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Access to Networks: Economic and Constitutional Connections

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Abstract

A fundamental transformation is taking place in the basic approach to regulating network industries. Policy makers are in the process of abandoning their century-old commitment to rate regulation in favor of a new regulatory approach known as access regulation. Rather than controlling the price of outputs, the new approach focuses on compelling access to and mandating the price of inputs. Unfortunately, this shift in regulatory policy has not been met with an accompanying shift in the manner in which regulatory authorities regulate prices. Specifically, policy makers have continued to base rates on either historical or replacement cost. We argue that courts and policy makers have largely ignored the fact that this fundamental shift in regulatory approach demands an equally fundamental shift in the approach to setting prices. Economic theory suggests that regulatory authorities should base access prices on market prices. In addition, because compelled access to most telecommunications networks requires that competitors be permitted to place equipment on the network owner's property, access requirements constitute physical takings for which market-based compensation must be paid. Although the unavailability of market-based determinants once justified basing prices on some measure of cost, the shift in regulatory policy (especially when combined with the emergence of direct, facilities-based competition made possible by technological convergence) has caused the justifications for refusing to set rates on the basis of market prices to fall away. We then use these insights to analyze access pricing with respect to three emerging regulatory issues: (1) access to unbundled network elements mandated by the Telecommunications Act of 1996, (2) the access to utility poles compelled by the 19996 amendments to the Pole Attachments Act, and (3) open access to digital subscriber line (DSL) and cable modem networks providing high-speed broadband services.

A fundamental transformation is taking place in the basic approach to regulating network industries. Policy makers are in the process of abandoning their century-old commitment to *rate regulation* in favor of a new regulatory approach known as *access regulation*. Rather than controlling the price of *outputs*, the new approach focuses on compelling access to and mandating the price of *inputs*. Unfortunately, this shift in regulatory policy has not been met with an accompanying shift in the manner in which regulatory authorities regulate prices. Specifically, policy makers have continued to base rates on either historical or replacement cost.

We argue that courts and policy makers have largely ignored the fact that this fundamental shift in regulatory approach demands an equally fundamental shift in the approach to setting prices. Economic theory suggests that regulatory authorities should base access prices on market prices. In addition, because compelled access to most telecommunications networks requires that competitors be permitted to place equipment on the network owner's property, access requirements constitute physical takings for which market-based compensation must be paid. Although the unavailability of market-based determinants once justified basing prices on some measure of cost, the shift in regulatory policy (especially when combined with the emergence of direct, facilities-based competition made possible by technological convergence) has caused the justifications for refusing to set rates on the basis of market prices to fall away.

We then use these insights to analyze access pricing with respect to three emerging regulatory issues: (1) access to unbundled network elements mandated by the Telecommunications Act of 1996, (2) the access to utility poles compelled by the 19996 amendments to the Pole Attachments Act, and (3) open access to digital subscriber line (DSL) and cable modem networks providing high-speed broadband services.

ACCESS TO NETWORKS: ECONOMIC AND CONSTITUTIONAL CONNECTIONS

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Access is becoming a potent conceptual tool for rethinking our world view as well as our economic view, making it the single most powerful metaphor of the coming age.

Jeremy Rivkin[1]

INTRODUCTION

One of the most striking economic developments of the last decade has been the growing importance of telecommunications networks. Scientific breakthroughs have allowed the information and communications sectors to explode to the point where they now comprise more than eight percent of the nation's total economic production[2] and have been responsible for a disproportionate share of the country's overall economic growth over the past several years, having expanded at roughly twenty percent each year, a rate more than five times faster than the economy as a whole.[3] Telecommunications companies have also played a starring role in a significant number of the recent megamergers that have transformed the business environment, with six of the ten largest mergers in history involving telecommunications-related companies,[4] and also served as the driving force

[1] JEREMY RIVKIN, THE AGE OF ACCESS 15 (2000).

[2] U.S. DEPT. OF COMMERCE, ECONOMICS AND STATISTICS ADMINISTRATION, DIGITAL ECONOMY 2002, at 26 (Feb. 2002), *at* http://www.esa.doc.gov/508/esa/pdf/DE2002r1.pdf.

[3] *Id*. at 25, 27 tbl.3.4 (reporting that the information technology sector has been responsible for between twenty-five and thirty-two percent of annual GDP growth between 1996 and 2000).

[4] The top ten mergers in world history include Mannesman-Vodafone (no. 1, $184 billion), America Online-Time Warner (no. 2, $150 billion), SBC-Ameritech (no. 5, $63 billion), AT&T-MediaOne (no. 7, $61 billion), Vodafone-AirTouch (no. 8, $60 billion), AT&T-TCI (no. 9, $54 billion), and Deutche Telecom-VoiceStream Wireless (no. 10, $50 billion). Other significant telecommunications-related mergers include Bell Atlantic-GTE ($49 billion), as well as the failed merger between WorldCom and

behind the spectacular rise and equally spectacular fall of the NASDAQ index. The increase in the importance of the telecommunications sector has been matched by an increase in its volatility. Perhaps most dramatically, the failure of WorldCom has produced the largest bankruptcy in U.S. history. As FCC Chairman Michael Powell has noted, these developments have left the telecommunications industry in a state of "utter crisis," with banks worldwide contemplating industry write-offs of up to half a trillion dollars and telecom operators and vendors in the U.S. laying off half a million workers in the space of a year and a half.[5]

The importance and the instability of the telecommunications sector have only served to heighten the importance of understanding how this sector is regulated. Not only does government policy play a key role in shaping returns and investment incentives, a growing number of commentators have suggested that regulation has played a decisive role in precipitating much of the turmoil that has wracked the industry of late, having shaped both the recent wave of mergers[6] and the WorldCom bankruptcy.[7] The direct linkage between regulation and industry performance has made understanding the economic implications of current regulatory policy all the more imperative.

For more than a century, telecommunications regulation was marked by a remarkable degree of segmentation and invariability. Since each communications service was available only through a single technology, each medium of communications could be governed by its own, discrete regulatory system that did not have to take into account the impact of other technologies. In addition, because policy makers tended to regard each medium as a natural monopoly, their basic approach was to subject telecommunications networks to the now-classic regime of common carriage regulation, in which state and federal regulatory authorities imposed nondiscrimination and mandatory service requirements, monitored quality, supervised investments, and restricted competitive entry. Most importantly, this approach focused on the rates that telecommunications providers could charge end users for purchasing *outputs*. The primary policy issue centered on whether such rates should be based on historical cost or replacement cost.[8]

Two forces have emerged that have begun to destabilize this century-old regulatory consensus. The first force is technological. It follows from the

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Sprint ($120 billion). Houlihan Lokey Howard & Zukin, Inc., *100 Largest Announcements in History*, MERGERSTAT REV. (Jan. 2000) (available on Lexis).

[5] *Too Many Debts; Too Few Calls*, ECONOMIST, July 20, 2002, at 59.

[6] *See* Jim Chen, *The Magnificent Seven: American Telephony's Deregulatory Shootout*, 50 HASTINGS L.J. 1503 (1999).

[7] For example, noted telecommunications expert Peter Huber has argued that "Washington created WorldCom" on the grounds that "[m]uch of the telecom industry's current woes can be traced to government accountants who set interconnection tariffs at levels completely divorced from economic reality." Peter Huber, *Washington Created WorldCom*, WALL ST. J., July 1, 2002, at A14. *See generally* PETER HUBER, LAW AND DISORDER IN CYBERSPACE (1997).

[8] *See infra* notes 41-56 and accompanying text.

fact that scientific advances are rendering different communications media increasingly interchangeable. Not only has technological convergence provided consumers and firms a dazzling variety of ways to access network services, it has begun to put pressure on the historical regulatory distinction among voice, video, and data communications, in which each type of service was governed by a separate regulatory regime.[9]

The second driving force is the fundamental shift in regulatory approach exemplified by the enactment of the Telecommunications Act of 1996.[10] The heart of the 1996 Act is designed to introduce competition into local telephone service by compelling every incumbent local telephone company to interconnect with its competitors on reasonable and nondiscriminatory terms and to provide them with unbundled access to every element of its network.[11] Initially hailed as a major deregulatory change,[12] it has become increasingly apparent that, rather than representing a shift towards deregulation, the 1996 Act marked a shift towards a different style of regulation known as "access regulation." Rather than regulating the terms under which consumers purchase *outputs*, access regulation instead regulates the ability of competitors to obtain access to *inputs*. A recent study revealed that the 1996 Act is part of a broader shift in regulatory philosophy that spans at least six network industries.[13] As the author of the quote that opens this Article aptly acknowledges, we do indeed live in "the Age of Access."[14]

These two forces have economic and constitutional implications that should fundamentally transform the manner in which policy makers approach network industries. Somewhat surprisingly, however, regulatory authorities have failed to take into account the full ramifications of convergence and the shift to compelled access and have instead reflexively adhered to the cost-based approaches associated with traditional rate regulation without adequately considering whether the shift to compelled access as the primary regulatory approach requires an equally fundamental change in the means of implementation. Because of the protracted nature of the legal proceedings regarding the implementation of compelled access, these issues have not yet been fully addressed by the courts, with the Supreme Court's recent decisions in *Verizon Communications, Inc. v. FCC*[15]

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[9] *See* Christopher S. Yoo, *Vertical Integration and Media Regulation in the New Economy*, 19 YALE J. ON REG. 171, 284-89 (2002).

[10] Pub. L. No. 104-104, 110 Stat. 56.

[11] *See* 47 U.S.C. §§ 251(c)(2)-(3).

[12] *See, e.g.*, Statement by President William J. Clinton Upon Signing S. 652, 1996 U.S.C.C.A.N. 228-1, 228-4 (praising the Act for "providing a roadmap for deregulation in the future"); *Congress Maps a Telecom Future*, CHI. TRIB., Feb. 6, 1996, at 14 (calling the overall thrust of the Act "clearly deregulatory and pro-competitive").

[13] Joseph D. Kearney & Thomas W. Merrill, *The Grand Transformation of Regulated Industries Law*, 98 COLUM. L. REV. 1323, 1340-57, 1364-83 (1998).

[14] *See* RIVKIN, *supra* note 1.

[15] 122 S. Ct. 1646 (2002).

and *National Cable and Telecommunications Ass'n v. FCC*[16] representing only a few rounds of what will undoubtedly be a protracted series of major court decisions addressing these issues.

The debates about access to telecommunication networks have been further obscured by academic writings that have made networks seem like increasingly complex and exotic phenomena. Many of the basic concepts about networks remain poorly defined and misunderstood. In addition, networks tend to be characterized by sunk costs as well as economies of scale and scope that many theorists mistakenly believe distinguish the economic analysis of networks from other forms of production. A burgeoning literature argues that networks are susceptible to unique types of market failures, so-called network externalities, which in turn require regulators to intervene in ways not required in other industries.

This argument advanced in this Article is designed to place the issues surrounding access pricing on a sounder economic and legal foundation that takes into account the full import of the recent changes in technology and regulatory theory. Part I demystifies networks as an economic phenomenon by offering a more precise definition of what constitutes network access. As we will explain in greater detail later, network access is properly viewed as third-party use of the transmission services provided through the network. Basic economic theory indicates that efficiency would best be promoted if access to those network services were based on their market value. Reliance on market-based pricing mechanisms tends not only to allocate goods to their highest and best use; it also provides the proper signals to parties who are thinking about investing in network technologies.

Rather than basing access prices on the market value of the network services provided, regulators are currently employing access pricing methodologies that focus instead on the cost of the inputs used to establish the physical network. For the reasons we further explain in Part I, we find this approach to be quite problematic. It is true that in a static world, the costs of production would represent a good approximation of the earning potential and thus the market value of those inputs. In a dynamic world, however, improvements in production technology, innovations in goods and services, shifts in consumer demand, entry and exit of producers, and changes in factor prices can cause the cost of inputs to deviate from their market value. The greater the rate of change of technology and other forces, the greater this disparity is likely to be. Given the unpredictability of such changes, the deviations from market value caused by basing access prices on the cost of the inputs used to create the network will tend to lead to gluts or shortages and will eventually induce entrants to over- or under-invest in certain types of network capacity. Furthermore, basing access prices on input costs ignores the fact that the whole is typically greater than the sum of

[16] 122 S. Ct. 782 (2002).

its parts. So long as a firm is efficient and creative, the value of the services provided by the firm is likely to exceed the cost of the inputs it uses.

The only plausible justification for basing regulated prices on cost in the past was that the fact that the absence of external markets caused by the lack of technological substitutes made it impossible to base rates on market prices. By stimulating direct facilities-based competition, the two forces that we have identified (technological convergence and the shift to access regulation) have made market-based pricing both feasible and desirable. Part I closes by refuting arguments advanced by other scholars suggesting that network industries are somehow prone to unique forms of market failure that would justify adhering to cost-based pricing. Our analysis shows that economies of scale and scope, sunk costs and network economic effects do not generally cause market prices to deviate from levels that promote efficiency and do not change the basic analysis.

Part II describes the constitutional implications of the transformations we have identified by evaluating the limits that the Takings Clause places on the regulation of access pricing. Because rate regulation simply limits the terms of the contracts for finished goods and services, it represents the type of "adjustment of economic burdens"[17] traditionally subject to the more permissive analysis applied to nonpossessory takings. Access regulation, in contrast, typically requires network owners to permit third parties to place equipment on their property. As a result, access regulation necessarily falls within the Supreme Court's physical takings jurisprudence, which mandates that the government reimburse property owners for the market value of their property without regard to the economic impact of the regulation or whether the regulation in question furthers important public interests.[18] Therefore, just compensation for compelled access exactly corresponds to the economically efficient prices for compelled access.

Part III applies the analytical framework developed in the preceding sections to three emerging policy problems: (1) unbundled access to elements of local telephone networks that underlay the Supreme Court's recent decision in *Verizon Communications, Inc. v. FCC*; (2) access to networks of utility poles that formed the basis for the Court's decision last Term in *National Cable & Telecommunications Ass'n v. Gulf Power Co.*; and (3) open access to high speed broadband systems, encompassing both cable modem systems and DSL systems, that represents the focus of two ongoing proceedings before the FCC.[19] We conclude that the steps taken to implement each of these access regimes violates the economic and constitutional principles that we have identified. Established principles of

[17] Penn Cent. Transp. Co. v. City of N.Y., 438 U.S. 104 (1978).
[18] *See, e.g.*, Loretto v. Teleprompter Manhattan CATV Corp., 458 U.S. 419 (1982).
[19] *See infra* notes 512-515, 535-539 and accompanying text.

economics and constitutional law instead require that regulators adopt methodologies that base access rates on market prices.

I. EFFICIENT PRICING OF ACCESS TO NETWORKS

This Part focuses on removing some of the perceived mystery surrounding the economics of network access. It begins in Section A by offering a definition of what constitutes a network and access to a network. Section B lays out the basic case for basing access rates on market pricing. Section C discusses the various methodologies for determining market prices. Section D offers a review of the various features of networks that have led some commentators to suggest that reliance on market prices in network industries might not constitute the best way to promote economic efficiency.

In short, conventional economic principles dictate that access prices should be based on the market value of the relevant input. Although the absence of comparable transactions in external markets has historically led regulatory authorities to eschew market-based pricing in favor of cost-based pricing, technological convergence and the shift to access regulation have drained this justification of its vitality. The emergence of direct facilities-based competition from alternative telecommunications networks has created market-based benchmarks that can serve as independent bases for setting rates. Contrary to the suggestion of some commentators, distinctive economic features of networks such as sunk costs, economies of scale and scope, and network economic effects, do not alter this core conclusion.

A. Defining Access to Networks

At its most basic level, a *network* is a system of nodes and links between them. The nodes of a traditional telecommunications network are the company's switches and customer premises connections, while the links are the wires. For a wireless network, the nodes are the receivers, transmitters, and the links are the radio spectrum. Networks have many different configurations. A star-shaped network is a simple configuration in which there is a single hub and all lines are spokes. Hub-and-spoke networks have multiple hubs with high-capacity trunk lines connecting the main hubs and lower-capacity spokes reaching terminal points. The high-capacity trunk lines aggregate traffic and offer cost economies in comparison to a network that provides connections between every individual point. Telecommunications networks have high-capacity trunks or backbones and lower-capacity distribution lines such as the local loop to the individual home or business. Economic life is critically dependent on many types of privately owned networks: for communications (broadcast television and radio, cable television, telephone, broadband data, utility poles), for energy

(electric power transmission and distribution, natural gas and petroleum pipelines), for transportation (airlines, railroads, bus and trucks, shipping), and for distribution systems (postal services, product wholesale services).

The type of networks on which we are focusing generally are *physical production facilities* that encompass factors of production such as land, capital equipment, and technology.[20] Construction of these facilities necessarily requires network owners to invest in substantial fixed assets that should be viewed in the same way as other types of capital equipment, such as manufacturing plants, office buildings, and commercial structures. Like other long-term assets the network's physical production facilities do not vary directly with output in the short-term. Like other capital investments, the configuration of the network's physical assets cannot be changed in the short-term. Given sufficient time, however, the network's capital equipment is variable and can be adjusted to create different capacity levels. The operation of a network's facilities often requires variable inputs as well, such as the labor used to maintain its facilities and to monitor its operations.

In combination, these productive inputs that constitute the network are used to create a stream of *services* that are the outputs of the network, such as the transmission and distribution of communications. Just as natural gas transmission does not consume the physical pipeline, usage of a telecommunications network does not consume the network itself but instead only temporarily precludes the use of the network for providing services to some other user. Of course, network use does impose some wear and tear on the network's physical production facilities. The measures of depreciation employed under generally accepted accounting principles do not provide an accurate indication of the value of the services provided by the equipment, however. As a result, the applicable depreciation rules typically do not provide an accurate reflection of the economic life of the equipment.

Access to a network refers to the usage of the network's services, which are the outputs of the network.[21] Thus, access to a network does not represent simply a physical connection to the network, which is but a means to an end. Rather, access refers to the opportunity to benefit from the services generated by the usage of the network. Since usage of network elements by another company potentially reduces the services that the

[20] Our focus is on physical facilities in transportation, energy, and communications networks. We do not consider other usages of the term networks that refer to interconnected relationships between people such as social or business relationships.

[21] Although more general definitions of "access" exist, they seem too broad to provide guidance for pricing access to network. *See, e.g.*, BLACK'S LAW DICTIONARY 13 (6th ed., 1990) (defining access as "an opportunity or ability to enter, approach, pass to and from, or communicate with"); OXFORD ENGLISH DICTIONARY (defining the noun, access, as a "way or means of approach" such as "entrance, channel, passage, or doorway" or the action of "coming to or towards; approaching," and identifies the verb, "to access," as "to gain access to (data, etc., held in a computer or computer-based system, or the system itself)"). We do not consider the notion of access as an entitlement, as is the case with access to facilities under the Americans with Disabilities Act, or access to education or housing under antidiscrimination statutes.

network owner can provide, the correct price of access depends on what the company could have obtained by using those network services itself or by selling network services to some other party. The proper measure of the value of network access is thus the value of the network services provided, which in turn is determined by the value of the final output of the network.

