level of fixed costs, F^*, such that

$$(1) \quad F^*(q) = \operatorname*{argmin}_{F} \{ F + \sum_{i=1}^{n} c^i(q_i, q_{-i}, F) \},$$

where $c_F^i < 0$ and $c_{FF}^i > 0$. Hence, investing in fixed costs serves to reduce variable costs at a decreasing rate. In equilibrium, the unconstrained, profit-maximizing firm will choose a level of fixed costs such that

$$(2) \quad -\sum_{i=1}^{n} c_F^i(q_i, q_{-i}, F^*) = 1.$$

Equation (2) indicates the cost-minimizing firm will invest in fixed costs up to the point where the last dollar invested in fixed costs results in a one dollar reduction in variable costs when cumulated across the entirety of the firm's products and services.

The digitalization of telecommunications networks implies that wireline telecommunications providers (efficiently) operate with a cost structure in which the ratio of variable (avoidable) costs to total costs is very low:

> In telecommunications networks, production facilities have well-determined capacities, and the costs of operation are nearly independent of the flow of services through those facilities . . . Consequently, . . . variable costs are very

small.[20]

Another way to interpret this characteristic is to note that the vast majority of a fixed telecommunications service provider's costs are incurred in supplying the *option to use* as opposed to *actual use*.[21] And yet, the market structure is such that telecommunications providers recover much of their total costs on the basis of usage-sensitive prices.

The above observations have a number of important implications. First, prices must exceed average variable or incremental costs by a significant margin in order for the firm to cover its costs.[22] Second, relatively large price-cost margins are not dispositive of market power in such an industry. Third, the dominance of fixed costs dictates that minimum efficient scale is relatively large. This, in turn, implies that the efficient number of firms will be small relative to other industries with distinct cost structures.[23] In this situation, traditional tools for diagnosing market power – including market share and price-cost margins – must be viewed in proper context. Standard metrics, unadjusted for the production characteristics of the industry, can easily produce false positives with respect to the determination of market power.[24]

III. Measuring Market Power

A. Standard Measures

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[20] Mitchell and Vogelsang (1991, p. 9).

[21] See Weisman (1988).

[22] In fact, when high margins are necessary for a firm to realize normal profits (i.e., when fixed and sunk costs are a large proportion of total costs) then competition can be so intense as to result in the "destructive competition" that in the past was the rationale for regulating industries such as transportation. See, for example, Kahn (1988, Vol. II, Chapter 5).

[23] See, for example, Sutton (1991, Chapters 2 and 3).

[24] To the extent this leads to increased regulation, either in the form of price caps, mandatory unbundling, or antitrust sanctions, it may have the effect of distorting technology choices. To wit, firms will have incentives to adopt sub-optimal technologies with higher variable costs and lower fixed costs if policymakers use simple price-cost margins to draw inferences about market power.

Tools to detect the presence of market power include market shares, Lerner indices,[25] rates of return, and q ratios (frequently referred to as Tobin q ratios[26]). Each of these measures seeks to identify market characteristics likely to be present when firms have the ability to harm consumers via unilateral conduct.

Market shares (s_i) for each firm i can be calculated and then aggregated to reflect concentration within an industry, yielding information on the likelihood that firms possess the ability to inefficiently restrict output. The Herfindahl-Hirschman Index (HHI), where $HHI = \sum s_i$, $i = 1, 2, ... n$, for n firms in the industry, is the measure used by U.S. antitrust agencies in setting threshold concentration levels for analyzing mergers.[27] The presence of high concentration within a market is taken to be necessary if insufficient for the presence of market power. In this context, the *HHI* serves as a filter. When modest incremental changes in unconcentrated markets are implicated by proposed combinations, no further antitrust review is warranted -- and conversely.

The Lerner Index defines the relationship between price and marginal cost: *(P-MC)/P = HHI/e*,[28] where *P* = price*, MC*=marginal cost, and *e*=own market price elasticity of demand.[29] This formula, derived from firm profit maximization conditions, implies that market power, defined by the mark-up of price over marginal cost, is increasing with the degree of industry concentration, as measured by the *HHI*. Under perfectly competitive conditions, each firm in the market is infinitesimally small, the *HHI* approaches zero and hence p $\cong$ mc. The Lerner index is equal to zero under these

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[25] See Saving (1970) and Landes and Posner (1981).

[26] See Tobin (1969).

[27] U.S. Department of Justice Antitrust Division, Horizontal Merger Guidelines (April 2, 1992; revised April 8, 1997); http://www.usdoj.gov/atr/public/premerger.htm.

[28] See Weisman (2003, 2007) and Tardiff and Weisman (2009) for adjustments to this formula in the case of multiple markets with interdependent demands.

[29] Lerner (1934, p. 171) observed that "the primary unit to which our measure of monopoly applies is the firm in the very shortest period."

conditions and there is no market power. Conversely, as market concentration increases as measured by the HHI, the Lerner index increases from zero and is suggestive of market power. The implicit assumption here, of course, is that the perfectly competitive equilibrium in which $p = mc$ is the appropriate benchmark for analysis.

Rates of return should predictably rise to supra-competitive levels when firms in an industry inefficiently restrict output and exercise market power. Indeed, the direct objective of the exercise of market power is to capture supra-competitive profits; output-restriction and price increases are merely collateral damage. (Indeed, in the case of perfect price discrimination, the exercise of market power results in no output restriction and the marginal price equals the competitive price.) Hence, evidence that firms with market power are consistently outperforming the risk-adjusted return available to similar investments is a necessary implication of output-restricting behavior.