B. Making the Economic Case for Market-Based Pricing of Network Access

1. Market Prices, Regulated Prices, and Efficiency

The modern consensus economic position is that market prices represent the best reflection of value. The market price is the outcome of the forces of supply and demand. The supply side of the market reflects the costs to sellers of providing a good. The demand side of the market reflects the benefits to buyers from consuming the good. At market equilibrium, prices are thus determined by the *marginal* cost to sellers of providing the good and the *marginal* benefit to buyers of consuming the good. Prices are adjusted through the process of exchange to balance supply and demand and clear the market so that prices are further reflections of scarcity—the meeting of consumer wants and supplier capacities.[22]

Because the services of a network are comparable to the output of any other type of production facility, they can be allocated by market processes. Markets refer to the interaction of buyers and sellers,[23] with market prices mediating between what buyers are willing to pay and what sellers are willing to accept. Market prices are determined through the activities of suppliers, customers and intermediaries such as retailers and wholesalers. In the short run, producers increase prices when demand exceeds supply and lower prices when supply exceeds demand. In the long run, suppliers make production decisions based on the incentives provided by the prices of goods in comparison with costs and the prices of alternative goods the supplier might provide. Firms that supply a good at some price are those whose cost of each unit provided and the cost at the margin (the last unit provided) equal or exceed the market price. Conversely, consumers make purchasing

[22] The determination of market equilibrium prices and of value by the interaction supply and demand, at least in the short run, were well understood by the classical economists, including Adam Smith and David Ricardo. The classical economists had various cost-based explanations for the determination of the long-run prices of land, labor, and capital. Beginning in the Nineteenth Century, the marginalist revolution that led to the neoclassical economies of today extended the supply and demand analysis consistently to output and input markets both in the short and long run. *See* WILLIAM STANLEY JEVONS, THE THEORY OF POLITICAL ECONOMY (London MacMillan 1871); CARL MENGER, PRINCIPLES OF ECONOMICS 119 (James Dingwall & Bert Hoselitz trans., 1950) (1871); LEON WALRAS, ELEMENTS OF PURE ECONOMICS (William Jaffé trans., Richard D. Irwin, Inc. 1954) (1874); ALFRED MARSHALL, PRINCIPLES OF ECONOMICS (London, MacMillan 1890). *See generally* MARK BLAUG, ECONOMIC THEORY IN RETROSPECT 302 (1968).

[23] On the role of intermediaries in market allocation mechanisms, see DANIEL F. SPULBER, MARKET MICROSTRUCTURE: INTERMEDIARIES AND THE THEORY OF THE FIRM (1999).

decisions based on the benefits that they derive from that good and the availability of substitute goods. The consumers that purchase a good at some price are those whose benefits of each unit consumed at the margin (the last unit consumed) equal or exceed the market price. The price will eventually adjust until the market clears, at which point supply and demand will be in balance and the benefits to consumers will equal or exceed the costs to suppliers. The market price equals the marginal benefit of the good and thus indicates its economic value.

Markets are effective mechanisms for pricing not only physical products such as automobiles and food but also services such as transportation or restaurant services. Many types of services are routinely purchased and sold. For example, video rental stores supply their customers with entertainment services corresponding to viewing a movie at home. Movie theaters provide similar entertainment services that require viewing the movie at the theater. Automobile renting and leasing supplies customers with the transportation services of a vehicle. There is no distinction in economic theory between the market allocation of physical products and the market allocation of services. Accordingly, markets can allocate services that are generated by networks just as they do any other type of physical product or service.

Market prices promote *allocative* and *dynamic* efficiency. Allocation of goods is said to be efficient when the purchasers of a particular good are those who obtain the greatest benefit from consumption and when the suppliers of the good are those who incur the lowest cost of production. By allocating the good or service to the person or firm willing to pay the most for it, the price mechanism also ensures that goods and services are placed in the hands of those able to put them to their best use. The price mechanism further insures that goods and services are provided by the most efficient suppliers.

Dynamic efficiency is attained when economic actors make efficient investment decisions. Investment decisions are efficient when the present discounted value of the marginal returns to invest equal the marginal cost of investment. Market prices provide incentives for efficient investment decisions because the market prices of services created by capital facilities are the best measure of the marginal benefit derived by users of those services. A firm deciding whether or not to invest in production facilities to produce a good or service makes efficient decisions by considering the market value of the products and services to be created with those facilities in comparison with the cost of investment. A firm choosing whether to purchase a good or service or to construct its own production facilities makes efficient decisions by comparing the market price of purchasing the good or service with the investment costs of constructing its own facilities and the costs of operating those facilities. Because market prices allocate productive capacity efficiently, signaling marginal benefits and marginal cost, they provide an accurate guide for investment decisions.

Regulated prices based on costs tend not to represent an accurate reflection of either the value of a good or services or the economic costs of producing the service. This is because regulatory authorities are less effective at processing information about costs and benefits than are the many buyers and sellers that make up a market.[24] Even worse, the government typically must rely on the regulated entities, which of course have a vested interest in the outcome, for much of the critical information.

As a result, it is not uncommon for regulated prices to cause allocative inefficiency. To the extent that the regulated price deviates from the market price, it sends incorrect signals to both users and suppliers of access. For example, regulation that compels access to networks at regulated prices that fall below market rates in effect requires network owners to subsidize competitors. This in turn leads those competitors to demand more network capacity than would be allocatively efficient. In addition, because access is an input used in the production of other goods and services, pricing it below market rates can cause competitors to make inefficient decisions about which markets to enter, since below-market pricing may mislead competitors into believing that the benefits of serving a particular market exceed the costs by understating the true economic costs associated with entering that market. In addition, the artificial reduction in input prices will cause secondary distortions. If regulators set the price of network access below market levels, competitors will naturally adjust the mix of inputs so that they employ reduced quantities of other inputs and greater quantities of network access. The result not only creates allocative inefficiency in the primary market by stimulating excess demand for network access; it also creates secondary distortions in the markets for the other inputs by increasing or reducing demand for those inputs. To the extent that the suppliers of access are regulated utilities, the burden will be borne by customers as well as the utilities.

In addition to impeding allocative efficiency, imposition of regulated pricing can also impede dynamic efficiency. Pricing access at below-market levels discourages existing network owners from investing in additional network capacity. At the same time, it also discourages competing companies from investing in alternative capacity, including substitute network technologies. This effect underscores the extent to which access requirements represent something of a policy anomaly.[25] The central focus of competition policy is to prevent monopolies from emerging and to break them up whenever they occur. Access requirements, in contrast, leave the bottlenecks in place and instead simply require the monopolist to share its facilities. In addition, by rescuing competing firms from having to supply

[24] See FRIEDRICH A. HAYEK, THE FATAL CONCEIT (W.W. Bartley III ed., 1988); Friedrich A. Hayek, *The Use of Knowledge in Society*, 35 AM. ECON. REV. 519 (1945).

[25] *See* Yoo, *supra* note 9, at 246-47, 269.

the relevant input for themselves, compelled access destroys their incentives to invest in alternative network technologies and thus deprives providers of emerging substitute technologies of their natural strategic partners. As a result, compelled access can have the perverse effect of entrenching any supposed bottleneck facility by forestalling the emergence of the alternative facilities. This is particularly problematic in technologically dynamic industries, in which the prospects of developing new ways either to circumvent or to compete directly with the alleged bottleneck are the highest.

Finally, there is good reason to question the extent to which ratemaking authorities will in fact make the pursuit of economic efficiency their primary goal. As the burgeoning literature on public choice has demonstrated, governmental institutions are subject to a wide variety of pressures that can cause them to redirect competition policy towards noneconomic ends.[26] The system of cross subsidies in telephone pricing provides an apt illustration of how governmentally established pricing can be directed towards political and social goals and thus provide an imperfect guide for allocation of goods and services or for investment decisions. A review of the FCC's previous attempts to use access requirements to promote competition provides little basis for optimism in this regard.[27]

The end result is similar to any system of rent controls, with demand for the service exceeding supply at the regulated price. Prices do not fully serve their function of rationing capacity among users and stimulating the provision of capacity among suppliers. Market prices, in contrast, send correct signals to companies that seek access as well as to utilities that provide access. Competing companies will have incentives to make economically correct decisions about the amount of services to obtain from the network access supplier and the extent to which the competing company should invest in its own network services.

2. The Difference Between Market Prices and Unit Costs

As the foregoing discussion demonstrates, the market price of a good is the best indication of its value. The market price of a good can differ from the costs incurred in obtaining the inputs used to produce the good. This is because there are many types of forces that affect market prices through changes in demand and supply. New methods of production that increase

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[26] *See, e.g.*, ROBERT H. BORK, THE ANTITRUST PARADOX 347-64 (1978); Fred S. McChesney, *Be True to Your School: Chicago's Contradictory Views of Antitrust and Regulation*, *in* THE CAUSES AND CONSEQUENCES OF ANTITRUST 323 (Fred S. McChesney & William F. Shughart II eds., 1995); William J. Baumol & Janusz Ordover, *Use of Antitrust to Subvert Competition*, 28 J.L. & ECON. 247, 256-59 (1985); Sam Peltzman, *Toward a More General Theory of Regulation*, 19 J.L. & ECON. 211 (1976); Richard A. Posner, *Natural Monopoly and Its Regulation*, 21 STAN. L. REV. 548, 622 (1969); George Stigler, *The Theory of Economic Regulation* 2 BELL J. ECON. 3 (1971).

[27] *See* Donna M. Lampert, *Cable Television: Does Leased Access Mean Least Access?*, 44 FED. COMM. L.J. 245 (1992).

efficiency are likely to increase supply at any given price. Changes in the relative prices of inputs, including finance capital, wages, land rents, and the prices parts and components have complex effects on supply. The entry and exit of producers and decisions to expand or contract production capacity also impact supply. The introduction of innovative products can create shifts in both demand and supply toward new products. Changes in consumer tastes and income can also change demand at any give price. Changes in the prices of substitute and complementary goods also shift demand. Accordingly, the market prices of output are unlikely to correspond to the past costs incurred to produce that output. Even if individual producers try to anticipate output prices in their decisions, market uncertainty will defeat their efforts, leading to randomness in profit margins.

Even if market prices were to reflect accurately the costs of the marginal producer, they would depart from the costs of the inframarginal producer. Costs tend to differ across firms; there are differences in business methods, management techniques, production processes and technological knowledge across firms. Moreover, the value of output can depart from the costs of inputs because firms combine those inputs in different ways, creating different products and addressing customer needs differently. Firm heterogeneity strongly implies that the unit costs of any individual firm are likely to differ from the market price. Under the textbook paradigm of perfect competition with identical firms and static demands, efficient entry guarantees that the market price eventually equals the unit cost of firms. This cannot be the case when unit costs vary across firms.

Because of uncertainty regarding changes in output markets, there are likely to be deviations between output prices and unit costs. Some firms will earn economic profits and others will suffer economic losses. Moreover, firms often change prices in anticipation of developments since they respond to the *expectations* of buyers and sellers about future market conditions. Thus, prices are likely to depart from costs.[28]

Even though competitive forces tend to move market prices toward cost through the exit of improvement of inefficient producers, the past costs of producing a good are likely to differ substantially from current and future costs. Costs change due to technological change and changes in input prices. Market prices correspond more to current and forward-looking demand and supply conditions than to past costs. Traditional cost-of-service regulation *at best* adjusts prices to reflect past costs, thereby permitting regulated rates to depart substantially from market prices. The fundamental reason for this departure is that the economic cost of inputs used to produce some output is not the same as the market price or economic value of an output produced

[28] "The question of fact is thus whether entrepreneurs as a class receive on the average more or less than the normal competitive rate of return on the productive services of person or property which they furnish to the business. The question does not admit to any definitive answer on inductive grounds." FRANK H. KNIGHT, RISK, UNCERTAINTY AND PROFIT 364 (1921).

with those inputs. This is why regulated rates based on the costs of production are necessarily second best.

C. Determining Market Price

Saying that regulatory authorities should base rates for network access on market prices leaves open the question of how to determine the prevailing market price. Market transactions constitute the most (if not the only) reliable indicator of individual preferences.[29] Thus, regulators should develop market benchmarks if they choose not to defer to market mechanisms for allocation.

1. Pricing Based on External Market Transactions

Under standard valuation techniques, the most reliable indicator of market price tends to be the *comparable sales approach*, in which the price charged for the hypothetical transaction in question is determined by prices changed in actual market transactions involving similar goods. Two types of market transactions can serve as external benchmarks for comparable sales. The easiest case occurs when network owner also sells the same type of access mandated by the government into an external market. When that is the case, determination of market value is easy, since comparable sales can serve as a reliable proxy for the services provided.

In addition, market value may be inferred from the price charged for access to a substitute transmission technology that provides similar services. Although the historical balkanization of communications has long made such determinations impossible, technological convergence has made resort to this type of external benchmark increasingly feasible. Admittedly, transactions involving substitute technologies can be slightly more difficult to apply as benchmarks than can transactions using the same type of network. Differences in network configuration can complicate direct comparisons between alternative technologies. For example, although cable television and digital broadcast satellite systems (DBS) have emerged as direct competitors, the wire-based distribution of cable operators is necessarily restricted to a limited geographic area, whereas the footprint of DBS providers is inherently national in scope.[30] In addition, network performance and reliability levels provided by different types of network technology often differ. As a result, prices must be adjusted to reflect differences in the type of network before any comparisons can be drawn. Although such

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[29] *See, e.g.*, Paul A. Samuelson, *Consumption Theory in Terms of Revealed Preference*, 15 ECONOMICA 243 (1948).

[30] The fact that DBS is inherently national in scope makes it uniquely well suited to taking advantage of the economies inherent in national distribution of video programming. *See* Christopher S. Yoo, *The Rise and Demise of the Technology-Specific Approach to the First Amendment*, 91 GEO. L.J. (forthcoming 2003),

adjustments can be somewhat complicated, they are by no means so intractable as to render transactions occurring on alternative networks useless as external benchmark for inferring market prices.

The other principal market-based valuation method is known as the *income capitalization approach*. When commercial property is involved, regulators can use a discounted cash flow analysis to determine the present value of the income that the input is projected to earn. Because the earnings are based on the prices charged in the output markets, it is possible to apply this method even if the input being priced is not sold in any external markets whatsoever. In addition, because the income capitalization approach is based from data derived from actual market transactions, it is still generally regarded as a reliable means for determining market value.

2. The Second-Best Solution in the Absence of External Markets

If a market benchmark is not available, then an estimate based on the economic costs of providing the service may be necessary. Such an estimate should approximate the market value of all the inputs used to create and operate the network, with the understanding that the market price of network access can be greater or less than that estimate. Over time, the market price of access should reflect the economic cost of all of the inputs used to provide network services. In the short run, however, market prices may deviate from economic cost. With scarcity of network access, the market price of access would likely be greater than the replacement cost of the network. Conversely, with a glut or network capacity or obsolescence of network technology, the market price of access would likely be less than the replacement cost of the network. For example, a glut in fiber optic capacity would be expected to reduce the price of access to below the cost of the network. Accordingly, it is important to distinguish the market value of a good from the economic costs of providing that good. However, the economic cost of providing that good properly estimated provides a second-best alternative.

The *economic cost* of producing a product or service is the total opportunity costs of all the inputs used to produce that product or service. The economic cost of producing network services in telecommunications includes the opportunity costs of such inputs as capital, land and land rights, wires, utility poles, towers and fixtures, switches, control systems, construction costs as well as operation and maintenance expenses and management costs. The *opportunity cost* of an input refers to the value of the best opportunity necessarily foregone, that is, the return from the best alternative employment of that input. The *user costs of capital* associated with owning plant and equipment is equal to the foregone return from the best alternative investment of expenditures made for plant and equipment.

For most productive inputs, the most accurate measure of opportunity cost is the *market value* of that input, which is simply the current market price of the input less the avoidable direct costs associated with providing the input. For those inputs for which there is no market price that is readily available, it is necessary to *impute* or estimate the market value. The best estimate is based on the opportunity cost of the input. For example, if a company owns a plot of land that it could rent to another company for the $500, that is the opportunity cost of using the land.

Replacement cost of an input, which is the cost of purchasing that input in the market at current market prices, is in turn provides a reasonable approximation of market value. Accordingly, the market value of the inputs used to create a network includes the replacement costs of facilities and equipments as well as the user cost of capital evaluated using the market cost of capital; land and land rights evaluated using current market rents, and current operation and maintenance expenses. Replacement costs refer to forward-looking costs of constructing the network and include all costs that the utility would incur to rebuild its system including the costs of capital, land, labor services, and management costs.[31] A good proxy for replacement cost is a recent purchase cost of the input. It is not a perfect measure, since the market price may have increased or decreased since the most recent purchase. Nonetheless, in the absence of indicia that measure market value more directly, estimates of replacement cost based on comparable transactions provide a useful and workable estimate of market value.

It is now generally accepted that replacement cost is superior to historical cost as a measure of market value, because, as noted by then-Professor Stephen Breyer, "[a] competitive marketplace values assets, not at their historical price, but at their *replacement* value—the present cost of obtaining the identical service that the old asset provides."[32] Historical costs suffer from several well-recognized infirmities. For example, the market value of an input may have increased or decreased since its purchase. In addition, historical costs will typically be based on the book values of plant and equipment (also known as "embedded costs"). The depreciation schedules allowed under the applicable accounting rules and tax laws often fail to constitute proper economic measures of depreciation. Replacement

[31] Scholars and policy makers have disputed whether the replacement cost determination should be based on the network as it is currently configured or on a hypothetical network employing the most efficient technology and configuration available. Resolution of this debate, while undoubtedly important in implementing any access regime, falls outside the scope of this Article, which focuses primarily on the importance of making sure that any access prices set by regulatory authorities include some measure of the market demand for access. For an early argument in favor of hypothetical networks, see *Missouri ex rel. Southwestern Bell Telephone Co. v. Public Service Commission*, 262 U.S. 276, 312 (1923) (Brandeis, J., concurring in the judgment). For a modern argument in support of basing replacement cost on the configuration of existing networks, see J. GREGORY SIDAK & DANIEL F. SPULBER, DEREGULATORY TAKINGS AND THE REGULATORY CONTRACT 419-25 (1997); J. Gregory Sidak & Daniel F. Spulber, *Givings, Takings, and the Fallacy of Forward-Looking Costs*, 72 N.Y.U. L. REV. 1068 (1997).

[32] STEPHEN BREYER, REGULATION AND ITS REFORM 38 (1982) (emphasis in original).

costs, in contrast, more accurately reflect changes in value. It is true that replacement cost is not without its own complications and that short-term changes can temporarily cause replacement cost to rise above or fall below equilibrium levels. On the whole, however, replacement cost provides a reasonably reliable measure of the direct costs of providing the services of a network.

The costs of supplying network access also include transaction costs. The network operator must devote management and employee resources to handling the provision of network services including arranging network connections, monitoring usage, and billing for use of the network. In the face of mandated access, the owner of the network must determine what are the existing demands for capacity and make arrangements to provide additional capacity to meet regulatory requirements. For example, in the case of pole attachments, the FCC requires that a utility take steps to expand the capacity of its poles, ducts, conduits, and even rights of way upon request by telecommunications carriers and cable operators.[33] The provision of pole attachment services also may involve actions that generate convenience or transaction cost savings for the telecommunications or cable TV companies seeking access in comparison with producing their own system of poles.[34] Transaction costs may be difficult to recover when rates are regulated because they may appear intangible to regulators. Despite this fact, transaction costs significantly affect prices and decisions in competitive markets.

3. The Efficient Component Pricing Rule

As emphasized thus far, pricing access to a network refers to the prices attached to the services generated by the entire network. An alternative regulatory approach to network access grants users the services of particular *inputs* to the network rather than the output of services from the network as a whole. This originates with trackage rights in railroads, whereby rights were given to third party operators of trains on a railroad's track, and is reflected in the Telecommunications Act of 1996, which mandates a very different type of network access based on usage of the services of individual *components* of the network rather than the services of the network itself. Thus, this approach focuses on the services of *inputs* to the network rather than the outputs of the network. For example, with regards to network components such as the local loop, switches, or other facilities (called "network elements"), the 1996 Act requires that incumbent local exchange

[33] Implementation of Local Competition Provisions in Telecomms. Act of 1996, First Report and Order, 11 F.C.C.R. 15499, 16075-76 ¶¶ 1162-1163 (1996).

[34] *Id*. at 16076-77 ¶ 1164 (declining to require companies seeking access under the Pole Attachments Act to exhaust the possibilities of leasing capacity from other providers before requesting the pole owner to expand its capacity).

carriers (LECs) to provide "nondiscriminatory access . . . on an unbundled basis at any technically feasible point."[35] In the case of collocation, incumbent LECs have the duty to provide "physical collocation of equipment necessary for interconnection or access to unbundled network elements at the premises of the local exchange carrier."[36] Access to unbundled network elements corresponds to a manufacturer providing another company with usage of a piece of capital equipment, such as a machine tool. Collocation corresponds to a manufacturer allowing another company to locate its equipment in the manufacturer's factory.

Regulatory pricing of access to isolated network inputs raises some of the same issues that came up in a connection with pricing of access to services provided by the network as a whole. The best way to price access to inputs is to consider the market price of similar access. If a market benchmark is not available, there is a need to resort to cost-based estimates of providing access to the input. Again, the market value of the input is a desirable benchmark if available.

It would be misleading to assume, as does the FCC, that the cost of providing usage of an input to the network is confined to the direct cost of that input.[37] The input is part of a network and, accordingly, the usage of a network component by another company necessarily has an impact on the output of services using the network. The capacity of the network element to provide network services is correspondingly diminished, thus reducing the output of services by the network itself. To take a simple example, a set of tires for an automobile may cost only $400, but allowing another motorist to use the tires would preclude usage of the automobile. The foregone value of the automobile might be say $20,000. In the same way, the cost of allowing competing telecommunications companies access to unbundled network elements would depend not on the direct cost of providing that element but on the indirect cost of removing the services of that element from the network of the incumbent telephone company. Accordingly, the cost of providing access to unbundled network elements should not be measured in terms of the cost of obtaining the input. Rather, the cost depends on the reduction in overall network services that result from using a network element for another purpose by another company.

The proper valuation of the cost of making an input available is the direct cost of the input plus the value of the diminished output. Thus, prices set at economic cost of an input must represent the sum of the direct

[35] 47 U.S.C. § 251(c)(3).

[36] *Id.* § 251(c)(6).

[37] As will be discussed in greater detail later, the FCC issued regulations that prices for the unbundled access to network elements be based on each element's Total Element Long Run Incremental Cost (TELRIC). This cost notion corresponds with the direct cost that a manufacturer would incur in providing another company with the usage of a piece of capital equipment in the manufacturer's factory. It does not include any factors designed to capture opportunity costs.

incremental cost of providing the input and the opportunity costs associated with providing the input to a competitor. The analytical methodology for setting input access prices at these levels is known as the Efficient Component Pricing Rule (ECPR), which would set access prices according to the following formula:

> *access price = incumbent's per-unit incremental cost of providing access + the incumbent's opportunity cost of providing the unbundled input.*

Since usage of network elements by another company potentially reduces the services that the network can provide, the correct price of those network elements depends on what the company could have obtained by selling network services. Thus, the market price of network services, the *outputs* of the network, should be used as the basis for determining the value of access to the services of network components, the *inputs* of the network.[38] In the absence of market prices for network output, the opportunity cost calculation can be based on the regulated rates for the incumbent firm's output.

We acknowledge that allocating the retail markup among multiple products using ECPR (or any other access pricing method) poses conceptual and administrative problems. For example, if a competitor were to lease two or more network elements from an incumbent LEC, it would be improper, of course, to include the entire retail markup in the opportunity cost component for both elements, since that would in effect allow the incumbent LEC to recover twice for the same markup. The retail markup could be divided among the various elements, but doing so would require some method (probably based in cost accounting) for apportioning the markup to particular elements. While this problem is most easily posed when the same competitor leases both elements, the same problem arises if two different competitors were to lease the same elements or even two different elements in the same chain of production. Although the allocation of foregone retail margin to particular components is inevitably somewhat arbitrary, such problems are endemic to any system of establishing prices for inputs. Apportioning the foregone retail margin should not prove any more intractable than the apportionment of common costs that must inevitably occur under any regulatory scheme that relies on compelled access.[39] In any event, the pricing of the element should at least cover its direct incremental cost to avoid cross subsidization.

The market-determined efficient component pricing rule (M-ECPR) adjusts the calculation of opportunity costs by using a benchmark market

[38] Cites to ECPR literature here.

[39] *See* Implementation of Local Competition Provisions in Telecomms. Act of 1996, First Report and Order, 11 F.C.C.R. 15499, 15852-53 ¶ 696 (1996) (proposing several possible approaches to allocating common costs).

price (if one exists) rather than using regulated rates for the incumbent firm's output. It is again likely that regulated rates for network services will not correspond to the market price of competing alternatives. Thus, the M-ECPR provides a method of adjusting access prices to reflect market prices of network services. This promotes efficient allocation of network services as well as dynamic efficiency of investment decisions.[40]

Opportunity cost is the means by which access pricing attempts to reflect market demand for the network services in question. Any regime that bases access prices solely on production costs without taking market demand into account would lead to allocative inefficiency and dynamic inefficiency. It would ignore the importance of a demand component that formed the foundation for the emergence of neoclassical economics.

4. Traditional, Cost-Based Approaches to Setting Rates in Regulated Industries

Conventional economic theory thus suggests that access rates in network industries promote economic efficiency only if they are set on the basis of market prices. If market-based pricing is unavailable, the appropriate second-best solution is to base rates on the economic costs of providing access, which is a concept that embraces both direct incremental costs and opportunity costs. Historically, however, regulatory authorities have established rates solely on the basis of direct costs without taking opportunity costs into account. The dominant initial position was the "fair value" principle associated with the landmark decision in *Smyth v. Ames*,[41] which required that rates be based on the replacement cost of the assets used to provide the service. The preference for replacement costs was based on the recognition that if the regulated entity constituted a natural monopoly, by definition no external transactions would exist that could serve as the basis for market-based pricing. At the same time, parties who obtain service under a regulated rate always had the option of constructing a substitute facility. This meant that in the long run replacement cost would tend to reflect market demand. Although technological and functional obsolescence could cause replacement cost to be a misleading reflection of market value in some circumstances, in the absence of data based on actual transactions replacement cost remained a useful proxy.[42]

The primary alternative to the replacement cost methodologies associated with *Smyth v. Ames* was the historical cost methodologies

[40] See SIDAK & SPULBER, *supra* note 31, at 307-33.

[41] 169 U.S. 466 (1898). On its face, *Smyth v. Ames* appeared to offer a laundry list of considerations to guide the ratemaking determination. *Id*. at 546-57. When placed in context, it becomes clear that *Smyth v. Ames* and its progeny firmly endorsed the replacement cost approach to rate regulation. Stephen A. Siegel, *Understanding the* Lochner *Era: Lessons from the Controversy over Railroad and Utility Rate Regulation*, 70 VA. L. REV. 187, 227-28 (1984).

[42] *See* Siegel, *supra* note 41, at 221-22, 229, 231; *supra* note 31-32 and accompanying text.

associated with Justice Brandeis's separate opinion in *Missouri ex rel. Southwestern Bell Telephone Co. v. Public Service Commission*.[43] Although Brandeis recognized that the comparable sales would represent the most accurate methodology for determining the utility's value for ratemaking purposes, he concluded that such prices were impossible to determine, "since utilities, unlike merchandise or land, are not commonly bought and sold in the market."[44] Brandeis further noted that calculate value by capitalizing the utility's earnings necessarily embroiled regulatory authorities in a "vicious circle."[45] As the Court later noted, "The heart of the matter is that rates cannot be made to depend upon 'fair value' when the value of the going enterprise depends on earnings under whatever rates may be anticipated"; the result is that fair value becomes "the end product of the process of rate-making not the starting point."[46]

In the absence of some market-determined basis for setting rates, Brandeis believed that rates necessarily must be based on some measure of cost. Brandeis recognized that replacement cost might well represent the best evidence of present value, since replacement cost constituted a better reflection of technological improvements.[47] In the end, however, pragmatic considerations led Brandeis to advocate relying on historical costs. Determining replacement cost was an inherently speculative endeavor fraught with unnecessary uncertainty.[48] In addition, basing value on replacement cost would expose both consumers and investors to the risks associated with fluctuations in market prices.[49] In comparison, relying on historic cost allowed for less variable and subjective determinations of value.[50]

Brandeis's argument quickly became one of the focal points in the debate over rate setting methodologies.[51] The Supreme Court has frequently invoked it as the definitive explanation for the decision of various regulatory

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[43] 262 U.S. 276, 292-94 (1923) (Brandeis, J., concurring in the judgment).

[44] *Id.* at 292.

[45] *Id*.

[46] FPC v. Hope Natural Gas Co., 320 U.S. 591, 601 (1944); *accord* Verizon Communications, Inc. v. FCC, 122 S. Ct. 1646, 1658 (2002); Duquesne Light Co. v. Barasch, 488 U.S. 299, 308 n.5 (1989); FPC v. Natural Gas Pipeline Co., 315 U.S. 575, 603 (1942) (Black, J., concurring); St. Louis & O'Fallon Ry. v. United States, 279 U.S. 461, 505 n.23 (1929) (Brandeis, J., dissenting); Jim Chen, *The Second Coming of* Smyth v. Ames, 77 TEX. L. REV. 1535, 1556 (1999); Siegel*, supra* note 41, at 246.

[47] *Southwestern Bell*, 262 U.S. at 300.

[48] *Id*. at 293-302.

[49] *Id*. at 302-08. To the extent that Brandeis's opinion evinces a strong desire to insulate both consumers and investors from the dislocation caused by market fluctuations, it exhibits some strikingly anti-economic tendencies. His position is perhaps explained by the desire to promote classical-style democracy that permeates his jurisprudence. *See* L.S. Zacharias, *Repaving the Brandeis Way: The Decline of Developmental Property*, 82 NW. U. L. REV. 596, 634-38 (1988). A more cynical observer might suggest that his interest in protecting investors from market fluctuations followed more from the fact that he held a substantial amount of his wealth in commercial paper issued by utilities. *See id.* at 637-38.

[50] *Southwestern Bell*, 262 U.S. at 308-10.

[51] Siegel*, supra* note 41, at 240 n.227.

authorities not to use market-based pricing when setting rates.[52] Eventually, however, the controversy between historical and replacement cost ended in a somewhat inconclusive draw. Rather than resolving this dispute on its substantive merits, in the end the Supreme Court invoked notions of administrative deference and judicial restraint to reject the notion that rates must be set in accordance with any particular approach. Instead, the Court resolved to uphold any rate determination regardless of methodology so long as it fell within a fairly broad zone of reasonableness.[53] Applying these principles allowed the Court to sustain a wide variety of ratemaking methodologies based on increasingly complicated versions of historical or replacement cost.[54] Eventually, formal ratemaking gave way to the imposition of price caps, in which the maximum rates that utilities could charge in any particular year did not depend on costs, but rather on the rates set the previous year, reduced by a fixed percentage to reflect increases in productivity. Price cap methodologies did not cure the basic flaw of failing to reflect demand considerations, since the rates charged for the initial year in the typical price cap scheme were based on historical cost.[55]

The unifying thread to all of these approaches was their consistent commitment to basing rates on direct cost (whether historical or replacement cost) and their consistent refusal to include a component taking opportunity cost or market-based influence into account.[56] Fortified by this background, regulators charged with implementing access regimes have tended to follow their traditional patterns and based access rates solely on either historical or replacement cost. As the foregoing discussion reveals, however, that regulatory approaches that base rates solely on direct costs suffer from a fundamental conceptual flaw. In failing to incorporate some dimension that reflects the earning potential of the regulated input, approaches based on

[52] *See Verizon*, 122 S. Ct. at 1657-58; *Duquesne*, 488 U.S. at 308-09 & n.5; *Natural Gas Pipeline Co*., 315 U.S. at 603 (Black, J., concurring).

[53] As the Court noted in *Hope Natural Gas*, "it is the result reached not the method employed which is controlling. It is not theory but the impact of the rate order which counts. . . . The fact that the method employed to reach that result may contain infirmities is not then important." 320 U.S. at 602 (citations omitted); *accord Duquesne*, 488 U.S. at 314-16; *Natural Gas Pipeline Co*., 315 U.S. at 586. *See generally* Siegel, *supra* note 41, at 252-59. It should be noted that the approach taken by the Court in *Hope Natural Gas* was itself circular.

[54] *See, e.g.*, *Verizon*, 122 S. Ct. at 1665-76, 1679-80 (upholding replacement cost methodology as a matter of statutory construction, but declining to address the overall reasonableness of rates on ripeness grounds); *Duquesne*, 488 U.S. at 310-12 (upholding rates based on modified historical cost methodology); Permian Basin Area Rate Cases, 390 U.S. 747, 761, 768-74 (1968) (upholding rates based on composite cost data from an entire area rather than prevailing field prices); *Hope Natural Gas*, 320 U.S. at 596-98, 603-05 (upholding rates based on historical cost).

[55] *Verizon*, 122 S. Ct. at 1660 (citing United States Tel. Ass'n v. FCC, 188 F.3d 521, 524 (D.C. Cir. 1999); and Alfred E. Kahn, Timothy J. Tardiff, & Dennis L. Weisman, *The Telecommunications Act at Three Years: An Economic Evaluation of its Implementation by the Federal Communications* Commission, 11 INFO. ECON. & POL'Y 319, 330-32 (1999)).

[56] *Verizon*, 122 S. Ct. at 1659 (citing ALFRED KAHN, ECONOMICS OF REGULATION 40-41 (1988)).

direct cost, whether historical or replacement cost, fail to reflect the basic insight that has guided economics for the last century.[57]

The only conceivable justification for failing to base rates on market prices is that the absence of comparable transactions rendered any attempt to base rates on market value inherently circular. Indeed, as the foregoing discussion reveals, that was precisely the reasoning upon which Justice Brandeis and the regulatory authorities and courts that followed his lead relied to justify their advocacy of cost-based approaches.[58] What modern regulatory authorities have failed to recognize is the manner in which technological convergence and the shift from rate regulation to access regulation has now made it possible to base rates on market benchmarks. The possibility of input substitution allows external markets for inputs to exist even when external markets for final goods do not. In addition, the raison d'etre of access regulations is to foster the emergence of competition in final goods markets. Any success in doing so will only serve to further undercut the justification for refusing to base rates on market transactions. The shift from output to input regulation has also undermined the previously proffered reasons for rejecting the income capitalization approach. When regulation focuses on the rate charged for an input rather than for a final good, the regulated price is only one of many factors that determines the good's overall earning potential rather than its sole determinant. So long as the input remains only one component of the overall good, it can no longer be said that the income capitalization approach will is inherently tautological. The degree of circularity will be limited to percentage of the total cost of the final good represented by the regulated input.

Equally important is the manner in which technological change has also allowed for competition among different network platforms to develop. The availability of substitute networks employing alternative means of transmission has in turn created external markets that now make it possible for regulatory authorities to base rates on prices charged in actual market transactions. In addition, the advent of facilities-based competition in turn can lead to deregulation of the rates charged for the final good, which in turn will eliminate the circularity inherent in the income capitalization approach.

Simply put, the two fundamental changes that we believe are transforming the basic approach to regulating network industries are both in the process of eviscerating the reasons underlying ratemaking authorities' longstanding decision to base rates on some measure of direct costs and to

[57] Siegel, *supra* note 41, at 251-52 (noting that although some jurists used neoclassical economics to attack the replacement cost methodology associated with *Smyth v. Ames*, the critique ultimately proved too much by also undermining attempts to base rates on historical cost); Herbert Hovenkamp, *The Marginalist Revolution in Legal Thought*, 46 VAND. L. REV. 305, 325 (1993) (noting that neoclassical economics affected the debate between basing rates on historical cost as opposed to an alternative measure that were based either a capacity to earn a profit or replacement cost).

[58] *See supra* notes 44-46 and accompanying text.

exclude from their ratemaking calculus components designed to reflect the regulated good's earning potential. Together the shift to access regulation and the development of technological convergence have rendered continued adherence to that position untenable and mandate as a matter of economic policy that regulatory authorities begin to base access rates on market prices.

D. Demystifying Network Economics

Fundamental economic principles thus indicate that efficiency would best be promoted if network access prices were based on the market value of the relevant inputs. If direct, market-based indicia are not available, regulatory authorities should use a methodology such as ECPR that includes both the direct costs as well as the opportunity costs of providing the input. Recent academic commentary, however, has suggested that network industries possess features such as sunk costs, economies of scale and scope, and network economic effects that may cause market prices to deviate from levels that promote efficiency. The analysis that follows refutes those arguments. Most of these features are not unique to network industries and are easily taken into account by traditional price mechanisms.

1. Economies of Scale and Scope

There are economies of scale and scope in networks, but these do not prevent markets from allocating the services that networks provide. *Economies of scale* are said to exist for a single product firm if unit costs decline as a function of output. For a multiple-product firm, economies of scale means that total costs of production exceed the total of each output times its marginal cost. *Economies of scope* are said to exist if a company achieves cost economies by producing goods in combination rather than separately.

Networks certainly exhibit economies of scale. Large-scale networks can employ advanced high-capacity switches. Moreover, building and operating a large network benefits from economies of scale since the firm can spread out the overhead costs associated with constructing and maintenance over a larger set of activities. Economies of scale may also be present because of volume-surface relationships, so that the volume of a conduit can be expanded with a less than proportional increase in the surface. Moreover, the unit costs of capacity in a transmission line decline because there are fixed costs of constructing the conduit that must be incurred which are somewhat invariant to the number of transmission wires inside the conduit. This is why telecom companies find that the incremental cost of installing additional fiber capacity at the time of the initial installation is less than the unit cost of installing fiber capacity.

Economies of scope are also present in networks, since multiple services can be provided using common facilities. For example, the same switch can be used to provide many different services such as call waiting and call forwarding. Economies of scope in networks also derive from network structure. Suppose that the products of the network are viewed as connections between pairs of network users. Rather than operating a point-to-point network, traffic can be aggregated in trunk lines with points reached by distribution or feeder lines. By realizing economies of scale in the trunk lines, the firm achieves economies of scope in the production of multiple connections.

Economies of scale and scope exist in practically any industry. For example, in the automobile industry, the unit costs of producing automobiles are lower the more automobiles are produced. Producing only a few cars requires making them practically by hand. Producing many cars allows the development of a large plant that takes advantage of automation as well as the benefits of specialization and division of labor recognized by Adam Smith.[59] Economies of scope are also familiar. They explain why a company can obtain costs savings from producing multiple types of automobiles. The company shares common costs of manufacturing, engineering, and management across multiple products.

The presence of cost economies in manufacturing does not prevent markets from allocating goods and services that are produced with economies of scale. Multiple producers can have economies and scale and scope and compete with each other in supplying goods and services. For example, automobile manufacturers compete with each other to sell cars unhindered by the presence of cost economies in manufacturing. There is no *a priori* reason that markets for telecommunications services should differ in any way. Multiple networks can operate with economies of scale and scope and compete to supply services to customers. Market prices continue to be an accurate measure of value.

Sufficient scale relative to the size of the market results in *natural monopoly*.[60] A given industry is said to exhibit natural monopoly

[59] ADAM SMITH, THE WEALTH OF NATIONS 3-16 (Random House 1965) (1776).