Rates of return are notoriously difficult to measure, however, and this has led economists to a market measure of profitability, q ratios, where q = *Firm Market Value/Replacement Cost of Tangible Capital.* A competitive firm typically exhibits a $q \approx$ 1. When market values rise, relative to the cost of duplicating the physical assets of the firm, the event is signaled by a $q \gg 1$. This captures the expectation of investors that the future flow of profits will be substantially in excess of costs, suggesting that supra-competitive profits are likely. This outcome is suggestive of market power, although the source of the market power may reflect *competition on the merits*.

B. Limitations of Traditional Metrics

Each of the standard approaches to measuring market power harbors serious limitations. Two concerns are generic. The first relates to empirical evaluation. Market shares

depend on the selection of a given scale statistic (e.g., revenues, profits, outputs, etc.) and then on defining the relevant market. Tools are available to assist this pursuit, but judgment calls are necessary to implement them and these are necessarily open to dispute. Similar controversy can compromise other measures.

More deeply, the question of market power, however defined, seeks to answer only a structural question. Even a highly profitable firm in a highly concentrated market may be delivering net benefits to society by developing more efficient products, methods, or business models. There may exist no alternative market structure that would, over time, yield higher welfare. As Joseph Schumpeter eloquently characterized the dynamics of output-expanding firms with market power, "they largely create what they exploit."[30]

In our empirical analysis of broadband market power, we focus on q ratio analysis for three primary reasons. First, the existence of supra-competitive profits is necessary, if insufficient, for the presence of monopoly power. Second, q ratio analysis abstracts from myriad empirical difficulties associated with inferring above-average from average rates of return, including assumptions about the time profile of profits, risk-adjusted discount rates, and depreciation of advertising and other capital inputs. Third, the measure of q is forward-looking, such that current and future profit expectations are incorporated. This tends to reduce discretion over the choice of a time period over which to evaluate market power, and to reflect long-run market dynamics. As share prices reflect expectations as to future prospects for competitive entry, a q ratio substantially exceeding unity is evidence that supra-competitive profits are not simply transitory.[31]

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[30] Schumpeter (1975, p. 101).
[31] A recent paper shows how share prices of public firms reflect such assets such as real options to merge and exploit economies of scale. That q ratios incorporate a large basket of such properties makes them relatively useful tools for interpreting market dynamics. See Roll and Weston (2008).

What is more, given the cost structure of the telecommunications industry as discussed in the previous section, prices set equal to marginal cost would not allow firms to recover their fixed costs and would therefore not be financially viable. Hence, in telecommunications markets, Lerner indices may be quite large when firms are simply recouping competitive returns to capital investment. The q ratio circumvents this problem by taking into account the entirety of the firm's costs over time,[32] essential for a proper understanding of market power. It is possible to reconcile the two concepts formally. A straightforward way to do so is to replace the marginal cost metric in the Lerner index with the corresponding Ramsey price.[33]

C. The Significance of "Competition at the Margin"

The cost structure for wireline broadband providers (i.e., pronounced scale/scope economies) and the corresponding high price-cost margins required for financial viability harbors important implications for competition policy. To wit, price increases that produce even small reductions in quantity demanded can generate large losses in contribution to joint and common costs because the firm's revenues decline much more than the costs it can avoid. The phrase that "competition occurs at the margin" means that it is the marginal customers, those most willing to substitute alternative services in the face of a price increase, who impose pricing discipline on the market provider.

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[32] See Rubinovitz (2009) for a discussion of how to incorporate changes in fixed costs into merger analysis for the purposes of identifying its effects on consumer welfare.

[33] Indeed, we could argue that the deviation of the actual price from the corresponding Ramsey price (rather than marginal cost) is the superior measure of market power. Ramsey prices represent a more general optimum in the sense that they are welfare-maximizing prices subject to a "zero-profit" constraint. See, for example, Tirole (1989, p. 70). Ramsey prices may be characterized formally by $\hat{p} \in argmax \{W(\hat{p})|\Pi \geq 0\}$ where $\hat{p}$ denotes the price vector, the superscript "R" denotes Ramsey, and W represents social welfare.

This observation has special significance for wireline providers because it implies that a relatively small percentage of "marginal customers" willing to discontinue service or switch to alternative service providers in the face of a price increase may sufficient to defeat a price increase—that is, to render such a contemplated price increase unprofitable (Hausman, 2003). Hence, not only are relatively high price-cost margins not dispositive of market power, their existence is a significant deterrent to raising price.

A stylized example may illustrate. Suppose that a broadband supplier provides only broadband and that the ratio of price to avoidable cost for this service is 2. This implies that this firm would not have an incentive to raise the price of broadband by 5% if the corresponding reduction in quantity demanded is at least 10%.[34] Now consider the more realistic scenario in which the broadband firm provides a portfolio of complementary services that includes basic local telephone service, long-distance and vertical features. Under plausible conditions, it can be shown that the broadband provider would not have an incentive to raise price if the corresponding reduction in demand volumes is at least 2.5%.[35] That is to say, even distinctly inelastic firm demand curves can render price increases unprofitable.