[60] Economies of scale are said to be present if the marginal costs of production are less than the average costs of production over the relevant range of output. Economies of scale can be due to many different technological factors, such as specialization of function and division of labor permitted by increased output. Fixed costs are a source of economies of scale that is particularly significant to the telecommunications industry – and to all other industries that require networks, such as railroads, oil and natural gas pipelines, electricity, and water services. Fixed costs are costs that do not vary with fluctuations in output, unlike operating or "variable" costs. The fixed costs of establishing a network system are the costs of facilities such as transmission lines, which are not sensitive to the level of transmission on the lines. The firm's average cost function refers to the cost per unit of output evaluated at each output level. The firm's marginal cost function refers to the additional cost of producing one more unit of output, evaluated at each level of output. Economies of scale at a given output level is not necessary for natural monopoly. The natural monopoly property can be present at an output level at which the cost function exhibits decreasing returns to scale. For further discussion, see DANIEL F. SPULBER, REGULATION AND MARKETS 117 (1989).

characteristics if the cost function derived from the underlying technology is "subadditive," i.e., if a single firm can supply the entire market at lower cost than can two or more firms.[61] If the technology of local telephone service were to exhibit natural monopoly characteristics, then a single firm could construct and operate that network at a lower cost than can two or more firms. Multiproduct cost functions are said to exhibit natural monopoly characteristics if and only if the cost function derived from the underlying technology is subadditive across products, that is, the costs faced by a single firm producing the entire set of products is less than the costs that would result if the same production were divided between two firms. There is some controversy over whether the technology of existing telecommunications networks fall within this definition.[62]

The existence of natural monopoly does not necessarily preclude competitive entry, however. For example, even if a particular telecommunications technology were to exhibit natural monopoly characteristics, efficient retail prices could still be achieved if providers were required to compete through periodic auctions for the right to serve the market.[63] Moreover, proponents of "contestability" theory have demonstrated that so long as entry and exit are easy, the potential for new entry can drive prices towards competitive levels even if the technology makes it most efficient for a single firm to serve the entire market.[64] Even if the incumbent prices at cost there are thus still some situations in which an incumbent monopoly cannot find prices that sustain its position against entry.

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[61] The concept of natural monopoly is generally credited to John Stuart Mill, who emphasized the problem of wasteful duplication of transmission facilities that can occur in utility services. 1 JOHN S. MILL, PRINCIPLES OF POLITICAL ECONOMY 132-54 (W.J. Ashley, ed., Augustus M. Kelly 1961) (1848). The connection between natural monopoly and regulation is developed by Leon Walras with reference to the construction and operation of railroads. LEON WALRAS, ETUDES D'ECONOMIE SOCIALE: THEORIE DE LA REPARTITION DE LA RICHESSE SOCIALE (1936).

[62] Statistical studies showing that costs are not subadditive include Richard Shin & John Ying, *Unnatural Monopolies in Local Telephone*, 23 RAND J. ECON. 171 (1992), who find that the costs of local exchange carriers were not subadditive before the AT&T divestiture using data from 1976 to 1983, and David S. Evans & James J. Heckman, *A Test for Subadditivity of the Cost Function with an Application to the Bell System*, 74 AM. ECON. REV. 615, 620 (1984), who show that AT&T's costs were not subadditive. Estimating telecommunications network costs is problematic for companies that have been regulated because data is obtained from regulatory accounting information. Also, the data are often presented at a aggregate level that is not suited to evaluation of cost functions. The estimation of cost functions using standard econometric techniques is difficult at best since an established legacy system built up over decades is not likely to be optimized. Engineering cost models that make assumptions about system configurations need not describe the costs of existing systems. Moreover, the notion of comparing the costs of two identical systems serving the same geographic area is likely to be counterfactual. For a review of the literature analyzing whether costs in the cable television industry are subadditive, see Thomas W. Hazlett, *Duopolistic Competition in Cable Television: Implications for Public Policy*, 7 YALE J. ON REG. 65, 71-75 (1990).

[63] *See* Harold Demsetz, *Why Regulate Utilities?*, 11 J.L. & ECON. 55 (1968) (arguing that with sufficient bidders and absent collusion, periodic auctioning of monopoly franchises can yield competitive pricing); Richard A. Posner, *The Appropriate Scope of Regulation in the Cable Television Industry*, 3 BELL J. ECON. 98 (1972) (applying Demsetz's analysis to cable television).

[64] WILLIAM J. BAUMOL, JOHN C. PANZAR, & ROBERT D. WILLIG, CONTESTABLE MARKETS AND THE THEORY OF INDUSTRY STRUCTURE (rev. ed. 1988).

Moreover, natural monopoly technology need not impede competition because the technology of entrants can differ from that of incumbents. In the standard textbook definition of natural monopoly, which also underlies most public policy discussions, it is presumed that incumbents and entrants have the same cost function and presumably the same underlying technology.[65] The assertion is that all firms have the same technology and that there is not enough room in the market for more than one firm, so that there is little that an entrant could add to productive capacity. Even if the incumbent's technology were to exhibit natural monopoly characteristics, assuming that an entrant would need to construct the same network certainly assumes the conclusion. It is unrealistic, however, to presuppose that the incumbent and the entrant will employ the same technology.[66] Entrants may employ capital equipment of more recent vintage than the incumbent so that their systems embody different technologies. Given the rapid pace of technological change in telecommunications, an entrant can operate a network with a different configuration.

Thus, an incumbent might operate a traditional telecommunications network with twisted copper pair to the home, a technology that is over a century old, while an entrant might offer wireless service. There are many transmission technologies including coaxial cable television systems, fiber-optic cable, various land-based wireless systems, and satellite-based systems. Each of these transmission approaches has different properties in terms of costs and performance. The many uses of transmission networks, including telephony, mobile communications, data transmission, and video, suggest that different transmission technologies are suited to different uses. Entrants that offer specialized networks targeted to particular applications are likely to have different technologies than the incumbent. Moreover, the entrant can target specialized market segments without the need to duplicate the incumbent's system.[67] Competition from Internet telephony, cable telephony, and wireless provides alternatives to the traditional telephone system. Thus, competitive markets for network services can form and market prices continue to be an accurate measure of value.

2. Sunk Costs

The substantial sunk costs in establishing certain types of telecommunications networks, particularly the traditional wireline network, do not prevent markets from allocating network services or prevent market

[65] *See, e.g.*, *id.* at 17 (defining natural monopoly as an industry in which all of the firms have the same cost function).

[66] Daniel F. Spulber, *Deregulating Telecommunications*, 12 YALE J. ON REG. 25 (1995).

[67] The discussion in this section draws upon *id.* at 45-50; and Daniel F. Spulber, *Competition Policy in Telecommunications*, i*n* HANDBOOK OF TELECOMMUNICATIONS ECONOMICS (Martin Cave et al. eds., forthcoming, 2002).

prices from representing an accurate measure of value. Sunk costs are present in most industries to a greater or lesser extent. Expenditures for research and development and marketing are generally regarded as sunk investment. Generally, the inability to recover expenditures is a fact of life otherwise known as business risk with few implications for the performance of market transactions. Moreover, most forms of manufacturing entail sunk costs in the form of capital equipment, whether it is used for manufacturing automobiles or extracting crude oil. This does not prevent in any way the market allocation of the products manufactured using that capital equipment. The method of manufacture does not alter the ability of market transactions to allocate a good or service. Telecommunications is not different even if it requires nonrecoverable expenditures in plant and equipment, namely wires and switches.

The notion often put forward in public policy discussions and legal cases involving telecommunications is that sunk costs prevent competition in telecommunications services and hence result in market failure. In particular, sunk costs are often said to be a barrier to entry if entrants need to make irreversible investments in capacity, while incumbents have already incurred these costs. The standard reasoning is as follows. The incumbent need only price to recover operating expenses and incremental capital expenditures, since the irreversible investment costs of entry can be written off. An entrant, in contrast, must anticipate earnings exceeding operating costs, incremental investment as well as the irreversible costs of establishing its facilities before it will decide to enter.[68]

In the *AT&T* case, Judge Greene observed with regards to barriers to entry, "The evidence introduced at the trial of this case clearly demonstrated that duplication of the ubiquitous local exchange networks would require an enormous and prohibitive capital investment, and no one seriously questions that this is true."[69] Richard Posner points out, however, that nonrecurring costs of entry are "irrelevant if there are small firms in the market that can grow to be large firms." He continues, "In any event, there is grave doubt whether there are important nonrecurring costs of entry-barriers to entry in the true sense."[70] Posner further notes that costs of capital are not a barrier since the costs should be comparable for firms already in the market.

There are many ways for potential entrants into an industry to reduce the risks associated with making nonrecoverable expenditures, including contracting with customers before irreversible investments are made and entering into joint ventures or mergers with incumbents. Furthermore, in

[68] *See, e.g.*, William J. Baumol & Robert D. Willig, *Fixed Costs, Sunk Costs, Entry Barriers, and Sustainability of Monopoly*, 96 Q.J. ECON. 405 (1981). According to George Stigler, barriers to entry are long-run costs imposed on entrants that are not present for incumbents. GEORGE J. STIGLER, THE ORGANIZATION OF INDUSTRY 67 (1968)

[69] United States v. W. Elec. Co., 673 F. Supp. 525, 538 (D.D.C. 1987).

[70] RICHARD A. POSNER, ANTITRUST LAW: AN ECONOMIC PERSPECTIVE 92 (1976).

competitive markets, duplication of investment often occurs. The entry of excess or insufficient capacity can take place as a consequence of uncertainty regarding costs, technology, or market demand. Overcapacity in automobile manufacturing or restaurants is part of the competitive process and certainly does not indicate the presence of market failure. Indeed, periods of excessive capacity so often observed in a wide variety of industries demonstrates that sunk costs are unlikely to deter vigorous competition. The same is true in telecommunications, of course in the absence of regulatory intervention that favors or penalizes incumbents.

Technological change further mutes the impact of sunk costs on entrants.[71] Entrants commit capital resources in those markets or market segments where they expect to earn competitive returns on their investments. The sunk costs involved in establishing a telecommunications system, given currently available technologies, are not different from irreversible investments in any other competitive market. Concern over sunk costs in telecommunications may be due to the substantial level of investment needed to establish a traditional telecommunications network, in particular due to the ubiquity of the regulated Bell System monopoly. This is a quantitative difference but hardly a qualitative one. Entrants can invest smaller amounts to create networks targeted at particular customers and specific services.

The argument that sunk costs are a barrier to entry also depends in part on the similarity of the technology of the incumbent and entrant, as in the earlier case of natural monopoly discussions. Yet, an entrant need not duplicate the incumbent's network. An entrant with lower operating costs could be assured of recovering at least the difference between the incumbent's operating costs and the entrant's own operating costs, which could well be sufficient to recover the costs of entry. This scenario is likely since technological change in telecommunications, such as the application of microprocessors in switching, potentially lowers the costs of operating networks. Moreover, even if the entrant's operating costs are greater than the incumbent's, entrants can generate incremental revenues to offset the costs of entry by offering enhanced or specialized services. By differentiating its offerings through branding, customer service and location, entrants gain incremental revenues to cover the costs of entry. New technologies offer enhanced performance including switched services, the mobility of wireless services and the increased bandwidth of coaxial and fiber-optic systems, thus allowing competition with established networks that have different technologies.

Even the need to sink costs into a telecommunications network has been altered by technological change. For example, wireless technologies avoid customer-specific irreversible investment for the "last mile" to the customer's location. Wireless transmission towers can be relocated. Thus,

[71] *See* SPULBER, *supra* note 60, at 608-10; Spulber, *supra* note 66, at 49.

even if substantial sunk costs are required to reproduce the incumbent's wireline network, a wireless alternative is an effective competitor without the same sunk costs. Thus, sunk costs in telecommunications need to impede the market allocation of telecommunications services.

3. Compatibility and Interconnection

Although there are clear benefits from compatibility and interconnection of networks, these benefits do not prevent markets from allocating network services so that market prices continue to be an accurate measure of value. The interconnection of networks is necessary for a call placed by a customer served by a network to reach a customer served by another network. Because the number of connections enhances the value of a network, it is in the interest of network operators to interconnect.

There is an extensive set of network interconnections. Local networks have access to most if not all long distance and international networks. Wireless services are connected to both local and long distance networks. Local telecommunications networks, wireless systems, digital subscriber lines, and broadband cable can be used to access the Internet. The Internet itself as a network of networks represents a vast number of interconnections. The terms of such interconnections are established both through market agreements and through regulated charges. Given this set of interconnection agreements, access to the services of a network implicitly entails access to the connections offered by the network. The customer may obtain some of these connections as part of the network service or the customer may pay for individual connections, just as retail telecommunications customers purchase local and long-distance services separately. Accordingly, the benefits from interconnecting networks enhance the ability of competitive firms to provide network services and do not conflict with market pricing of network services.

4. Network Economic Effects

Many networks have the property that the number of people connected to them determines their value. The classic example of a network that exhibits such an effect is the telephone system, since the value of a telephone network is determined in large part by the number of people with whom one can communicate through that network. The more people that are part of the network, the more valuable the network becomes. The result is that the value of network access depends not only by the access price charged, but also on the number of users who have access to the network. This economic literature refers to this characteristic as a *network economic effect*.

Some economists consider network economic effects to be a kind of *externality*.[72] Externalities occur whenever individuals do not bear all of the economic consequences of their actions. Proponents of the network externalities view suggest that network users' inability to capture all of the benefits generated by their usage represents a positive externality that will cause overall utilization of the network to drop below efficient levels.[73] These theorists also suggest that network externalities can turn network access into a competitive weapon. By refusing to interconnect with other networks, network owners can force users to choose one network to the exclusion of others. Forcing users to commit to one network naturally leads users to flock to the largest network. It is argued that network owners can thus use network externalities to create or reinforce a monopoly position.

In addition, other scholars argue that network effects can adversely affect technological adoption and product selection decisions.[74] In their view, network externalities can cause a different market failure known as *technology lock-in*, in which markets adhere to previous technology commitments notwithstanding the arrival of new, more efficient network technologies. If users cannot capture all of the benefits created by their decision to adopt a new technology, they may refrain from making a technological change even when doing so would increase total welfare. These considerations have led some to argue that compelled access is required to ensure that the early leaders in any network technology and owners of large networks do not use their leading position to stifle technological innovation.[75] It also provides a basis for questioning whether basing access rates on market prices would in fact promote efficiency.

The concept of network externality thus suggests that network industries are uniquely susceptible to market failures that prevent the price mechanism from playing its usual role in generating efficient outcomes. If network externalities prevent markets from functioning efficiently, then it might follow that the market equilibrium market price of network access might somehow be distorted as well. Although formal models developed by

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[72] *See, e.g.*, Michael L. Katz & Carl Shapiro, *Network Externalities, Competition, and Compatibility*, 75 AM. ECON. REV. 424 (1985) [hereinafter Katz & Shapiro, *Network Externalities*]; Michael L. Katz & Carl Shapiro, *Systems Competition and Network Effects*, 8 J. ECON. PERSP. 93 (1994) [hereinafter Katz & Shapiro, *Systems Competition*].

[73] Katz & Shapiro, *Network Externalities*, *supra* note 72, at 100.

[74] *See* Katz & Shapiro, *Network Externalities*, *supra* note 72, at 100; Joseph Farrell & Garth Saloner, *Installed Base and Compatibility: Innovation, Product Preannouncements, and Predation*, 76 AM. ECON. REV. 940, 941 (1986). Thomas Schelling identified the effects of *critical mass* on many types of economic and social behavior. THOMAS C. SCHELLING, MICROMOTIVES AND MACROBEHAVIOR (1978); *see also* Harvey Leibenstein, *Bandwagon, Snob, and Veblen Effects in the Theory of Consumer's Demand*, 64 Q.J. ECON. 183 (1950).

[75] *See* Jerry A. Hausman et al., *Cable Modems and DSL: Broadband Internet Access for Residential Customers*, 91 AM. ECON. REV. 302, 306 (2001); Jerry A. Hausman et al., *Residential Demand for Broadband Telecommunications and Consumer Access to Unaffiliated Internet Content Providers*, 18 YALE J. ON REG. 129, 161-64 (2001); Mark A. Lemley & Lawrence Lessig, *The End of End-to-End: Preserving the Architecture of the Internet in the Broadband Era*, 48 UCLA L. REV. 925, 942 (2001).

proponents of the network externality view have demonstrated that such market failures are possible, we believe that claims of widespread market failure are exaggerated. A critical review of the economic literature reveals that network externality theories are subject to several conceptual limitations that suggest that network externalities do not in fact cause markets to fail and that even if markets do fail, other features of the market exist that can mitigate, if not eliminate, such problems. In addition, theoretical models simply demonstrate that a particular type of market failure is *possible*. Determining whether such a market failure is *likely* depends upon a close empirical evaluation of whether the preconditions underlying any particular theory actually exist. To date, network externality theorists have relied on a handful of supposedly classic examples of technology lock-in as the sole empirical support for their positions. A close review of those examples reveals that they do not properly represent examples of market failure. The absence of even a single documented case of technology lock-in raises significant skepticism about the propriety of these claims. And lastly, these proponents must answer the question whether the cure might be worse than the disease. More specifically, resolution of the regulatory question depends not just on whether a market failure exists, but also on whether government intervention is likely to do better or worse than private ordering.

a. Network Economics as a Questionable Source of Market Failures — As noted above, theories that rely on the supposed presence of network externalities to justify more intrusive regulation of network industries suffer from several conceptual shortcomings.[76] On closer inspection, it becomes clear that arguments that network externalities tend to entrench incumbents and existing technologies is far too simplistic. As Joseph Farrell and Garth Saloner have pointed out, a consumer's decision to adopt a new technology actually gives rise to two distinct and countervailing externalities. When the value of a network depends on the number of people using the network, any decision to adopt a new technology enhances the value of the new network for those who have already joined the network as well as to those who will join it in the future. It is the presence of this externality that can cause markets to become locked in to obsolete technologies, a phenomenon that Farrell and Saloner refer to as "excess inertia."[77]

At the same time, the adoption of a new technology also gives rise to a countervailing negative externality that tends to produce precisely the opposite effect. This is because any decision to adopt a new technology simultaneously lowers the value of the old technology by reducing the number of people using it. In effect, adoption of the new technology tends to strand the installed base in the old technology. Individuals who adopt a new technology thus do not fully internalize all of the costs created by their

[76] The discussion that follows is based in part on Yoo, *supra* note 9, at 278-82.
[77] Farrell & Saloner, *supra* note 74, at 941.

actions. This may make that individual willing to adopt a new technology even when the costs to society exceed the benefits, a situation variously called "excess momentum"[78] or "insufficient friction."[79] It is thus theoretically possible that the presence of network economic effects may prevent network providers from realizing all of the available economies of scale and may accelerate the pace with which new technologies are adopted beyond levels. Whether network externalities would in fact cause a market failure thus depends upon which of these two countervailing effects dominates.

Even if the balance of these two network externalities tends to produce excess inertia, a series of insightful articles authored by Stan Liebowitz and Stephen Margolis demonstrates that such effects are unlikely to lead to market failure.[80] Their explanation distinguishes between two different types of network externalities that were identified by the seminal articles in the literature, but not developed therein. *Direct network externalities* are those generated "through a direct physical effect of the number of purchasers on the quality of the product,"[81] with the leading example being the number of subscribers attached to a telephone network. *Indirect network externalities*, in contrast, involve instances that do not involve a direct physical connection. Instead, the value of a good is determined by the number of other people who purchase the same good, with the examples commonly cited including the network of users of a particular type of format of video cassette recorder (VCR), a particular type of software, or a particular computer operating system.[82]

With respect to direct network externalities, Liebowitz and Margolis argue that private ordering can easily resolve any of the problems that may exist. This is because direct network externalities have the benefit of occurring within a physical network that can be owned. Thus, although individual users may not be in a position to capture all of the benefits created by their demand for network services, the network owner will almost certainly be in a position to do so. The existence of a single network owner allows the problems associated with this type of externality to be solved through the same mechanism used to solve externality problems that arise in

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[78] *Id.* at 941-42.

[79] Michael L. Katz & Carl Shapiro, *Product Introduction with Network Externalities*, 40 J. INDUS. ECON. 55, 73 (1992).

[80] *See* S.J. Liebowitz & Stephen E. Margolis, *Are Network Externalities a New Source of Market Failure?*, 17 RES. LAW & ECON. 1 (1995) [hereinafter Liebowitz & Margolis, *Market Failure*]; S.J. Liebowitz & Stephen E. Margolis, *Network Externality: An Uncommon Tragedy*, 8 J. ECON. PERSP. 133, 142 (1994) [hereinafter Liebowitz & Margolis, *Uncommon Tragedy*]; *see also* STAN J. LIEBOWITZ & STEPHEN E. MARGOLIS, WINNERS, LOSERS AND MICROSOFT (rev. ed. 2001).