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[34] Let r denote the ratio of price to avoidable cost. It is straightforward to show the critical percentage reduction in demand volumes is given by $c^*=[r/(r-1)]\times 5\% = [2/(2-1)]\times 5\%=10\%$. See, for example, Weisman (2006). The higher the ratio of price to avoidable cost, the smaller is the critical reduction in demand volumes necessary to render a contemplated price increase unprofitable, *ceteris paribus*. For example, if the ratio of price to avoidable cost is 5, the broadband provider would not have an incentive to raise price if the expected decrease in demand volumes is $c^*=[5/5-1)] \times 5\% = 6.25\%$.

[35] The critical reduction in demand volumes in the case of a multiproduct firm is given by

$$c^* = \left[\frac{r^i}{r^i-1}\right]\left[1+\sum_{j\neq i}^{N}\frac{(r^j-1)}{r^j}\frac{R^j}{R^i}\varepsilon_d^{ji}\right]\times 5\% = \left[\frac{r^i}{r^i-1}\right][1+k]\times 5\%,$$

where R^i and R^j denote revenues in markets i and j, respectively, and ε_d^{ji} is the cross-elasticity of demand in market j with respect to the price in market i. The variable k is simply a correction factor to account for multi-market provisioning and demand interdependence. Note that when $k = 0$, the critical reduction formula is identical to that in note 34. Hence, when $r = 5$ and $k = -0.6$, which is indicative of net complements, $c^*=[5/5-1)][1-0.6]\times 5\% = 2.5\%$. See Tardiff and Weisman (2009).

To summarize, the higher the price-cost margins required for financial viability and the more pronounced the demand complementarities, the stronger the pricing discipline imposed on the broadband firm. This implies that relatively modest levels of competition, even from "imperfect" substitutes such as wireless, may be sufficient to discourage broadband firms from raising price.

IV. Market Power by the Numbers—Where's The Beef?

A. Historical Developments

Broadband service is provided by Internet Service Providers (ISPs) as a complement to Internet usage, enabling subscribers to access data networks with high-speed links. As the Internet became a commercial, mass market service in the mid-1990s, such connections were developed initially for large enterprises, while residential customers were served only by dial-up. These latter connections used existing telephone wires for data transmissions, a narrowband approach that was cheaply implemented (Faratin, et al., 2007). By 2002, the largest dial-up ISP, AOL, served approximately 34 million household subscribers at a monthly fee of about $20.[36]

Driven by burgeoning demand for network access, both cable TV and telephone networks raced to develop high-speed links that could be supplied using their existing lines. While telcos had initially unveiled such a technology – digital subscriber lines (DSL) – in 1989, cable modems (CMs) were deployed much more aggressively by cable TV operators in the 1999-2002 time period. By the first quarter of 2003, CM subscribers outnumbered DSL households by nearly two-to-one (Hazlett and Caliskan, 2008).

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[36] See Hansen (2003).

This substantial market share advantage for CM over DSL technology may have been driven by regulatory differences. Cable operators were unregulated with respect to their data access offerings; telephone operators faced extensive unbundling obligations. When these latter rules were relaxed, in reforms enacted in early 2003 and mid-2005, the market share advantage among new additions (subscribers gained, quarter over quarter) for cable quickly disappeared. By year-end 2006, DSL subscribership of about 25 million was about 10 million above the pre-deregulation (first quarter 2003) trend, a difference unexplained by overall trends in U.S. or Canadian broadband markets. This suggests that regulatory constraints had a material impact in suppressing DSL and aggregate broadband penetration.

B. Services and Market Shares

CM and DSL dominate broadband competition for U.S. households. As of 1Q2009, the two services accounted for about 69 million subscribers, for an aggregate penetration rate of about 60 percent. CM maintained the largest market share, accounting for nearly 55 percent of the (CM + DSL) total. See Table C1.

TABLE C1. CABLE MODEM AND DSL SUBSCRIBERS, 1Q2009 (LEICHTMAN)[37]

Broadband Internet Provider	Subscribers at the end of 1Q 2009	Net Adds in 1Q 2009	% (CM+DSL)
Cable	37,755,701	837,114	54.5
Phone	31,512,629	775,326	45.5
Total CM+DSL	69,268,330	1,612,440	

Source: LEICHTMAN RESEARCH NOTES 2Q2009, p. 5.

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[37] We use these data, as opposed to the FCC broadband survey, because the Leichtman series is made available more quickly than the FCC data (currently only available through June 2008). The Leichtman data track the top cable and telephone companies, accounting for 94% of the broadband market. Hence, they differ slightly from contemporaneous FCC counts.

Other technologies are also in the mix. By 2005 U.S. mobile operators were selling a significant numbers of high-speed data subscriptions. By June 2008, the FCC counted some 59.7 million such customers. See Table C2. The links these mobile subscribers use are often defined not as broadband, which requires that uplinks as well as downlinks offer a minimum of 200 kbps, but as "high-speed," which requires only the downlink to exceed this level. The growth of such services is impressive, and potentially quite important for competition in the industry. At this point, most observers believe the mobile wireless option, supplied to laptops via plug-in antennae or to smart phones and computers with built-in wireless modems, is largely a complement rather than a substitute for fixed-line services such as CM and DSL. While noting that the same premise falsely led some analysts to assert – as late as 2004[38] – that mobile voice was not a competitor to fixed line voice,[39] we do not take up this question here.

It is also important that one major phone carrier, Verizon, is vigorously pursuing a fiber-to-the-home (FTTH) build-out that brings ultra-high-speed broadband options to some 11.5 million U.S. households with some 3.3. million subscribing (June 2009 data).[40] The ultra high-capacity system delivers up to 50 Mbps to end users.[41] The existence of this market rival is important in several respects, one of which is the visibility it yields in appraising the view that broadband providers enjoy duopoly profits.
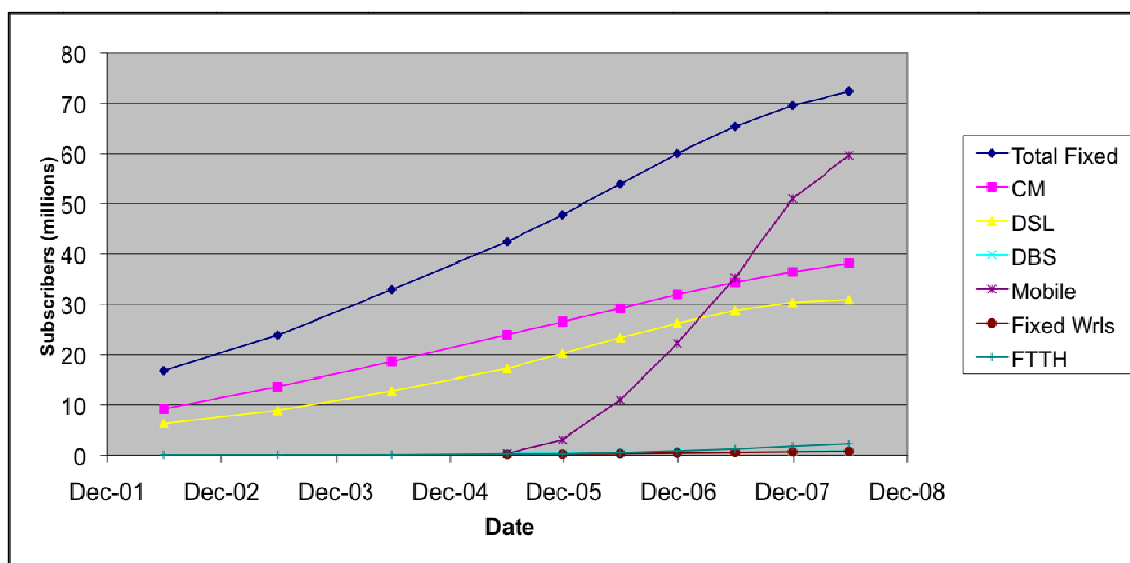
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[38] See Phoenix Center (2004).

[39] It is now indisputable that mobile and fixed voice services compete with one another. See, for example, Mao, Tsai and Chen (2008).

[40] Verizon FiOS website; http://newscenter.verizon.com/kit/fios-symmetrical-internet-service/all-about-fios.html

[41] Ibid.

FIG. 1. HIGH-SPEED ACCESS LINES, 2Q2008

Source: Federal Communications Commission, "High Speed Services for Internet Access as of July 2008" (July 2009), p. 5.

Two competing satellite TV operators connect just under 900,000 subscribers via high-speed data links. See Figure 1. These are better for one-way downloads than for two-way real-time applications – like voice-over-Internet Protocol (VoIP) – in that the satellites using geosynchronous orbits are located over the equator, requiring electronic transmissions to travel far enough that notable latency appears. (Low earth orbit satellites overcome most of this problem, but require greater numbers of vehicles to compensate for their inability to stay at a fixed location high in the sky. This multiplies costs.) Prices are substantially higher than comparable CM or DSL services, and presumably few subscribers are served who have one of these rival technologies available.

Terrestrial fixed wireless accounted for just over 800,000 subscribers as of 2Q2008. Of this total, one firm – Clearwire – served more than 400,000.[42] The remaining

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[42] Clearwire reported 461,000 subscribers in June 2008. News Release, *Clearwire Reports Second Quarter 2009 Results*, BUSINESS WIRE (Aug. 11, 2009). While the company does not break out the number of non-U.S. subscribers included in that total, it is likely to be small; just four markets out of 50 served are outside the U.S.

subscribers were served by a large number of small ISPs, many of which use "free" unlicensed bandwidth. This includes "muni wi-fi" networks organized and, to some degree, supported by local governments. While highly touted as a competitive alternative to CM and DSL services provided by the "telco-cable duopoly," and enjoying abundant new unlicensed spectrum allocations provided by the FCC to promote wireless broadband (Brito, 2007), this business model has yet to gain significant market share, accounting for no more than – in total – about 400,000 subscribers nationwide.

The one emergent player in this space that merits more attention is the afore-mentioned Clearwire. Backed by some of the most powerful players in wireless, including cellular entrepreneur Craig McCaw, Intel, Google, Motorola, and Sprint, Clearwire is rolling out so-called 4G "WiMax" services. This wireless broadband product offers a strong technological rival for 3G/4G services offered by mobile carriers, although the expense and difficulty in building a nationwide network from the ground up is daunting; the companies' shares are off over 75% since the 2007 IPO.[43]

C. Computational Methods

In this inquiry we rely on a simple measure of firm *q-ratio*:

$$q_{it} = EV_{it}/TA_{it},$$

where q_{it} = the *q* ratio of the *ith* firm at time *t*; EV_{it} = Enterprise Value (= market value of equity and debt) for the *ith* firm at time *t*; $TA_{it,}$ = Book Value of total assets of the *ith* firm at time *t*. This is an approximation of the true *q,* which is difficult to ascertain from existing data sources. Of the various proxies available, the basic book value method

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[43] Clearwire shares opened at $27.25 on March 8, 2007, and closed at $6.42 on Nov. 16, 2009. Yahoo!Finance data.

performs reasonably well.[44] Comparing a number of alternative metrics, a recent analysis

concludes that, "until further improvements are made, researchers are just as well off

using a simple measure of q as using a computationally complex measure" (Erickson

and Whited, 2006; p. 28).