[81] *See* Katz & Shapiro, *Network Externalities*, *supra* note 72, at 424.

[82] Liebowitz & Margolis, *Market Failure*, *supra* note 80, at 3; Liebowitz & Margolis, *Uncommon Tragedy*, *supra* note 80, at 135; *see also* Joseph Farrell & Garth Saloner, *Standardization, Compatibility, and Innovation*, 16 RAND J. ECON. 70, 70 (1985) (contrasting direct network externalities with market-mediated effects).

other contexts, i.e., by placing property in the hands of a single owner and protecting it with well-defined property rights.[83] Any benefits created by network participation can thus be internalized and allocated through the interaction between the network owner and network users.[84]

Reliance on unitary ownership of a network to internalize any network externalities that may exist does not necessarily mean that competition cannot emerge. In many cases, a network need not occupy the entire market in order to realize all of the available demand-side economies of scale. When this occurs, no unexploited gains from trade regarding network size remain, and the equilibrium solution is competition among multiple proprietary networks. The point can be illustrated through the now classic problem presented by overfishing of a lake. Because individual anglers do not internalize all of the costs of their actions, they lack sufficient incentives to undertake efficient levels of conservation and investment. The solution is to vest property rights to the entire lake in a single owner. Doing so will not, however, eliminate competition in the market for fish, since giving owners unitary property rights over a particular lake is not the same thing as giving them control over all lakes and the various owners of different lakes will continue to compete with one another. Placed in the context of networks, the proper policy question becomes one of defining property rights in away that insures that networks achieve sufficient size to realize all of available network economies. It does not necessarily mean that only one network will emerge and that government indiscretion is required to ensure that that network is the "right" one.[85]

Indirect network externalities pose a somewhat different problem, since the lack of a direct physical connection among users means that policy makers cannot simply rely on network ownership to internalize the relevant externalities.[86] To date, scholars have focused primarily on the fact that indirect network externalities typically arise in markets that involve complementary goods and that proprietary control of a network provides network users with some assurance that a ready supply of complementary goods will remain available.[87] Although these concerns are correct as far as

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[83] *See* R.H. Coase, *The Problem of Social Cost*, 3 J.L. & ECON. 1 (1960); Garrett Hardin, *The Tragedy of the Commons*, 162 SCIENCE 1243 (1968).

[84] Liebowitz & Margolis, *Market Failure*, *supra* note 80, at 11-13; Liebowitz & Margolis, *Uncommon Tragedy*, *supra* note 80, at 137, 141-44.

[85] Liebowitz & Margolis, *Uncommon Tragedy*, *supra* note 80, at 140-42; *see also* Liebowitz & Margolis, *Market Failure*, *supra* note 80, at 13-15 (describing how the assumptions embodied in formal models of network externalities in effect assume away this problem by positing inexhaustible economies of scale).

[86] Note that to the extent that key network elements receive some degree of patent, copyright, or trademark protection, it is conceivable that the use of well-defined property rights may solve as a solution to some types of indirect network externalities. Liebowitz & Margolis, *Market Failure*, *supra* note 80, at 11.

[87] *See* James B. Speta, *Handicapping the Race for the Last Mile?: A Critique of Open Access Rules for Broadband Platforms*, 17 YALE J. ON REG. 39 (2000) (citing Katz & Shapiro, *Network Externalities*, *supra* note 72, at 103-04).

they go, the work of Liebowitz and Margolis has demonstrated that theories of market failure based on indirect network externalities theories typically suffer from deficiencies that are far more fundamental.

In order to understand the nature of this conceptual shortcoming, it is necessary to review the basic flaws contained in A.C. Pigou's classic analysis of increasing-and decreasing-cost industries.[88] Pigou erroneously believed that the industry marginal cost curve represented the true social cost of production. Because prices tended to be uniform, he concluded that all industries that did not involve constant costs required either a tax or a subsidiary in order to attain efficient levels of output. The mistake in Pigou's analysis is that markets produce efficient outcomes whenever the last unit produced (i.e., the marginal unit) is priced at marginal cost. Pricing other units (i.e., inframarginal units) above marginal cost simply effects a transfer of wealth from consumers to producers without affecting price and output levels. Although this redistributes total surplus, it does not have any impact on efficiency. Indirect network externalities are essentially no different from the type of wealth transfer mistakenly decried by Pigou. Markets will set network outputs at efficient levels so long as the price charged to the marginal network user at marginal cost. Although charging inframarginal users higher prices has distributional consequences, it has no impact on efficiency. Indeed, internalizing these externalities may actually be harmful, since doing so would create monopsony power.[89]

Furthermore, it is often impossible to distinguish an indirect network externality from the results of a properly functioning market. Even if prices fall as networks grow in size, it is not necessarily indicative of a market failure. It may represent nothing more than the declining costs associated with a classic natural monopoly. If so, the drop in price would simply reflect movement along the cost curve rather than an externality that caused a deviation from the cost curve. In addition, any decline in price may also represent the type of ordinary technological progress that typically occurs when participation in a particular technology increases. In either event, there is no efficiency loss to be abated. Any remedies imposed in the name of compensating for a network externality would thus be the cause of, rather than the solution to, market failure. Even worse, the true source of the decline in cost may lie in one of the input markets rather than the output market. Positing that the problem is an indirect network externality operating in the output market may thus prompt an incorrect policy response by focusing attention away from the input markets that may be the true locus of whatever market failure that may exist.[90]

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[88] *See* A.C. PIGOU, WEALTH AND WELFARE (1912).

[89] Liebowitz & Margolis, *Market Failure*, *supra* note 80, at 3-7; Liebowitz & Margolis, *Uncommon Tragedy*, *supra* note 80, at 136-38.

[90] Liebowitz & Margolis, *Market Failure*, *supra* note 80, at 7-10; Liebowitz & Margolis, *Uncommon Tragedy*, *supra* note 80, at 138-39.

At the same time, it is important to recognize the adoption of a new technology carries significant costs. The standardization associated with the existence of an established technology can create real benefits by facilitating compatibility between complementary products that would be lost if a new technology were adopted. In addition, changes in technology necessarily impose significant transaction costs, since production of new technological platforms and adaptation of existing network infrastructure to incorporate innovations can be quite costly.[91] Accordingly, some delay in the introduction of new products may reflect efficiency, not market failure. Absent a compelling reason to believe that network externalities are causing efficiency losses that the market cannot properly redress, regulations designed to counteract network economic effects cannot be justified.

Even assuming for the sake of argument that the type of network externalities that tend to cause monopolistic dominance and technology lock-in actually exist, it is far from clear that other features of the market and the structure of consumers preferences might not serve to mitigate, if not eliminate, these adverse effects. For example, the market can dislodge an existing network technology so long as the additional value provided by the new technology exceeds the value of the network externalities supporting the old technology.[92] As Steven Kaplan and Mark Ramseyer succinctly put it, "an entrenched inefficient technology is potentially a twenty-dollar bill lying on the sidewalk."[93]

In addition, network externalities may be substantially mitigated if user preferences are nonuniform. As Michael Katz and Carl Shapiro have noted:

> Customer heterogeneity and product differentiation tend to limit tipping and sustain multiple networks. If the rival systems have distinct features sought by certain customers, two or more systems may be able to survive by catering to consumers who care more about product attributes than network size. Here, market equilibrium with multiple incompatible products reflects the social value of variety.[94]

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[91] Timothy F. Bresnahan, *New Modes of Competition: Implications for the Future Structure of the Computer Industry*, *in* COMPETITION, INNOVATION AND THE MICROSOFT MONOPOLY: ANTITRUST IN THE DIGITAL MARKETPLACE 155, 200 (Jeffrey A. Eisenach & Thomas M. Lenard eds., 1999).

[92] Katz & Shapiro, *Network Externalities*, *supra* note 72, at 106 (observing that new, incompatible standards may emerge despite the presence of network externalities if "consumers . . . care more about product attributes than network size"); S.J. Liebowitz & Stephen E. Margolis, *The Fable of the Keys*, 33 J.L. & ECON. 1, 4 (1990) (noting that a "greater the gap in performance between the two standards, . . . the more likely that a move to the efficient standard will take place"), *reprinted in* FAMOUS FABLES OF ECONOMICS 90, 92 (Daniel F. Spulber ed., 2002); *and* LIEBOWITZ & MARGOLIS, *supra* note 80, at 19, 21-22.

[93] Steven N. Kaplan & J. Mark Ramseyer, *Those Japanese Firms with their Disdain for Shareholders: Another Fable for the Academy*, 74 WASH. U. L.Q. 403, 405 (1996).

[94] Katz & Shapiro, *Network Externalities*, *supra* note 72, at 106 (citing Joseph Farrell & Garth Saloner, *Standardization and Variety*, 20 ECON. LETTERS 71 (1986)); S.J. Liebowitz & Stephen E.

The existence of large users may further mitigate any problems caused by network economic effects. If a single user controls a significant portion of the network, that user would be able to internalize more of the benefits of its adoption decision, which would help minimize any slippage caused by the existence of the network externality. Furthermore, because large users are in a position to capture a disproportionate share of the benefit resulting from the adoption of a new technology, they have has a significant incentives to make the investments needed to begin the shift towards the new technology.[95] Indeed, formal models of such market structures indicate that "the sponsor of a new technology earns greater profits than its entry contributes to social welfare. In other words, markets with network externalities in which new technologies are proprietary exhibit a bias towards new technologies."[96] Far from being a bane, the existence large network players may be a blessing in disguise.

Finally, significant growth in market size can render any network externalities that lead markets to tend towards market dominance and technology lock-in irrelevant.[97] If a market is undergoing explosive growth, market outcomes are determined by the commitments that future users will make and not the decisions of the users who have already committed to a particular technology.[98] In such cases, the fact that a particular firm may currently dominate a market is of little consequence. People concerned about lock in will focus on the network that will exist in the future, not the one that exists today.

b. The Lack of Empirical Support for Market Failures Caused by Network Economics — The fact that markets seem fully capable of resolving most of the supposed market failures identified by the theoretical literature on network economics suggests that any attempt to remedy these supposed problems should be approached with considerable caution. Indeed, it would seem appropriate to insist on empirical proof that such problems actually exist before authorizing governmental action to redress them. Proponents of network externality theories have yet to offer any systematic evidence to support their theories. Instead, most of these theorists have opted instead to

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Margolis, *Should Technology Choice Be a Concern of Antitrust Policy?*, 9 HARV. J.L. & TECH. 283, 292 (1996) ("Where there are differences in preference regarding alternative standards, coexistence of standards is a likely outcome.").

[95] Katz & Shapiro, *Network Externalities*, *supra* note 72, at 101; Katz & Shapiro, *Technology Adoption in the Presence of Network Externalities*, 94 J. POL. ECON. 822, 825 (1986); Liebowitz & Margolis, *Market Failure*, *supra* note 80, at 11, 13. The fear of being held up after committing to a network might make consumers reluctant to join proprietary networks. Katz and Shapiro describe a number of ways that a network owner can allay such fears. *See* Katz & Shapiro, *Network Externalities*, *supra* note 72, at 104-05, 107.

[96] Katz & Shapiro, *supra* note 79, at 73.

[97] *Id*. at 67, 73 (concluding that exponential market growth effectively prevents excess inertia); Liebowitz & Margolis, *supra* note 94, at 292 ("Entrenched incumbents are less entrenched when consumers react to new sales . . . .").

[98] Liebowitz & Margolis, *supra* note 94, at 312.

invoke a handful of well-known anecdotes concerning supposed technology lock-in. The example most commonly cited is the persistence of the conventional typewriter keyboard layout (called the Qwerty keyboard for the after the arrangement of letters in the upper left-hand corner of the array) despite the emergence of a rival layout known as the Dvorak keyboard that is supposedly more efficient.[99] The next most popular example cited is the emergence of VHS as the standard format for videocassettes despite the supposed technical superiority of the Beta format.[100]

The lack of systematic evaluation has allowed the proponents of network externality theories to be maddeningly imprecise about what constitutes lock-in. The lack of clear definition of terms ignores the fact that no technological standard is permanent and that over a long enough time horizon all technological standards are subject to change. Whether a technology has become locked in is thus in no small part a function of the period of time deemed relevant for evaluating such a change. The failure to explain terms essentially renders the concept of lock in currently employed in the literature arbitrary and obscures any attempt to prove or falsify its existence empirically.

Furthermore, close analysis of the historical record reveals that none the key examples that form the empirical basis for network externality theory can properly be regarded as market failures. Specifically, the evidence suggests that the Qwerty keyboard does not represent an obsolete technology locked into place by network externalities. On the contrary, it appears that the Qwerty keyboard first emerged as the winner of a vibrant competition on the merits, in which various keyboard designs were tested against one another in a series of typing contests. Modern ergonomic studies suggest that any technical difference between the Qwerty and the Dvorak keyboard remains nominal. In addition, the evidence supposedly demonstrating the Dvorak keyboard's superiority is riddled with conflicts of interest, since all of the key studies, including the Navy tests that represent perhaps the primary support for these claims, were conducted by the person who invented and patented the Dvorak keyboard.[101]

The historical record also belies any suggestion that VHS's emergence as the prevailing standard for videocassettes represents the perseverance of an obsolete technology. The evidence suggests that the final resolution of the competition between Beta and VHS turned on a design tradeoff, with Beta incorporating a smaller cassette in order to enhance portability and VHS opting for a larger cassette in order to provide for longer playing and recording time. VHS's victory over Beta thus seems to have resulted from

[99] *See, e.g.*, Paul A. David, *Clio and the Economics of QWERTY*, 75 AM. ECON. REV. 332 (1985); JEAN TIROLE, THE THEORY OF INDUSTRIAL ORGANIZATION 405 (1988); Farrell & Saloner, *supra* note 74, at 941, 942.

[100] *See, e.g.*, W. Brian Arthur, *Positive Feedbacks in the Economy*, 262 SCI. AM. 92, 92 (1990).

[101] Liebowitz & Margolis, *supra* note 92.

consumers' preference for videotapes capable of recording a two-hour movie on a single cassette rather than from any market failure that frustrated the efficient outcome. In fact, any suggestion that VHS's victory was the result of inefficient lock-in effects is contradicted by the fact that Beta was deployed first and was the early leader in VCR technology. If anything, then, the final outcome is more properly regarded as an example of how markets can use differences in product value and the availability of an expanding customer base to displace an existing technology rather than an example of lock in.[102]

The other anecdotal examples upon which network externality theorists rely have been similarly debunked.[103] Moreover, against the absence of empirical evidence indicating that network externalities have caused markets to fail is arrayed a large number of instances in which new technologies have displaced incumbent technologies that were firmly entrenched. For example, vinyl and cassette recordings have been displaced by compact disks, and the VHS video format is in the process of being displaced by the digital video disc (DVD) format. In short, the empirical record provides little reason to believe that networks are in any way sufficiently prone to market failure to justify more intrusive regulation than any other type of industry. If anything, the history of technological change suggests the contrary.

c. The Limits of Regulation as a Solution to Market Failure — Lastly, even if it were proven that certain economic features of networks can cause markets to fail, it would not necessarily support regulatory intervention. As noted earlier, solutions imposed by the government often fall short of efficient outcomes even when they are imposed in the name of correcting a market failure.[104] Not only can imposition of an access regime harm allocative efficiency if access prices are set at inefficient levels, regulation can also harm dynamic efficiency by causing incentives to invest in network technologies to fall below efficient levels and by creating de facto entry barriers.[105] Thus, regulatory authorities confronting a market failure must ask themselves the logically subsidiary question whether governmental intervention is likely to improve matters or make matters worse.

Consider, for example, the particular regulatory decisions associated with any state-sponsored attempt to solve the problems of technological lock-in. Such intervention would necessarily require the government to

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[102] LIEBOWITZ & MARGOLIS, *supra* note 80, at 120-27, *reprinted in* FAMOUS FABLES OF ECONOMICS, *supra* note 92, at 111-16; S.J. Liebowitz & Stephen E. Margolis, *Path Dependence, Lock-In, and History*, 11 J.L. ECON. & ORG. 205, 218-22 (1995); Liebowitz & Margolis, *Market Failure*, *supra* note 80, at 147-49; Liebowitz & Margolis, *supra* note 94, at 314-16.

[103] *See* LIEBOWITZ & MARGOLIS, *supra* note 80, at 116-21.

[104] *See supra* notes 24-25 and accompanying text.

[105] Under rate regulation, which still represents the traditional governmental response to market failure, regulatory authorities explicitly prohibit competitors from entering the market. Although access regulation does not involve any de jure prohibition of market entry, it can forestall the emergence of facility-based competition to existing networks by rescuing users from having to invest alternative capacity. *See supra* note 25 and accompanying text.

replace clear winners in the technology marketplace with what it believed represented the superior technology. Moreover, in order to be effective, the government must do so at a fairly early stage in the technology's development, when making such determinations is the most difficult. Regulators would also typically have to make such determinations on extremely thin information that in most cases would be provided by parties with a direct interest in the outcome of the regulatory process. In addition, decisionmakers would have to insulate themselves from the types of systematic biases traditionally associated with political decisionmaking processes. It is for these reasons that even supporters of network externality theories caution that governmental intervention might well make the problem worse, not better.[106]

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In short, there appears to be ample reason to be skeptical of claims that network economic effects will cause widespread market failure in network industries. Not only are such claims problematic as a theoretical matter, they also appear to be essentially devoid of any empirical support. There thus appears to be little justification for believing that basing access rates on actual market transactions would lead to inefficient outcomes. On the contrary, basic economic principles indicate that market-based pricing represents the most appropriate way for ratemaking authorities to ensure that access rates are set at levels that promote both allocative and dynamic efficiency. The only plausible justification for failing to do so—that the absence of technological substitutes rendered market-based pricing a practical impossibility—has been drained of its vitality by the feasibility of direct, facilities-based competition made possible by the two fundamental transformations that we have identified (i.e., technological convergence and the shift to access regulation).

II. CONSTITUTIONAL LIMITS ON THE PRICING OF ACCESS TO NETWORKS

Just as regulatory authorities have largely failed to recognize the economic significance of both technological convergence and the shift from rate regulation to access regulation, so also have they failed to appreciate that these transformations compel a different constitutional analysis as well. Because rate regulation simply adjusts the terms under which parties can contract, it represents the type of nonpossessory regulation traditionally subjected to a rather permissive standard of review under the Taking Clause that only requires that the rate set fall within a zone of reasonableness. Compelling access to a physical network, in contrast, invariably requires the network owner to permit third parties to locate equipment on its property.

[106] Bresnahan, *supra* note 91, at 200-03; Katz & Shapiro, *Network Externalities*, *supra* note 72, at 112-113.

As such, access regulations are subject to the more restrictive standards associated with the Court's physical takings jurisprudence. Unlike nonpossessory regulations, in which reductions in the value of property are not necessarily compensable, physical takings necessarily command market value compensation. Principles of constitutional law thus reinforce the basic economic conclusion that network access should be priced at market levels.

A. The Distinction Between Physical and Nonpossessory Takings

1. The Emergence of Nonpossessory Takings Doctrine

Initially, it was generally believed that the Takings Clause only protected against direct appropriations of private property by the government or invasions that effectively ousted the owner of possession to the same extent as would have occurred had the government formally condemned the property.[107] Governmental actions that merely reduced the value of property did not qualify.[108] The Court subsequently recognized two types of takings that can arise without a physical occupation. First, the Court acknowledged that a rate regulation may effect a taking if the rate is set so low as to be "confiscatory." Second, the Court has recognized that the government may effect a "regulatory taking" even if no physical occupation or appropriation is involved, if the government "goes too far"[109] in limiting the manner in which owners can use their property.

a. Confiscatory Ratemaking — Confiscatory ratemaking doctrine is rooted in the notion that, although regulatory authorities may limit the amounts that regulated industries may charge for their services, "it is not to be inferred that this power of limitation or regulation is itself without limit. This power to regulate is not a power to destroy, and limitation is not the equivalent of confiscation."[110] As a result, the Court early on acknowledged that the Constitution forbid rates that are set so low as to be confiscatory.[111]

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[107] *See, e.g.*, Transp. Co. v. Chicago, 99 U.S. 635, 642 (1878) (holding that dam that barred access to property without physically invading it did not effect a taking even though it effectively rendered the property worthless); Meyer v. City of Richmond, 172 U.S. 82 (1898) (holding that deprivation of highway access which did not involve physical invasion did not constitute a taking). *See generally* Lucas v. S.C. Coastal Council, 505 U.S. 1003, 1014 (1992); Tahoe-Sierra Preservation Council, Inc. v. Tahoe Regional Planning Agency, 122 S. Ct. 1465, 1480 n.21 (2002).