We here examine the key market rivals offering broadband service to U.S. residential

customers, focusing on the leading providers of household Internet access. The reason

for this approach is straightforward: the policy argument concerning broadband services

is directed toward consumer, rather than business, services. This presumably stems from

the fact that the dense-demand sub-markets in which most businesses buy broadband

services – downtown business districts – are evidently competitive. Hence, the question

of market power is far more relevant in the residential context.

D. Cable TV

Market power in cable television markets, as evidenced by q ratio data, was observed

for many years. Following federal deregulation of FCC rules that protected off-air TV

broadcasters from competitive entry in video in the 1970s, and then federal pre-emption

of local government rate regulation in the 1984 Cable Act, system values were observed

to increase to a multiple of capital investment costs. In 1990, Paul MacAvoy produced

cable q estimates of between about 4 and 5.   A 1994 analysis by the FCC found average

cable q ratios in the 4 to 6 range. See Table 2. These data led the Commission to state

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[44] Chung and Pruitt (1994) find that our simple approximation is highly correlated with more complicated
measures, such as used in Lindenberg and Ross (1981), which entail far higher data requirements.   Their
definition of "approximate q" is identical to ours: q = (MVE + PS + DEBT)/TA, where MVE = market
value of equity; PS = estimated value of preferred stock; DEBT = estimated value of net firm debt.   We
use Enterprise Value (=MVE + PS + DEBT) because EV data are now publicly available (and reported
daily) on Yahoo!Finance.

"that, overall, cable television operators possess substantial market power" (FCC 1994; par. 212).

	TABLE 2. *q* RATIO ESTIMATES FROM MACAVOY (1989) AND FCC (1994)			
Method	*Sample*	*MacAvoy (1990)*	*FCC (1994)*
Public Market Value Adjusted Book Value	MacAvoy: 5 pure plays FCC: 4 pure plays	4.47	4.30
Public Market Value Adjusted Book Value	2 firms common to both samples	4.52	4.17
Public Market Value Median Construction Cost	MacAvoy: 5 pure plays FCC: 4 pure plays	5.23	4.56
Private Market Value (1993 transactions) Median Construction Cost	"	4.11	6.2
Private Market Value (1993-94 transactions) Median Construction Cost	"	3.95	6.2

Source: FCC (1994), Table 5.2.

Cable TV systems have, however, seen their markets change dramatically over the decade and a half since. Two major shifts are of material interest. First, satellite TV systems initiated in 1994 (DirecTV) and 1996 (EchoStar). After an initial lull when regarded chiefly as rivals in rural areas left unwired by cable systems, it became clear that substantial market share could be taken in wired areas where satellite and cable went head-to-head. By the first quarter of 2009, direct broadcast satellite (DBS) operators served 31.665 million subscribers, as against about 56.955 million cable subscribers.[45] This strong and successful foray into multi-channel video program distribution has substantially altered market structure. It has not only forced greater competition in retail

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[45] Leichtman Research Notes 2Q2009, pp. 4-5.

markets (for subscribers), but forced cable operators to compete more fiercely in input markets (for content), increasing the scope and cost of video programming.

Second, the convergence of telecommunications networks has brought cable operators into direct rivalry with phone carriers. In one respect, this benefits cable system owners, who now provide a richer menu of services. Whereas cable systems traditionally provided only video and telephone companies supplied only voice services, both networks now provide "triple plays" – voice, broadband data, and video.[46] By 2009, cable operators served nearly as many voice and broadband subscribers (about 54 million, combined) as cable TV subscribers (with considerable overlap between the two groups). But while the expansion of products yields incremental revenue, direct rivalry with phone carriers limits profit margins. These structural changes appear to have substantially reduced average cable industry q ratios. See Table 3, which charts values for the three leading cable TV operators, systems accounting for nearly 80% of total U.S. cable subscribers.[47]

Cable q ratios have dropped sharply over the past 15 years, with current values being only about (or below) unity. Inter-modal competition from satellite and telephone operators appears to have more than fully offset the profit advantages of burgeoning economies of scope. The expected profitability of cable TV operators approximates competitive levels.[48] This is seen by taking the subscriber-weighted mean of the three

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[46] Phone company video build-outs are as yet limited, but where carriers lack video delivery facilities they bundle satellite TV services.

[47] The three firms are Comcast, Time Warner Cable, and Cablevision. Time Warner is a pure play cable operator, with Time Warner having spun off its cable operations in 2008. Comcast and Cablevision generate their revenues largely from cable TV distribution services, but also own programming and other assets.

[48] Indeed, average estimated q ratios for competitive firms are expected to be somewhat above unity due to survivor bias. Erickson and Whited (2006, p. 16) estimate, on a sample of U.S. corporations during the 1985-2000, that the average q (using the book value method similar to that employed here) equaled 1.46.

major operators, the unweighted mean, or by focusing on the pure play operator, Time Warner Cable. The implication for broadband market power is clear. Given that bundled supply is, by survivorship, efficient, the inability of cable operators to produce profit expectations above risk-adjusted normal returns suggests an absence of market power as per the self-interested trading activity of investors.