[108] *Transp. Co.*, 99 U.S. at 642 (noting that "acts done in the proper exercise of governmental powers, and not directly encroaching upon private property, though their consequences may impair its use, are universally held not to be a taking"); Legal Tender Cases, 79 U.S. (12 Wall.) 457, 551 (1871) (holding that the Takings Clause "has never been supposed to have any bearing upon or to inhibit laws that indirectly work harm and loss to individuals" even if the government action "render[s] valuable property almost valueless").

[109] Pa. Coal Co. v. Mahon, 260 U.S. 393, 415 (1922).

[110] Railroad Comm'n Cases, 116 U.S. 307, 331 (1886).

[111] *See. e.g.*, Covington & Lexington Turnpike Road Co. v. Sandford, 164 U.S. 578, 597 (1896); *see also* Munn v. Illinois, 94 U.S. 113, 142-43 (1877) (Field, J., dissenting) (observing that property could be "practically confiscated" by excessively low rates); Stone v. Wisconsin, 94 U.S. 181, 184-85 (1877) (Field, J., dissenting) (same).

Although the Court was initially unclear regarding whether its confiscatory ratemaking doctrine was based on takings or due process principles, subsequent decisions have since made clear that its conceptual home lies in the Takings Clause.[112]

Whether a particular rate is confiscatory cannot be determined solely by examining at the methodology on which it is based.[113] Instead, determining whether a particular rate falls within the zone of reasonableness required by the Court's confiscatory ratemaking jurisprudence involves a "balancing of the investor and the consumer interests."[114] Rates are constitutional so long as they provide a return on equity that is sufficient to cover operating expenses, allow for returns that are "commensurate with returns on investments in other enterprises having corresponding risks," and are "sufficient to assure confidence in the financial integrity of the enterprise, so as to maintain its credit and to attract capital."[115] In so holding, the Court made clear that the mere fact that a particular rate reduced the value of the utility's property more was not by itself sufficient to render a rate confiscatory. As the Court acknowledged, "Rate-making is indeed but one species of price-fixing. The fixing of prices, like other applications of the police power, may reduce the value of the property which is being regulated. But the fact that the value is reduced does not mean that the regulation is invalid."[116]

In the process, some Justices have emphasized that the Court's confiscatory ratemaking jurisprudence occupied a sphere that was distinct and separate from its physical taking jurisprudence. For example, Brandeis recognized that the Court's decisions regarding the determination of value in condemnation cases did not serve as precedents for confiscatory ratemaking purposes, and vice versa. Such considerations played no part in determining value for ratemaking purposes.[117] Justice Black offered a similar observation in *FPC v. Natural Gas Pipeline Co*.[118] In condemnation cases, " 'the value of property, generally speaking, is determined by its productiveness,—the

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[112] JAMES W. ELY, JR., THE CHIEF JUSTICESHIP OF MELVILLE W. FULLER, 1888-1910, at 104 (1995).

[113] As the Court concluded, "an otherwise reasonable rate is not subject to constitutional attack by questioning the theoretical consistency of the method that produced it. 'It is not theory, but the impact of the rate order which counts.' " Duquesne Light Co. v. Barasch, 488 U.S. 299, 314 (1989) (quoting FPC v. Hope Natural Gas Co., 320 U.S. 591, 602 (1944)).

[114] *Hope Natural Gas*, 320 U.S. at 603; *see also supra* note 53 and accompanying text.

[115] *Id*.; *accord id*. at 605 (holding that rates are constitutional so long as they "enable the company to operate successfully, to maintain its financial integrity, to attract capital, and to compensate its investors for the risk assumed"); *Duquesne Light*, 488 U.S. at 312 (holding that rates are constitutionally unobjectionable so long as they do not "jeopardize the financial integrity of the companies, either by leaving them insufficient operating capita or by impeding their ability to raise future capital" and are adequate "to compensate current equity holders for the risk associated with their investments").

[116] *Hope Natural Gas*, 320 U.S. at 601; FPC v. Natural Gas Pipeline Co., 315 U.S. 575, 603 (1942) (Black, J., concurring).

[117] *Southwestern Bell*, 262 U.S. at 310-11 (Brandeis, J., concurring in the judgment).

[118] 315 U.S. 575 (1942).

profits which its use brings to the owner.' "[119] In addition, "when property is taken under the power of eminent domain the owner is 'entitled to the full money equivalent of the property taken, and thereby to be put in as good position pecuniarily as it would have occupied, if its property had not been taken.' "[120] Those principles, Black pointed out, "have no place in rate regulation."[121] All rate regulation necessarily reduces the value of the property, but that fact had not been construed as "stay[ing] the hand of the legislature or its administrative agency in making rate reductions."[122]

b. Regulatory Takings — Regulatory takings represent the second type of nonpossessory taking recognized by the Supreme Court. As the Justice Holmes explicitly acknowledged in his seminal opinion in *Pennsylvania Coal Co. v. Mahon*,[123] regulatory takings necessarily involve a difficult balance of interests. On the one hand, the government must have wide latitude in regulating the use of property, even if such regulation reduced the property's value. Indeed, "[g]overnment hardly could go on if to some extent values incident to property could not be diminished without paying for every such change in the general law."[124] On the other hand, the government's ability to impose limits on the use of property "must have its limits" if the constitutional protection of property was to be at all meaningful.[125] Without some restriction on the government's ability to qualify the manner in which owners can use their property, "the natural tendency of human nature [would be] to extend the qualification more and more until at last private property disappears."[126] Thus, "[t]he general rule at least is that while property may be regulated to a certain extent, if regulation goes too far it will be recognized as a taking."[127] Although the Supreme Court's regulatory takings jurisprudence originally emerged in the context of land use restrictions, it has since been applied more generally to any governmentally imposed nonpossessory restriction on property.[128]

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[119] *Id*. at 603 (Black, J., concurring) (quoting Monongahela Nav. Co. v. United States, 148 U.S. 312, 328-29 (1893)).

[120] *Id*. (quoting United States v. New River Collieries Co., 262 U.S. 341, 343 (1923)).

[121] *Id*.

[122] *Id*.

[123] 260 U.S. 393 (1922). Although *Pennsylvania Coal* is generally regarded as the seminal opinion on regulatory takings, *see, e.g.*, Lucas v. S.C. Coastal Council, 505 U.S. 1003, 1014 (1992), it was not without its historical antecedents. *See, e.g.*, Hadacheck v. Sebastian, 239 U.S. 394 (1915); Commonwealth v. Perry, 155 Mass. 117, 123 (1891) (Holmes, J., dissenting).

[124] 260 U.S. at 414.

[125] *Id*.

[126] *Id*. at 415.

[127] *Id*. For more recent restatements of the same rationale, see *Lucas*, 505 U.S. at 1014; and *Tahoe-Sierra Preservation Council, Inc. v. Tahoe Regional Planning Agency*, 122 S. Ct. 1465, 1480 n.21 (2002).

[128] *See* Phillips v. Wash. Legal Found., 524 U.S. 156 (1998) (interest on attorney trust accounts); Concrete Pipe & Prods. of Cal., Inc. v. Constr. Laborers Pension Trust, 508 U.S. 602 (1993) (pension plans); Bowen v. Gilliard, 483 U.S. 587 (1987) (welfare payments); Connolly v. Pension Benefit Guar. Corp., 475 U.S. 211 (1986) (pension plans); Ruckelshaus v. Monsanto Co., 467 U.S. 986 (1984) (pesticide formulas); Pension Benefit Guar. Corp. v. R.A. Gray & Co., 467 U.S. 717 (1984) (pension plans); United States v. Sec. Indus. Bank, 459 U.S. 70, 78 (1982) (liens on real property); Andrus v.

In the landmark decision in *Lucas v. South Carolina Coastal Council*,[129] the Court squarely held what it had frequently noted *in dicta* in other cases[130]: that a nonpossessory regulation may constitute a per se taking if it deprives the owner of all economically beneficial or productive use of its land.[131] When a restriction reaches this level, it can no longer be considered a regulation "simply adjusting the benefits and burdens of economic life" and instead is more properly regarded as "the equivalent of a physical appropriation."[132]

The more difficult issue is when a restriction that falls short of eliminating all economically beneficial use nonetheless constitutes a regulatory taking. Holmes did not elaborate on the proper way to balance the interests of property owners and the government aside from noting that "this is a question of degree."[133] The Court did not offer much additional guidance until 1978, when the Court issued its opinion in *Penn Central Transportation Co. v. City of New York*[134] recognizing that, although determining whether a particular governmental action constituted a taking is an "essentially ad hoc, factual inquir[y]" that turns on the particular circumstances of each case,[135] it was possible to identify three factors that have particular significance. Specifically, the Court focused on (1) "the economic impact of the regulation" on the property owner, (2) "the extent to which the regulation has interfered with distinct investment-backed expectations," and (3) "the character of the governmental action."[136] The Court immediately thereafter emphasized that "[a] 'taking' may more readily be found when the interference with property can be characterized as a physical invasion by government than when interference arises from some public program adjusting the benefits and burdens of economic life to promote the common good."[137]

What is perhaps most striking about *Penn Central* is its suggestion that physical and regulatory takings might be governed by the same analysis. The Court's observation that a taking may "more readily" be found when the regulation affects a physical invasion arguably implied that the presence of a physical invasion of property was not dispositive of whether a taking had

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Allard, 444 U.S. 51 (1979) (eagle feathers); Usery v. Turner Elkhorn Mining Co., 428 U.S. 1 (1976) (black lung benefits); *see also* E. Enters. v. Apfel, 524 U.S. 498, 522-37 (1998) (plurality opinion) (retiree benefits in the coal industry).

[129] 505 U.S. 1003 (1992).

[130] *See* Nollan v. Cal. Coastal Comm'n, 483 U.S. 825, 834 (1987); Keystone Bituminous Coal Ass'n v. DeBenedictis, 480 U.S. 470, 495 (1987); Hodel v. Va. Surface Mining & Reclamation Ass'n, 452 U.S. 264, 295-96 (1981); Agins v. City of Tiburon, 447 U.S. 255, 260 (1980).

[131] *Lucas*, 505 U.S. at 1015.

[132] *Id.* at 1017 (internal quotation marks omitted).

[133] 260 U.S. at 416.

[134] 438 U.S. 104 (1978).

[135] *Id*. at 124.

[136] *Id*.

[137] *Id*. (citation omitted).

occurred. Instead, it was simply one consideration that could be overcome if the other factors weighed in the opposite direction. This conclusion seemed to be confirmed in the Court's subsequent decision in *PruneYard Shopping Center v. Robins*,[138] in which the Court upheld the California Supreme Court's decision requiring that the owner of a shopping center allow a group of high school students to engage in political speech on his premises. In holding that this requirement did not violate the Takings Clause, the Court flatly stated that the fact that the students may have physically invaded the shopping center owner's property "cannot be viewed as determinative."[139] Many noted scholars have downplayed the importance of this language and argued that *PruneYard* can be explained solely on First Amendment grounds.[140] Nevertheless, a number of lower courts followed this reading of *PruneYard* and held that the *Penn Central* factors governed takings that effected physical invasions as well as nonpossessory restrictions on the use of property.[141]

The Supreme Court would soon remove any remaining doubts about the issue. In the first of two leading cases on the proper takings analysis applied to attempts to compel access to communications networks, the Court's landmark decision in *Loretto v. Teleprompter Manhattan CATV Corp.*[142] firmly reestablished the distinction between the Court's physical and regulatory takings jurisprudence.

2. Loretto *and the Distinction Between Physical and Regulatory Takings*

At issue in *Loretto* was the fact that the deployment of cable television in Manhattan depended on the cable operator's ability to string coaxial cables on apartment buildings. Such cables served two distinct purposes. First, they allowed cable operators to provide service to each building's tenants. Second, even if no tenant in a particular building subscribed to cable, the cable operator still often needed to string a "crossover" line in order to service customers in buildings that lay on the other side of the building from the cable operator's central facility, commonly called the "headend."[143] In 1970, a building owner agreed to allow the local cable operator to install a thirty-five foot crossover line on its property that was less than one-half inch in diameter and which ran eighteen inches above the building's roof. The

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[138] 447 U.S. 74 (1980).

[139] *Id.* at 84.

[140] *See, e.g.*, LAURENCE H. TRIBE, AMERICAN CONSTITUTIONAL LAW § 9.5, at 600 (2d ed. 1988); *cf.* Loretto v. Teleprompter Manhattan CATV Corp., 458 U.S. 419, 450-51 (1982) (Blackmun, J., dissenting) (implying that *Loretto* overruled the takings rationale of *PruneYard*).

[141] *See, e.g.*, Loretto v. Teleprompter Manhattan CATV Corp., 423 N.E.2d 320, 330-34 (N.Y. 1981), *rev'd*, 458 U.S. 419 (1982).

[142] 458 U.S. 419 (1982).

[143] *Id.* at 422.

operator also attached cubical directional taps measuring four inches on each side on the front and rear of the roof along with two silver boxes along the roof cables measuring eighteen inches by twelve inches by six inches. When some of the building's tenants eventually subscribed to cable service, the cable operator also installed another cable running down the front of the building to the first floor to provide that service.[144]

The cable operator originally compensated building owners for such access by paying them a standard rate of five percent of the gross revenues realized from the particular property. A new statute went into effect in 1973 requiring that landlords permit the cable operator to install equipment on their property and providing that the rate of compensation would be set by a state regulatory agency. The agency eventually set the compensation for such incursions at a one-time payment of one dollar. The owner of the building at issue brought a takings challenge to the statute.[145] Consistent with the suggestion of the language in *Penn Central* and *PruneYard* quoted above, the New York Court of Appeals held that a physical occupation authorized by government is not necessarily a taking.[146]

The Supreme Court responded with a ringing reaffirmation of the distinction between physical and regulatory takings. In particular, the Court rejected the conclusion that the takings determination should in all cases be governed by the ad hoc standards announced in *Penn Central*. Instead, the Court held that any regulation that authorizes a permanent physical occupation of property constitutes a per se taking. It made no difference whether the government itself occupied the property itself or simply empowered a third party to do so. As the Court reasoned, "A permanent physical occupation authorized by state law is a taking without regard to whether the State, or instead a party authorized by the State, is the occupant."[147]

The Court based its decision on three considerations. The first was based on precedent: a review of the Court's prior decisions revealed that that "when the character of the governmental action is a permanent physical occupation of property, our cases have uniformly found a taking to the extent of the occupation, without regard to whether the action achieves an important public benefit or has only minimal economic impact on the owner."[148] Indeed, the Court referred to treating a permanent physical occupation as a per se taking as the "historical"[149] and "traditional" rule.[150] In so holding, the

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[144] *Id.* at 422, 438 n.16.
[145] *Id.* at 423-24.
[146] Loretto v. Teleprompter Manhattan CATV Corp., 423 N.E.2d 320, 330-34 (N.Y. 1981).
[147] 458 U.S. at 433 n.9.
[148] *Id.* at 434-35; *accord id.* at 437 ("When faced with a constitutional challenge to a permanent physical occupation of real property, this Court has invariably found a taking."); *see also id.* at 427-34 (reviewing precedents).
[149] *Id.* at 435.
[150] *Id.* at 436, 441.

Court explicitly limited or disavowed language in *Penn* Central and *PruneYard* suggesting the contrary.[151]

Second, the Court drew support for its conclusion from the general policies underlying the existence of property rights. Permanent appropriation of property "is perhaps the most serious form of invasion of an owner's property interests."[152] In so reasoning, the Court invoked the now familiar metaphor that conceives of property as a bundle of rights encompassing three separate strands, i.e., the rights to possess, use, and dispose of the property. Unlike regulatory takings, which affect only the strand relating to the use of the property, physical invasions "chop[ ] through the bundle, taking a slice from every strand."[153] Specifically, physical occupations necessarily foreclose owners from either possessing or using the occupied portion of property themselves.[154] Even though the owner retains the theoretical right to dispose of the occupied space, the presence of equipment attached to that space essentially empties that right of any value. In addition, the Court concluded that these injuries are particularly severe when the government authorizes a stranger to invade and occupy the owner's property, since doing so vitiates the longstanding expectation that a property owner "will be relatively undisturbed at least in the possession of his property."[155] As a result, the Court concluded that a permanent physical occupation "is qualitatively more severe than a regulation of the *use* of property, even a regulation that imposes affirmative duties on the owner, since the owner may have no control over the timing, extent, or nature of the invasion."[156]

Lastly, the Court invoked practical considerations. Treating permanent physical invasions as per se takings "avoids otherwise difficult line drawing

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[151] The Court reasoned that nothing in the Court's opinion in *Penn Central* "repudiate[s] the rule that a permanent physical occupation is a government action of such a unique character that it is a taking without regard to other factors that a court might ordinarily examine." *Id*. at 432. The Court emphasized that the "permanence and absolute exclusivity" of the physical occupation at issue in *Loretto* served to differentiate it from the "temporary limitations on the right to exclude" at issue in *PruneYard*. *Id*. at 435 n.12. In addition, the Court distinguished *PruneYard* on the grounds that the invasion in that case was "temporary and limited in nature" and because "the owner had not exhibited an interest in excluding all persons from his property." *Id*. at 434. The Court further narrowed *PruneYard*'s scope in *Nollan v. California Coastal Commission*, 483 U.S. 825, 832 (1987), in which the Court held that because easements grant individuals "a permanent and continuous right to pass to and fro," they constitute a permanent physical occupation under *Loretto*, even though no particular individual is permitted to station himself permanently upon the premises. The Court further emphasized that in *PruneYard* "the owner had already opened his property to the general public, and in addition permanent access was not required." *Id*. at 832 n.1. For a recent analysis of *PruneYard*, see Richard A. Epstein, *Takings, Exclusivity and Speech: The Legacy of* PruneYard v. Robins, 64 U. CHI. L. REV. 21, 33-50 (1997).

[152] 458 U.S. at 435; *accord id.* at 441 (concluding that a permanent physical occupation "is qualitatively more intrusive than perhaps any other category of property regulation").

[153] *Id*. at 435.

[154] *Id*. at 435-36. The Court emphasized that "[t]he power to exclude has traditionally been considered one of the most treasured strands in an owner's bundle of property rights." *Id*. at 435.

[155] *Id.*

[156] *Id.*

problems."[157] Unlike the necessarily ad hoc quality of the *Penn Central* balancing test, "whether a permanent physical occupation has occurred presents relatively few problems of proof. The placement of a fixed structure on land or real property is an obvious fact that will rarely be subject to dispute."[158] As a result, when the government action takes the character of a permanent physical invasion, that factor by itself becomes "determinative."[159] Although the size and economic impact of the occupation is relevant in ascertaining the amount of compensation due,[160] those considerations play no role in determining whether a taking has occurred.[161]

In so holding, the Court was careful to emphasize that its holding did not contradict the "substantial authority upholding a State's broad power to impose appropriate restrictions upon an owner's use of his property."[162] Citing *Penn Central*, the Court observed that "[s]o long as these regulations do not require the [property owner] to suffer the physical occupation of a portion of his building by a third party, they will be analyzed under the multifactor inquiry generally applicable to nonpossessory governmental activity."[163] The reference to *Penn Central* indicates that by this the Court meant conventional regulatory takings doctrine.