TABLE 3. *q* RATIOS FOR 3 MAJOR U.S. CABLE TV OPERATORS (YEAR-END 2008)		
Comcast		
Subscribers	24,578,030	Comcast Annual Report (2.09.09)
Enterprise Value	$71,490,000,000	Yahoo!Finance (8.17.09)
Total Assets	$113,107,000,000	Comcast Annual Report (2.09.09)
EV/Sub	$2,909	calculated
EV/Sub (pure play)	$2,699	Bernstein & Co. 8.27.09; p. 31)
Book Value/Sub	$4,602	calculated
estimated *q*	0.632	calculated
Time Warner Cable		
Subscribers	14,600,000	Yahoo!Finance (as of Dec. 31, 2008)
Enterprise Value	$34,220,000,000	"
Total Assets	$47,889,000,000	T.W. Cable Annual Report (2.9.09)
EV/Sub	$2,344	calculated
EV/Sub (pure play)	$2,449	Bernstein & Co. (8.27.09; p. 31)
Book Value/Sub	$3,280	calculated
estimated *q*	0.715	calculated
Cablevision		
Subscribers	5,300,000	Cablevision Annual Report (2.26.09)
Enterprise Value	$17,720,000,000	Yahoo!Finance (8.17.09)
Total Assets	$9,937,583,000	Cablevision Annual Report (2.26.09)
EV/Sub	$3,343	calculated
Book Value/Sub	$1,875	calculated
estimated *q* ratio	1.783	calculated
Subscriber-Weighted Average *q*		0.796
Unweighted Avg. *q*		1.043

E. Fixed Telephony

Telephone carriers also bundle telecommunications services, and offer high-speed DSL and FTTH services in competition with cable modem services. Estimated q ratios for these rivals can be calculated by examining three carriers with (in aggregate) dominant shares of the local exchange business: AT&T, Verizon, and Qwest. The largest firms, AT&T and Verizon, own extensive wireless networks which now generate about one-half of company revenues, making a break-down of fixed line assets elusive. Fortunately, Qwest can be easily valued with public data because it does not own extensive wireless assets.[49] Additionally, estimates of the values of asset categories held by AT&T and Verizon are available through the sell-side analyst firm, Bernstein & Co. While book values are not apportioned to wireless v. wireline by Bernstein, we split company-wide total assets by the most recent revenue split. This undercounts fixed line costs, which account for a larger share of network assets than their revenue share, and so biases q estimates upwards.

As seen in Table 4, capital markets do not anticipate that owners of fixed telephone networks will reap supra-competitive returns. This is based on q ratios that average only about 0.6. Interestingly, the highest q ratio is seen for Qwest, a highly troubled firm that narrowly escaped bankruptcy in the 2002-03 period.[50] We suspect that the explanation for this is that the firm has strategically withdrawn from additional capital spending, allowing its network to depreciate. The market approves of this infrastructure-saving approach, which is further evidence that the incremental returns in the sector are below competitive levels.

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[49] It had about 715,000 retail wireless subscribers at year-end 2008, contracting with other carriers to provide service. This business segment should have little impact on company value or on book value of company assets.
[50] See Torode (2002).

This fits with market sentiment. Investors see the telephone business (and its broadband and video products) as requiring heavy, ongoing capital outlays not justified by future cash flows. In a recent report, Bernstein & Co. explains the dismal financial results for AT&T and Verizon, arguing that the trend is not cyclical (related to the 2007-09 recession) but associated with secular decline. There was good news, however, for AT&T in its 2Q2009 results. "If there was a silver lining in this otherwise bleak picture of current results, it is that capital intensity is falling" (Moffett 2009b, p. 22). This was a reference to the fact that quarterly capital spending fell from $5.3 billion (2Q2008) to $3.9 billion (2Q2009).

It is tempting to view the telephone carriers as divesting their outmoded networks, as fixed voice lines decline precipitously and relentlessly. Both firms have seen wireless revenues overtake wireline revenues (although the split is still near 50-50). But either firm is being forced, presumably for competitive reasons, to invest relatively heavily in their *wireline* networks: AT&T is investing 70% of its capital budget into its wired network, while Verizon is investing 61% (Ibid.). Rather than simply letting the fixed network die as traditional lines are lost, the carriers are pumping additional capital expenditures into this infrastructure in order to supply data and video services.

TABLE 4. *q* RATIOS FOR MAJOR U.S. TELCO OPERATORS (YEAR-END 2008)		
Firm	*Value ($)*	*Source*
AT&T		
Wireline Subscribers	30,838,000	Bernstein & Co. (6.4.09)
Enterprise Value	81,885,000,000	Bernstein & Co. (6.4.09)
Total Assets (firm)	265,245,000,000	Annual Report
Total Assets (ex wrls)	131,031,000,000	49.7% of 2008 revenue from wireline (Bernstein & Co. estimate)
EV/Sub	2,655	calculated
Book Value/Sub	4,278	calculated
estimated *q*	0.620	calculated
Verizon		
Wireline Subscribers	20,956,000	Bernstein & Co. (6.4.09)
Enterprise Value	38,053,000,000	Bernstein & Co. (6.4.09)
Total Assets (firm)	202,352,000,000	Annual Report
Total Assets (ex wrls)		49.4% of 2008 revenue from wireline (Bernstein & Co. estimate)
EV/Sub	1,816	calculated
Book Value/Sub	4,773	calculated
estimated *q*	0.380	calculated
Qwest		
Subscribers	11,565,000	Annual Report (2.26.09) (lines)
Enterprise Value	18,950,000,000	Yahoo!Finance (8.18.09)
Total Assets	20,182,000,000	Annual Report (2.26.09)
EV/Sub	1,638	calculated
Book Value/Sub	1,745	calculated
estimated *q* ratio	0.934	calculated
Subscriber-Weighted Average *q*		0.599
Unweighted Avg. *q*		0.647

F. Verizon's FiOS.

A more finely calibrated picture of broadband market profitability emerges from examining new investments being made in the sector. The largest and most strategically important of these is Verizon's current build-out of FiOS, a FTTH network, to pass 18

million homes (about 1/6 of the U.S.),[51] considered a state of the art "next generation network" (NGN).