Loretto thus established two principles that play a central role in our analysis. First, it articulated a strong rationale for subjecting physical takings to the highest degree of protection under the Takings Clause. If a regulation requires a property owner to allow third parties to install equipment on its property on an indefinite basis, it constitutes a per se taking without regard to the size of the physical invasion or the public purposes advanced by the regulation.[164] Second, it reasserted the sharp distinction between the Court's physical takings and regulatory takings jurisprudence. When a physical taking is involved, the regulatory takings precedents simply do not apply.

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[157] *Id.*

[158] *Id.* at 437; *see also* Palazzolo v. Rhode Island, 533 U.S. 606, 628 (2001) (noting that when a physical taking is involved, "the fact and extent of the taking are known.").

[159] 458 U.S. at 426.

[160] *Id.* at 437-38.

[161] *See id.* at 430, 434-35, 436. As Justice Marshall quipped, "whether the installation is a taking does not depend on whether the volume of space it occupies is bigger than a breadbox." *Id.* at 438 n.16.

[162] *Id.* at 441; *accord id*. at 440 ("[O]ur holding today in no way alters the analysis governing the State's power to require landlords to comply with building codes and provide utility connections, mailboxes, smoke detectors, fire extinguishers, and the like in the common area of a building.").

[163] *Id.* at 440 (citing *Penn Central*).

[164] It bears emphasizing that the argument advanced in this Article is far narrower than the one advanced in SIDAK & SPULBER, *supra* note 31, at 229-32, which claimed that *Loretto* required compensation any deviation from investment-backed expectations resulting from a change in regulatory systems and that the introduction of a data stream by a third party constituted a physical occupation. Instead, the argument advanced in this Article limits itself to what is indisputably the core holding of *Loretto*, which is that regulations authorizing the permanent placement of equipment on another person's property constitute a physical taking. Thus, even those who question the interpretation of *Loretto* offered in the prior article are unlikely to find the interpretation of *Loretto* advanced in this Article controversial.

3. Florida Power *and the Distinction Between Physical Takings and Confiscatory Ratemaking*

The Supreme Court sounded similar themes in the other leading case involving a takings challenge to an attempt to compel access to a communications network: *FCC v. Florida Power Corp.*[165] As noted in the foregoing discussion of *Loretto*, the deployment of cable television depended on its ability to establish a web of coaxial cables connecting individual households. Although in urban areas this could be accomplished by compelling apartment owners to allow cable operators to string cable across their properties, in suburban and rural areas the network of existing utility poles owned by telephone and electric companies represented the only feasible means of establishing the physical infrastructure needed for the provision of cable television service. Congress was concerned, however, that utility companies were exploiting their monopoly position by overcharging cable operators for the right to attach their coaxial cables to existing utility poles. As a result, Congress enacted legislation in 1978 known as the Pole Attachments Act that authorized the FCC to regulate the terms and conditions of pole attachment agreements in any state that did not impose such regulation itself.[166]

The Court held that the Pole Attachments Act did not constitute the type of permanent physical occupation authorized by the government required to constitute a per se taking under *Loretto*. What was missing was the "element of required acquiescence" present in the statute at issue in *Loretto*.[167] Nothing in the original version of the Pole Attachments Act gave "cable companies any right to occupy space on utility poles or prohibit[ed] utility companies from refusing to enter into attachment agreements with cable operators."[168] Instead, the Act simply regulated the rents charged by those parties who voluntarily choose to enter into such agreements. The Court found dispositive the language from *Loretto* concluding that, " '[s]o long as these regulations do not *require* the landlord to suffer the physical occupation of a portion of his building by a third party, they will be analyzed under the multifactor inquiry generally applicable to nonpossessory governmental activity.' "[169]

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[165] 480 U.S. 245 (1987).

[166] 480 U.S. at 247-48. Although cable companies could theoretically have instead employed the underground rights of way owned by natural gas companies, as a general matter underground installation of cables was either impossible or impractical. *Id.* at 247.

[167] *Id*. at 252.

[168] *Id.* at 251.

[169] *Id*. at 252 (quoting *Loretto*, 458 U.S. at 440). The Court further noted, "Appellees contend, in essence, that it is a taking under *Loretto* for a tenant invited to lease at a rent of $7.15 to remain at the regulated rent of $1.79. But it is the invitation, not the rent, that makes the difference. The line which separates these cases from *Loretto* is the unambiguous distinction between a commercial lessee and an interloper with a government license." *Id*. at 252-53.

Having held that the original version of the Pole Attachments Act fell outside the per se rule announced by *Loretto* to govern physical takings, the Court proceeded to evaluate whether it nonetheless represented a nonpossessory taking. Rather than proceeding to cite the *Penn Central* factors, as its quotation of *Loretto* suggested, *Florida Power* held that the Takings Clause simply required that the rates set not be confiscatory.[170] The Court concluded that the pole attachment rates established by the statute allowed for sufficient return on investment to satisfy the requirements its confiscatory ratemaking jurisprudence.[171]

Florida Power thus reinforced the same key principles that underlay Court's decision in *Loretto*. First, although the Court stopped short of addressing the issue explicitly,[172] the Court's reasoning strongly implied that had the Pole Attachments Act compelled utilities to give cable television systems access to their poles, it would have constituted a per se taking under *Loretto*. Second, *Florida Power* underscored the sharp distinction between the Court's physical takings and confiscatory ratemaking precedents. Echoing the admonitions offered by Justices Brandeis and Black cautioning that physical takings and confiscatory ratemaking represented distinct jurisprudential spheres,[173] the Court established that its confiscatory ratemaking precedents did not have any application to cases involving physical takings.

4. Implications

a. Towards a Possible Synthesis of Regulatory Takings and Confiscatory Ratemaking Doctrine — Although courts and scholars typically treat regulatory takings and confiscatory ratemaking as conceptually distinct,[174] the court's opinions in *Loretto* and *Florida Power* suggest that both of those lines of precedent may in fact represent a single concept. It is quite easy to reconceptualize a restriction on the amount that a person can charge for access to a piece of property as either a restriction on the property's use or as a "public program adjusting the benefits and burdens of economic life to promote the common good" that characterizes the classic regulatory taking.[175] Moreover, both lines of precedent appear to be animated by similar concerns. Each line of authority recognizes that almost every government action necessarily affects the value of private property and that imposing too stringent a leash on regulatory action would conflict with

[170] 480 U.S. at 253 (citing St. Joseph Stock Yards Co. v. United States, 298 U.S. 38, 53 (1936), and Permian Basin Area Rate Cases, 390 U.S. 747, 761, 770 (1968)).
[171] *Id.* at 253-54.
[172] *Id.* at 251 n.6.
[173] *See supra* notes 117-122 and accompanying text.
[174] *See, e.g.*, SIDAK & SPULBER, *supra* note 31, at 213.
[175] *See Penn Central*, 438 U.S. at 124

the exigencies of modern governance.[176] At the same time, both attempt to balance this concern against the recognition that, if taken to excess, the power to regulate can constitute the power to destroy.[177] In addition, both employ almost identical methodologies that emphasize the fact specific nature of the claims[178] and focus in large part on the economic impact of the restriction both on the regulated entity[179] and on the expectations of investors.[180]

Finally, certain precedents suggest that these two approaches may be fungible. For example initial discussion in the Court's *Florida Power* opinion invoked the Court's regulatory takings jurisprudence when it suggested that, in the absence of some requirement that utilities permit permanent occupation of their poles by cable companies, the regulations would be " 'analyzed under the multifactor inquiry generally applicable to nonpossessory governmental activity.' "[181] Immediately following that observation, however, the Court held that, in the absence of such compulsion, the Pole Attachments Act was properly analyzed under the Court's confiscatory ratemaking precedents.[182] The juxtaposition of these two observations in the same opinion indicates that the Court may well have viewed these two lines of precedent as simply being variations of the same doctrine.

The reasoning contained in the Court's rent control precedents raise a similar inference. For example, the Court analyzed the rent control ordinance at issue in *Pennell v. City of San Jose*[183] in terms of the Court's

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[176] *Compare, e.g.*, *Pa. Coal*, 260 U.S. at 413 ("Government hardly could go on if to some extent values incident to property could not be diminished without paying for every such change in the general law."), *with Hope Natural Gas*, 320 U.S. at 601 ("The fixing of prices … may reduce the value of the property which is being regulated. But the fact that the value is reduced does not mean that the regulation is invalid.").

[177] *Compare Pa. Coal*, 260 U.S. at 415 (noting that without some limit on the government's ability to restrict the manner in which owners can use their property, "the natural tendency of human nature [would be] to extend the qualification more and more until at last private property disappears"), *with* Railroad Comm'n Cases, 116 U.S. 307, 331 (1886) ("[I]t is not to be inferred that this power of limitation or regulation [of rates] is itself without limit. This power to regulate is not a power to destroy, and limitation is not the equivalent of confiscation.").

[178] *Compare Penn Central*, 438 U.S. at 124 (calling the regulatory takings standard an "essentially ad hoc, factual inquir[y]"), *with Hope Natural Gas*, 320 U.S. at 603 (observing that determining whether a rate is confiscatory depends upon a series of fact-intensive inquiries focusing on the net effect of the rate on the utility's property).

[179] *Compare Penn Central*, 438 U.S. at 124 (identifying "the economic impact of the regulation on the claimant" as a factor in the regulatory taking analysis), *with Hope Natural Gas*, 320 U.S. at 603 (recognizing the importance of ensuring that the regulated entity receives "enough revenue not only for operating expenses but also for the capital costs of the business").

[180] *Compare Penn Central*, 438 U.S. at 124 (identifying "the extent to which the regulation has interfered with distinct investment-backed expectations" as a factor in the regulatory taking analysis), *with Hope Natural Gas*, 320 U.S. at 603 (noting that investors have "a legitimate concern with the financial integrity of the company whose rates are being regulated").

[181] FCC v. Fla. Power Corp., 480 U.S. 245, 252 (1987) (quoting Loretto v. Teleprompter Manhattan CATV Corp., 458 U.S. 419, 440 (1982)).

[182] *Id*. at 253.

[183] 485 U.S. 1, 11-13 (1988).

confiscatory ratemaking precedents. In contrast, the Court analyzed the rent control ordinance in *Yee v. City of Escondido*[184] in terms of its regulatory taking jurisprudence, explicitly stating that the rent control ordinance at issue "merely regulate[s] petitioners' *use* of their land by regulating the relationship between landlord and tenant."[185] Indeed, the Court specifically equated ceilings on the rents the landlord can charge with other types of use restrictions and declared that both types of restrictions were properly analyzed under classic regulatory takings precedents such as *Pennsylvania Coal v. Mahon* and the progeny of *Penn Central*.[186] The parallels between the two doctrines are further underscored by the fact that the Court's opinion in *Lucas v. South Carolina Coastal Council*[187] described the strand of regulatory takings doctrine used to invalidate regulations that prohibit all economically beneficial use of land as being directed against "confiscatory" regulations.[188]

It is thus arguable that amount to the Court's regulatory takings and confiscatory ratemaking jurisprudence actually slightly different aspects of a single doctrine. Unfortunately, the Court has never clearly addressed the relationship between these two lines of precedent, and scholarly analysis shed little additional light on the issue.[189] In addition, it would be somewhat anachronistic to suggest that the Court had a unified takings jurisprudence in mind from the outset. The Court's jurisprudence on confiscatory takings long antedates its recognition of regulatory takings in *Pennsylvania Coal*, let alone the announcement of the ad hoc factors in *Penn Central*. In fact, since rate regulation was primarily state regulation and the Takings Clause was not assimilated against the states until 1897,[190] the earliest confiscatory ratemaking cases arose under the Due Process Clause, rather than the Takings Clause. The historical dichotomy is further reinforced by the views of Justice Brewer, who was perhaps the primary architect of the Court's early takings jurisprudence. His famous speech at Yale Law School on the subject clearly evinces his belief that rate regulation and use restrictions represent distinct lines of authority.[191]

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[184] 503 U.S. 519, 522-23 (1992).

[185] *Id*. at 528 (emphasis in original); *see also* Block v. Hirsch, 256 U.S. 135, 155-56 (1921) (Holmes, J.) (analogizing rent control to restrictions on the use of property, such as limits on building heights or billboards).

[186] *Id*. at 529.

[187] *See* 505 U.S. 1003 (1992).

[188] *Id.* at 1029, 1032 n.18.

[189] *See* John N. Drobak, *From Turnpike to Nuclear Power: The Constitutional Limits on Utility Rate Regulation*, 65 B.U. L. REV. 65, 98 (1985) (asserting, without analysis, that the Court's regulatory takings and confiscatory ratemaking precedents are "equivalent"); *see also* Richard Goldsmith, *Utility Rates and "Takings"*, 10 ENERGY L.J. 241, 256-59 (1989) (identifying similarities in the Court's regulatory takings and confiscatory ratemaking precedents, but ultimately concluding that confiscatory ratemaking was based on due process).

[190] *See* Chi., B. & Q.R. Co. v. Chicago, 166 U.S. 226 (1897).

[191] David J. Brewer, *The Protection of Private Property from Public Attack*, 55 NEW ENG. & YALE REV. 97 (1891).

b. The Paradigmatic Importance of the Shift to Access Regulation — Fortunately, we need not resolve the precise relationship between regulatory takings and confiscatory ratemaking in order to press our argument. Although the cases do not shed much light on whether or not regulatory takings and confiscatory ratemaking represent distinct concepts or instead represent slightly different aspects of the same doctrine, for our purposes, it is sufficient that the Court has emphasized the importance of keeping both of the categories distinct from its physical takings jurisprudence.[192] If a regulation authorizes a third party to establish a permanent physical invasion, *Loretto* and *Florida Power* together make clear that it constitutes a per se taking without resort to any of the considerations typically invoked under both the Court's regulatory takings and confiscatory ratemaking jurisprudence.

Equally importantly, the Court has frequently reiterated that its physical and nonpossessory takings precedents occupy separate spheres and that its decisions involving nonpossessory takings have no application to physical takings. For example, the Court held in *Yee v. City of Escondido*[193] that a regulatory takings challenge was not fairly included in a question presented focusing on physical takings on the grounds that "[c]onsideration of whether a regulatory taking occurred would not assist in resolving whether a physical taking occurred as well."[194] In so holding, the Court emphasized that both questions "exist side by side, neither encompassing another."[195] The Court struck a similar note in *Palazzolo v. Rhode Island*[196] when it recognized that physical takings "present[ ] different considerations than cases alleging a taking based on a burdensome regulation."[197]

The Court issued its most recent reaffirmation of these principles last Term in *Tahoe-Sierra Preservation Council, Inc. v. Tahoe Regional Planning Agency*.[198] The Court reaffirmed that whenever a physical taking occurs, the government has a categorical duty to compensate the owner, regardless of the size of the occupation or whether the government only takes part of a larger parcel.[199] Echoing its more extended discussion in *Loretto*, the Court found it appropriate to treat physical takings in such categorical fashion because "physical appropriations are relatively rare, easily identified, and usually represent a greater affront to individual property rights."[200] As a result, when determining whether a physical taking has occurred, there is no need to evaluate the magnitude of the economic impact of the government's

[192] *See supra* notes 164, 173 and accompanying text.
[193] 503 U.S. 519 (1992).
[194] *Id.* at 537-38.
[195] *Id*. at 537.
[196] 533 U.S. 606 (2001).
[197] *Id.* at 628.
[198] 122 S. Ct. 1465 (2002).
[199] *Id*. at 1478.
[200] *Id*. at 1479.

action on the property owner or to inquire into the substantiality of the governmental interest underlying the regulation. Any physical invasion, no matter how small, is sufficient.[201] Most importantly for our purposes, the *Tahoe-Sierra* Court emphasized these differences "make[ ] it inappropriate to treat cases involving physical takings as controlling precedents for the evaluation of a claim that there has been a regulatory taking, and vice versa."[202]

Tahoe-Sierra thus reaffirmed the core substantive holding of *Loretto* by reiterating that permanent physical occupations constitute per se takings without regard to the economic impact or the public purpose served by the invasion. Equally importantly, it offered the Court's plainest statement to date that its regulatory takings decisions do not constitute precedent in cases involving physical takings.

B. Physical Takings Jurisprudence Applied to Network Access

Determining whether a takings violation has occurred thus requires resolution of two separate questions. First, has the governmental action in question effected a taking? As the foregoing discussion underscores, the approach to resolving this question varies depending on whether the regulation at issue is alleged to be a physical taking. Second, if so, has the government provided just compensation for its actions.

1. Determining Whether a Taking Has Occurred

In contrast to the analysis applied to both regulatory takings and confiscatory ratemaking, which attempt to balance the interests of the public with those of the utility and which carefully examine the regulation's economic impact, physical takings are governed by a simple bright line rule. As the Court held in *Loretto* and reaffirmed several times since, government action is a per se taking if it authorizes a permanent physical occupation, such as occurs when a regulation gives third parties the right to place telecommunications equipment on the network owner's property.[203] If a permanent physical occupation is involved, it does not matter whether the action furthers an important public interest or achieves an important public benefit.[204] Nor does it matter that the size or economic impact of the invasion may be minimal.[205] Indeed, a permanent physical invasion is still a

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[201] *Id.*

[202] *Id.* (footnote and internal quotation marks omitted).

[203] *See supra* notes 147-164 and accompanying text.

[204] *Tahoe-Sierra*, 122 S. Ct. at 1479; Lucas v. S.C. Coastal Council, 505 U.S. 1003, 1015, 1028 (1992);
Yee, 503 U.S. at 530; Nollan v. Cal. Coastal Comm'n, 483 U.S. 825, 831-32 (1987); Loretto v. Teleprompter Manhattan CATV Corp., 458 U.S. 419, 426, 434-35 (1982)).

[205] *See Tahoe-Sierra*, 122 S. Ct. at 1479; Palazzolo v. Rhode Island, 533 U.S. 606, 617 (2001); *Lucas*, 505 U.S. at 1015; *Nollan*, 483 U.S. at 831-32; *Loretto*, 458 U.S. at 435, 437, 438 n.16.

per se taking even if it causes the value of the property to increase.[206] The Court reasoned:

> [This] conclusion . . . [is] premised on our longstanding recognition that property is more than economic value; it also consists of "the group of rights which the so-called owner exercises in his dominion of the physical thing," such as "the right to possess, use and dispose of it." While the [property] at issue here may have no economically realizable value to its owner, possession, control, and disposition are nonetheless valuable rights that inhere in the property.[207]

Thus, any regulation that requires a network owner to permit third parties to place equipment on its property constitutes a per se taking under *Loretto*. This fact underscores the constitutional significance of the shift from rate regulation to access regulation. As will be discussed in greater detail during the application of this analytical framework to three current policy problems, regulations that compel access to wireline telecommunications networks generally require the placement of third-party equipment on the network owner's property.[208] As a result, the shift from rate regulation to access regulation generates an equally fundamental shift in the constitutional analysis. Finding that a taking has occurred is only the first step in the constitutional inquiry, however. Whether access regulations violate the Takings Clause thus depends on whether the regulation provides for just compensation.

2. Determining Just Compensation

Once a court determines that a taking has occurred, the constitutionality of the regulation in question is determined by whether the government provides just compensation for the property taken. The *Loretto* Court did not address the question of compensation, leaving that for consideration by the

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[206] *See* Phillips v. Wash. Legal Found., 524 U.S. 156, 169-70 (1998); *Loretto*, 458 U.S. at 437 n.15.

[207] *Phillips*, 524 U.S. at 170 (citations omitted) (quoting United States v. Gen. Motors Corp., 323 U.S. 373, 378 (1945)); *accord Loretto*, 458 U.S. at 435-36.