Profits extracted via such new (marginal) broadband investments reveal key financial dynamics. If the current cable-telco market supports duopolistic profits, the building of a NGN that strengthens that market structure, or eliminates one of the two rivals, should then presumably increase market power and, hence, expected profits of the NGN. The data do not support this interpretation.

The FiOS investment yields benefits to Verizon that include cost savings in operating its existing wireline (telephone) businesses (voice and data), and a platform for the supply of valuable, new services (video).   These gains are distributed across at least three market segments (voice, data, video), and involve gains from sales increases and cost declines. All must be calculated, along with the costs of building and operating the new system, in order to reach plausible estimates of the profits to be realized from achieving ownership of the anticipated "duopoly" or "monopoly" in broadband. Craig Moffett of Bernstein & Co. has broken out the incremental gains to Verizon shareholders associated with these outlays.

As a bundled proposition, Moffett estimates the cost per subscriber (or "connected household") at about $4,000, while estimating the value of a FiOS-connected household at approximately $3,200. These projections include costs and revenues associated with the build-out phase, in which inputs are being purchased and during which subscriber growth occurs gradually, reflecting real-world conditions.[52] The figures represent all

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gains associated with the new FTTH infrastructure for Verizon, including lower operating costs in delivering existing services and incremental revenues achieved by providing higher-quality, higher-speed voice, data, and video products. Indeed, Moffett breaks out the calculations across the three services in the "triple play," finding that investments across each of them produce negative NPV projects. See Table 5.

TABLE 5. BERNSTEIN & CO. ESTIMATES OF VERIZON FIOS NPV			
	Customer Type		
	Voice & Data	*Voice & Video*	*Triple Play*
Costs per Connected Sub ($PV)			
Plant passing	3,049	3,049	3,049
Connection	718	718	718
Subscriber acquisition (after-tax)	100	390	390
Advertising (after-tax)	130	130	130
Total Cost	3,897	3,897	3,897
Returns per Connected Sub ($PV)			
Operating cost savings	572	572	572
Capital cost avoidance	390	390	390
Video service		556	556
Data service	814		814
Voice service	565	565	565
Total Returns	3,068	2,520	3,334
NPV (Returns – Cost)	(830)	(1,377)	(563)
Distribution of customers	.375	.125	.50
Weighted Average NPV/Sub	**(769)**		

Source: Craig Moffett, "Verizon FiOS… Great for Consumers, but What About Investors," Bernstein & Co. (Jan. 14, 2009), p. 30.

A key variable driving profitability is penetration (= subscribers as a proportion of homes passed). The Moffett baseline assumes that Verizon achieves forty percent broadband penetration when each local market system reaches maturity (five years from service initiation), with one-half of these subscribers paying for the entire triple play

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avoided capital spending, amount in aggregate to approximately $3,200 per customer, yielding a *negative* NPV of nearly $800 per subscriber." Moffett (2008), p. 1 (emphasis in original).

(adding fixed voice and video).[53] Marketing data thus far suggest that the 40% goal may prove challenging. In 2Q2009, Verizon FiOS passed 11.5 million homes and served 3.3 million subscribers -- 28.7% penetration.[54] In video, where Verizon is the fourth or fifth entrant into video services (after the local cable operator, DTV and DISH, and, in some markets, a broadband service provider such as RCN), the company is doing nearly as well, however, with a 24.7% penetration rate.[55]

Lower penetration rates raise capital costs per subscriber. Moffett estimates that – excluding subscriber acquisition costs of an estimated $200 per connected household – the $3,767 cost per customer rises to $4,784 if only 30% penetration is achieved. This suggests a risky proposition without much upside: were Verizon's FiOS to achieve a 50% penetration, it would still incur forecast costs of $3,157 per subscriber.   Adding subscriber acquisition costs, this implies that not even a very strong consumer response – higher than evidenced to date – will pull stand alone FiOS investment into positive NPV territory.

The analysis is supported by stock market evidence. The performance of Verizon equity shares, highly correlated with those of SBC/AT&T prior to the announcement and implementation of the FiOS investments, deviates markedly following the initiation of FiOS.   Moffett writes of the conventional wisdom in noting that "the market already knows how bad FiOS, and that damage is…. [I]ndeed Verizon had badly lagged peer AT&T, which has spent more parsimoniously on fiber…."[56]

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[53] Ibid., Table 6.
[54] Verizon FiOS Fact Sheet; http://newscenter.verizon.com/kit/fios-symmetrical-internet-service/all-about-fios.html (visited Nov. 24, 2009).
[55] Ibid.
[56] Moffett (2008), p. 31.

This raises the question: why does Verizon pursue a negative NPV strategy? Clearly, firm management sees the value proposition differently than the median investor trading Verizon shares.[57] Managerial perspective may be focused on two sets of possible payoffs.

One is that the market currently under-estimates the revenue potential of services supplied by FiOS. If NGNs trigger a wave of new applications that drive customer demand for ultra-high-speed broadband, having sunk assets to create the FiOS infrastructure will permit Verizon to emerge with competitive superiority in the broadband market. In this scenario, the FiOS project yields visible gains that can today be capitalized, but also yields real options that are difficult to price.[58] Under Moffett's analysis, FiOS investments become NPV positive at retail broadband prices 40% higher than anticipated today. Verizon cannot maintain an assumed 57% market share in fixed household broadband services and simultaneously increase prices by such an amount (Moffett 2008).

Second, Verizon managers may see the company's future without FiOS as worse than do investors, and the seemingly negative NPV project is undertaken to avert further displacement of the wireline network. In this view, the FiOS outlays are taken to avert a much more severe loss not entirely incorporated into share prices prior to the FiOS announcements. More aggressive assumptions concerning fixed line losses in the

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[57] Technological forecasting is notoriously difficult and prone to errors of significant magnitude. A case in point is that of cellular service in the United States. As part of the divestiture of the Bell System, AT&T agreed to have its newly developed cellular business assigned to the Bell Operating Companies under the belief that cellular telephony would remain a minor supplement to the basic wireline service, growing to no more than a million U.S. subscribers. See Cauley (2005, pp. 36-37).

[58] Option pricing formulas rely on historical price variance; disruptive technologies emerge without such statistical data. This, of course, makes entrepreneurship an art, not a science. On the general issue, see the colorful description given in Taleb (2007).

absence of FiOS raise FiOS NPV estimates.[59] This explanation also provides some insight on the divergence in perspectives between insiders and the market. Corporate management would not be disposed to stress the bleak future of their internal projections in public announcements, but would logically strive to strategically avert them. Market investors might have taken the FiOS announcements as profit-reducing on their own, or as a signal of the bleak alternative (no FiOS) alternative seen by firm managers.[60] Either reaction, or both together, are consistent with the share price reduction observed.

V. Conclusion

The consensus among economists is that dynamic efficiencies tend to dominate static efficiencies in generating consumer benefits. Such considerations are likely to be particularly important in technologically dynamic industries. The U.S. telecommunications regulator has itself concurred, resisting policies to regulate the industry. In this context, the FCC strongly resisted pleas to impose "open access" regulation on cable TV operators offering cable modem services (Lemley and Lessig 2001; Lessig 2001), made in the early days of the broadband era. In rejecting such petition, Chairman William Kennard stated;

> The fact is that we don't have a duopoly in broadband. We don't even have a monopoly in broadband. We have a "no-opoly." The bottom line is that, most Americans don't even have broadband.

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[59] "[T]here is an alternative interpretation that would justify the FiOS build-out: that access line and DSL subscriber declines will be so severe and enduring that the 'base case' scenarios that we have outlined above are far too optimistic. In other words, a greater percentage of FiOS revenue is truly incremental…" Ibid.

[60] "So slice it anyway you like -- fiber to the home is damned expensive. And the payback takes years, maybe decades. But without a next-generation access network, carriers simply won't have a business." See Harvey (2006).

So how do we get Americans broadband pipes? The answer lies in the history that I just laid out for you: by letting a competitive marketplace thrive. [61]

The Commission followed up that decision (leaving cable modems unregulated) with reforms removing the asymmetric network sharing mandates then in place for telecommunications carriers. By 2005, DSL and fiber-to-the-home services were essentially unregulated, achieving legal parity with cable. The pronounced spurt in DSL subscriber growth relative to cable modem sales following deregulation (Hazlett and Caliskan 2008) empirically supports Kennard's dynamic view of the technology adoption process.

Now that the market has matured, and such pro-growth policies have been proven successful, it is ironic that policy discussion reverts to the dialogue of a decade ago. But now, with the emergent growth of two U.S. fixed line rivals, the evidence – at first blush – appears self-evident: market power is being exercised by head-to-head duopolists. Regulatory interventions at multiple levels are being recommended for the per se non-competitiveness of the market (Wu 2006; Berkman 2009).

The policy approach is faulty on at least two fundamental grounds. First, the burden cannot be on the market to perform according to textbook renditions of atomistic concentration. The burden is properly placed on the ability of new regulatory mandates to establish that the proffered reforms will, on net and counting all costs, benefits, and risks, be pro-consumer. Second, the equilibrium represented in a small numbers competition can be efficient, reflecting economies that deliver social benefits. Indeed, the lack of atomistic competition in the marketplace is decidedly a result of this general

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[61] Remarks by FCC Chairman William E. Kennard Before the Federal Communications Bar Northern California Chapter, San Francisco, CA, July 20, 1999.

condition. Hence, an investigation into the market power actually exercised by incumbent players, who would be constrained by new regulations, is an essential element of the argument for new rules.

This paper has focused on the latter of these questions. We find no credible basis to believe that broadband providers, despite their relatively few numbers, are currently exercising market power. This is clear from focusing on the key metrics of profitability and market value, as opposed to the more arbitrary and less dynamically relevant measures of market share or operating margin.

The absence of market power, as measured by q ratios that are consistently less than one, is a two-edged sword. From a static efficiency (market power) perspective, it may well suggest that there is no credible basis for government intervention in the form of price regulation or more intrusive unbundling obligations. From a dynamic efficiency (investment) perspective, the concern would be that investors are not particularly bullish on this sector and hence the prospects for continued, robust investment are not particularly promising. This begs the question of what role, if any, the government can be expected to play in stimulating investment in a sector it deems critical for economic growth and international competitiveness.

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