[208] Interestingly, it is less clear whether a regulation compelling access to a wireless network would invariably constitute a physical taking. In contrast to wireline communications, which depend on having a physical connection to the network, spectrum-based communications may require nothing more than the appropriate placement of antenna owned by the property holder or occupant. Regulations mandating access to wireless networks thus do not necessarily require the installation of third-party equipment on private property. For example, the D.C. Circuit recently rejected a takings challenge to an FCC order intended to ensure access to different forms of television service by in essence requiring property owners to allow residents to install antennas needed to receive DBS service, broadcast signals, and other forms of television programming. The court concluded that, since the regulation in question did not compel a physical invasion of property, it did not constitute a per se taking under *Loretto* and was properly analyzed as a regulatory taking. Bldg. Owners & Managers Ass'n Int'l v. FCC, 254 F.3d 89, 99 (D.C. Cir. 2001).

state courts on remand.[209] In addition, most courts confronted with this issue have held the issue not yet ripe for judicial consideration.[210]

a. Market Value as the Preferred Measure of Just Compensation — The Court has often averred that the guiding principle in determining what constitutes just compensation has been that "the owner shall be put in as good position pecuniarily as he would have been if his property had not been taken."[211] As a result, the Court established that the predominant measure of just compensation should be "market value."[212] As Justice Frankfurter reasoned in *Kimball Laundry Co. v. United States*[213]:

> Most things . . . have a general demand which gives them a value transferable from one owner to another. As opposed to such personal and variant standards as value to the particular owner whose property has been taken, this transferable value has an external validity which makes it a fair measure of [just compensation].[214]

The external validity identified by Frankfurter has both a theoretical and practical basis. As a theoretical matter, market value reflects the seminal insights of neoclassical economics that effectively transformed value from an intrinsic concept into a one based on market-based evidence of the property's earning potential. This shift was already evident in the very first case in which the Court addressed the principles that would guide the just compensation inquiry, *Monongahela Navigation Co. v. United States*,[215] in which the federal government condemned a lock and a dam operated by a

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[209] *Loretto*, 458 U.S. at 441.

[210] *See, e.g.*, Verizon Communications, Inc. v. FCC, 122 S. Ct. 1646, 1679-80 (2002); Gulf Power Co. v. FCC, 208 F.3d 1263, 1272-73 (11th Cir. 2000) ("*Gulf Power II*"), *rev'd on other grounds sub nom.* Nat'l Cable & Telecomms. Ass'n v. Gulf Power Co., 122 S. Ct. 782 (2002); Gulf Power Co. v. FCC, 187 F.3d 1324, 1338 (11th Cir. 1999) ("*Gulf Power I*"); Iowa Utils. Bd. v. FCC, 120 F.3d 753, 818 (8th Cir. 1997), *rev'd & remanded in part on other grounds*, AT&T Corp. v. Iowa Utils. Bd., 525 U.S. 366 (1999); Ill. Bell Tel. Co. v. FCC, 911 F.2d 776, 780 (D.C. Cir. 1990).

[211] United States v. 564.54 Acres of Land, 441 U.S. 506, 510 (1979) ("*Lutheran Synod*") (quoting Olson v. United States, 292 U.S. 246, 255 (1934)). As Richard Epstein has noted, "In principle, the ideal solution is to leave the individual owner in a position of indifference between the taking by the government and the retention of the property." *See* RICHARD A. EPSTEIN, TAKINGS: PRIVATE PROPERTY AND THE POWER OF EMINENT DOMAIN 182, (Harvard University Press 1985). For the earliest statements of this principle, see Monongahela Nav. Co. v. United States, 148 U.S. 312, 326 (1893); Seaboard Air Line Ry. v. United States, 261 U.S. 299, 304 (1923).

[212] *See, e.g.*, United States v. 50 Acres of Land, 469 U.S. 24, 29 (1984) ("*Duncanville Landfill*"); Kirby Forest Indus., Inc. v. United States, 467 U.S. 1, 10 (1984); *Lutheran Synod*, 441 U.S. at 511; Almota Farmers Elevator & Warehouse Co. v. United States, 409 U.S. 470, 474 (1973); United States v. Commodities Trading Corp., 339 U.S. 121, 123 (1950); United States v. Toronto, Hamilton & Buffalo Nav. Co., 338 U.S. 396, 402 (1949); *Gen. Motors*, 323 U.S. at 379; United States v. Miller, 317 U.S. 336, 374 (1943); *Olson*, 292 U.S. at 255; *Mitchell*, 267 U.S. at 343; United States v. New River Collieries Co., 262 U.S. 341, 344 (1923). Although the cases at times refer to this standard as "fair market value," as the Court noted in *Miller*, the two formulations essentially amount to the same thing. 317 U.S. at 374.

[213] 338 U.S. 1 (1949).

[214] *Id*. at 5.

[215] 148 U.S. 312 (1893).

private company pursuant to a state franchise. The issue was whether the Takings Clause simply required compensation for the tangible property taken or whether the federal government also had to compensate the company for the tolls the facility would have earned by using that property. The Court held that the Takings Clause required payment of "a full and perfect equivalent for the property taken,"[216] which, "generally speaking, is determined by its productiveness,—the profits which its use brings to the owner."[217] "The value, therefore, is not determined by the mere cost of construction, but more by what the completed structure brings in the way of earnings to its owner."[218] As a result, it followed that the income that the lock and the dam would have earned had to be regarded as an intrinsic part of the property's value.[219] The Court has subsequently reaffirmed the principle on numerous occasions.[220]

Practical considerations provide additional reasons for preferring exchange-oriented approaches over cost-oriented approaches when determining just compensation. As the Court observed, the shift to the market value standard was driven in part by the "need for a clear, easily administrable rule governing the measure of 'just compensation.' "[221] The use of external measures of value eliminated many of the "serious practical difficulties in assessing the worth an individual places on particular property at a given time."[222] Permitting such subjective considerations to determine what constitutes just compensation "would enhance the risk of error and prejudice."[223]

The Court has stated that the market value standard is not a constitutional mandate and has held out the possibility that the Court might permit some deviation from it.[224] Indeed, the Court has long recognized that the market value fails to give the principle of putting property owners in as good a position as if their property had not been taken "its full and literal force."[225]

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[216] *Id.* at 326; *accord id.* (alternatively stating the test as "a full equivalent" and "a full and exact equivalent" for the property taken).

[217] *Id.* at 328.

[218] *Id*.

[219] *Id.* at 329.

[220] *See, e.g.*, Lucas v. S.C. Coastal Council, 505 U.S. 1003, 1017 (1992) (" 'For what is the land but the profits thereof?' " (quoting 1 E. COKE, INSTITUTES, ch. 1, § 1 (1st Am. ed. 1812) (alterations omitted)); *Kimball Laundry*, 338 U.S. at 9 ("The market value of land as a business site tends to be as high as the reasonably probable earnings of a business there situated would justify.").

[221] *Kirby Forest*, 467 U.S. at 10 n.15.

[222] *Lutheran Synod*, 441 U.S. at 511; *accord* United States *ex rel.* Tenn. Valley Auth. v. Powelson, 319 U.S. 266, 280 (1943) (noting that the market value standard avoided "serious practical difficulties in assessing the worth an individual places on particular property at a given time").

[223] *Duncanville Landfill*, 469 U.S. at 36

[224] *See* United States v. Cors, 337 U.S. 325, 332 (1949) (cautioning against making a "fetish" of market value); *see also Duncanville Landfill*, 469 U.S. at 29; *Lutheran Synod*, 441 U.S. at 512; *Kirby Forest*, 467 U.S. at 10 n.14; United States v. Fuller, 409 U.S. 488, 490 (1973); United States v. Va. Elec. & Power Co., 365 U.S. 624, 633 (1961); *Toronto, Hamilton & Buffalo*, 338 U.S. at 402; United States v. Miller, 317 U.S. 369, 374 (1943).

[225] *Lutheran Synod*, 441 U.S. at 511.

For example, the market value standard fails to require the government to provide "compensat[ion] for all values an owner may derive from his property."[226] In particular, the Court has frequently observed that just compensation does not necessarily require compensation for the special value that a piece of property may have for a particular user.[227] Furthermore, the Court does not allow recovery of any transaction costs imposed by the taking.[228] As a result, the market value standard has been criticized for failing to make whole those whose property is taken.[229]

The Court has nonetheless concluded that the market value standard offers an appropriate accommodation for the exigencies of modern governance. In most cases market value "achieves a fair 'balance between the public's need and the claimant's loss,' "[230] thereby mediating "the conflict between the people's interest in public projects and the principle of indemnity to the landowner."[231] Although the failure to take subjective valuation into account can impose real costs on those whose property is taken, such slippage is "properly treated as part of the burden of common citizenship."[232] As a result, any exceptions to the market value rule that may exist remain very narrow.[233]

b. Determining Market Value under the Takings Clause — Market value is defined as the amount that would be paid for the property in a transaction between a willing buyer and a willing seller.[234] Consequently, market value must take into account any aspect of the property that would affect the price that a reasonable buyer would be willing to pay.[235] For example, in *Boom Co. v. Patterson*, the Court held that in determining the value of condemned land, "the same considerations are to be regarded as in a sale of property between private parties. The inquiry in such cases must be what is the property worth in the market, viewed not merely with reference

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[226] *Id*.

[227] *Id.* (citing *Miller*, 317 U.S. at 374-75; and *Cors*, 337 U.S. at 332).

[228] *See, e.g.*, United States v. Petty Motors Co., 327 U.S. 372, 377-78 (1946); *cf. supra* notes 33-34 and accompanying text (noting that transaction costs are real costs that should be taken into account when compensating network owners for access to their inputs).

[229] *See, e.g.*, James Geoffrey Durham, *Efficient Just Compensation as a Limit on Eminent Domain*, 69 MINN. L. REV. 1277, 1300 (1985). *See generally* D. Michael Risinger, *Direct Damages: The Lost Key to Constitutional Just Compensation When Business Premises Are Condemned*, 15 SETON HALL L. REV. 483, 526-40 (1985) collecting commentary); Michael DeBow, *Unjust Compensation: The Continuing Need for Reform*, 46 S.C. L. REV. 579, 579-80 & n.7 (1995) (same).

[230] *Id*. at 33 (quoting *Toronto, Hamilton & Buffalo*, 338 U.S. at 402).

[231] *Powelson*, 319 U.S. at 280.

[232] *Kimball Laundry*, 338 U.S. at 5.

[233] DeBow, *supra* note 229, at 581; Ann E. Gergen, *Why Fair Market Value Fails as Just Compensation*, 14 HAMLINE J. PUB. L. & POL'Y 181, 195 (1994) ; Glynn S. Lunney, Jr., *Compensation for Takings: How Much Is Just?*, 42 CATH. U. L. REV. 721, 729-31, 759-61 (1993).

[234] *Kirby Forest*, 467 U.S. at 10; *Lutheran Synod*, 441 U.S. at 511; *Miller*, 317 U.S. at 374.

[235] *Almota*, 407 U.S. at 474 (plurality opinion); *Va. Elec.*, 365 U.S. at 635-36; *Olson*, 292 U.S. at 260; *Mitchell*, 267 U.S. at 343; Boom Co. v. Patterson, 98 U.S. 403, 407-08 (1878).

to the uses to which it is at the time applied, but with reference to the sues to which it is plainly adapted."[236]

The Court reiterated these principles in *Olson v. United States*.[237] When determining the price upon which a willing buyer and a willing seller would settle, "there should be taken into account all considerations that fairly might be brought forward and reasonably be given substantial weight in such bargaining."[238] The Court involved the concept of opportunity cost when it noted that "[t]he highest and most profitable use for which the property is adaptable and needed or likely to be needed in the reasonably near future is to be considered, not necessarily as the measure of value, but to the full extent that the prospect of demand for such use affects the market value while the property is privately held."[239] In addition, "to the extent that probable demand by prospective purchasers or condemnors affects market value, it is to be taken into account."[240]

Consistent with the economic principles identified above,[241] the Court has held that an evaluation of comparable sales represents the most reliable way to determine how much a willing buyer would have agreed to pay to a willing seller had the property been transferred on the open market. As the Court observed in *Kimball Laundry*, "If exchanges of similar property have been frequent, the inference is strong that the equivalent arrived at by the haggling of the market would probably have been offered and accepted, and it is thus that 'market price' becomes so important a standard of reference."[242]

Other measures may be required when the property being valued is so infrequently traded that in effect no market for it exists.[243] In the absence of comparable sales, the Court has sanctioned use of the income capitalization approach when valuing commercial property, in which market value is determined to be the net present value of the property's projected income.[244] Although this approach has the advantage of being based on data derived

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[236] 98 U.S. at 407-08.

[237] 292 U.S. 246 (1934).

[238] *Id*. at 257; *accord id.* at 255 ("Just compensation includes all elements of value that inhere in the property . . .").

[239] *Id*. at 255.

[240] *Id*. at 256 (citing *Boom Co*.); *accord Almota*, 409 U.S. at 477-78 (valuing property based on every consideration that the market would have included had the property been sold in an open market); *id.* at 479 (Powell, J., concurring) (given weight to every value that would have been given weight in a transaction between a willing buyer and a willing seller).

[241] *See supra* Part I.C.1.

[242] 338 U.S. at 6.

[243] *See, e.g.*, *Duncanville Landfill*, 469 U.S. at 29; *Kirby Forest*, 467 U.S. at 10 n.14; *Lutheran Synod*, 441 U.S. at 512; United States v. Commodities Trading Corp., 339 U.S. 121, 123 (1950); *Kimball Laundry*, 338 U.S. at 6; *Toronto, Hamilton & Buffalo*, 337 U.S. at 402; *Miller*, 317 U.S. at 374-75.

[244] *See Lutheran Synod*, 441 U.S. at 515 (noting that "the uses to which commercial property is put can often be valued in terms of the capitalized earnings produce"); *Kimball Laundry*, 338 U.S. at 16-17 ("One index of going-concern value offered by petitioner is the record of its past earnings."). For an application of these principles in the context of telecommunications, see *Illinois Bell Telephone Co. v. FCC*, 988 F.2d 1254 (D.C. Cir. 1993).

from actual market transactions, the Court has recognized that it does carry some risks. Estimates of value based on capitalization of income are only as reliable as the data upon which they are based. For example, projections of future income are typically based on the income that a particular property has earned in the past. While such data are often reliable indicators of future earnings, at times they may fail to reflect the full range of technological and economic developments.[245]

In addition, the Court has suggested that in the absence of better measures of value, it is appropriate for courts to consider replacement cost when determining whether the government has provided just compensation. As noted earlier, replacement cost is better than historic cost at reflecting changes in value across time.[246] It also provides a useful ceiling, since all those who would purchase access would also have the option of making it themselves. At the same time, approaches that focus on replacement cost suffer from several conceptual limitations. First and foremost, such approaches are problematic in that they do not necessarily reflect exchange value.[247] In addition, by failing to incorporate any element that reflects demand, the replacement cost approach may fail to take technological obsolescence into account and as a result may require compensation even "when no one would think of reproducing the property."[248] Moreover, in order to compensate for functional obsolescence, courts must analyze the replacement cost of a plant of equal efficiency by including an allowance for physical depreciation. Failing to do so would have the effect of bestowing a windfall on the property owner, represented by the difference in quality between the new, replacement facility and the older facility actually taken. The addition of depreciation as a valuation factor adds considerable uncertainty to the valuation process.[249]

The Court reserved its heaviest criticism for the valuation approach upon which regulatory authorities have most often relied in network industries: historical cost. The Court's criticism of historical cost methodologies dates back to its earliest takings decisions.[250] As the Court explained in *United States v. Toronto, Hamilton & Buffalo Navigation Co.*,[251] historical cost all too often represents a "false standard of the past" that bears no necessary

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[245] *See Toronto, Hamilton & Buffalo*, 337 U.S. at 398, 403 (finding earnings record based on ferry routes from 1916 to 1932 inapposite when the development of alternative ferry routes in 1928 rendered those routes obsolete).

[246] *See supra* notes 31-32 and accompanying text.

[247] 4 JULIUS L. SACKMAN, NICHOLS ON EMINENT DOMAIN § 12.01[1], at 12-33 to -34 (rev. 3d ed. 2001).

[248] *Toronto, Hamilton & Buffalo*, 337 U.S. at 403. For example, the *Toronto, Hamilton & Buffalo* Court determined that replacement cost was misleading in light of the fact that the development of rail lines and larger ferries had rendered ships of the type in question obsolete. *Id*. at 399-400.

[249] *Duncanville Landfill*, 469 U.S. at 34-35; *Lutheran Synod*, 441 U.S. at 518 (White, J., concurring).

[250] *See Monongahela*, 148 U.S. at 328 ("The value, therefore, is not determined by the mere cost of construction . . ..").

[251] 338 U.S. 396 (1949).

relationship with present value.[252] As a result, the Court condemned historical cost as "a backward-looking measure that is unreliable in determining a current fair market value."[253] The Court elaborated further in *Olson*, in which it pointed out that market value

> may be more or less than the owner's investment. He may have acquired the property for less than its worth or he may have paid a speculative and exorbitant price. Its value may have changed substantially while held by him. . . . The public may not by any means confiscate the benefits, or be required to bear the burden of the owner's bargain . . . He must be made whole but is not entitled to more.[254]

Because of the problems associated with these other methodologies, the Court has consistently indicated that the comparable sales approach represents the best evidence of market value.[255] Indeed, the Court has gone so far as to refer to other valuation methodologies (including replacement cost) as exceptions to the comparable sales approach and to hold these other methodologies inapplicable whenever market-based transactions in similar properties exist.[256] The Court offered its most dramatic statement to this effect in *United States v. New River Collieries Co*.,[257] in which the Court held that "[w]here private property is taken for public use and there is a market price prevailing at the time and place of the taking, that price *is* just compensation."[258] When comparable sales data existed, evidence of income and replacement cost was properly held inadmissible.[259] The implication is

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[252] *Id.* at 403 (footnote and citations omitted).

[253] *Id*.

[254] 292 U.S. at 255; *accord* 4A NICHOLS ON EMINENT DOMAIN, *supra* note 247, § 15.09[1], at 15-62 (noting that historical cost "is not a conclusive test, because the money may have bee improvidently expended, or by reason of a change in conditions, parts of the works may have ceased to be of value, or the cost of labor and materials may have increased or decreased").

[255] *See* 3 NICHOLS ON EMINENT DOMAIN, *supra* note 247, § 12B.04[3], at 12B-22 (calling the comparable sales approach "the preferred way to compute market value); DeBow, *supra* note 229, at 582 ("it is widely understood that in practice the Supreme Court shows a strong preference for the comparable sales approach"); Lunney, *supra* 233, at 728 (noting that the Court "has preferred that a party establish market value through the comparable sales approach").

[256] *See Duncanville Landfill*, 469 U.S. at 29; *Lutheran Synod*, 441 U.S. at 512; *Kirby Forest*, 467 U.S. at 10 n.14; *Toronto, Hamilton & Buffalo*, 338 U.S. at 402. The Court has also suggested in dicta that the market value standard may be set aside when application of the market value standard " 'would result in manifest injustice to owner or public.' " *Duncanville Landfill*, 469 U.S. at 29 (quoting *Commodities Trading Corp.*, 339 U.S. at 123); The Court has never provided much guidance as to when this exception might arise. In addition, to date the Court has rejected every attempt to invoke this exception in terms that gave no suggestions as to the circumstances in which it might actually apply. *See id.* at 30-36; *Lutheran Synod*, 441 U.S. at 514-17. The language of these opinions and the fact that the Court has yet to find a case in which this exception applies strongly suggests that this exception is at best extremely narrow and possibly even empty.

[257] 262 U.S. 341 (1923).

[258] *Id.* at 344 (emphasis added).

[259] *Id.*

that whenever equivalent property is regularly traded on an established market, comparable sales represent the sole measure of compensation. Only if such data is unavailable may courts resort to other methodologies, and even when doing so, it should turn first to the income capitalization approach and then the replacement cost approach before evaluating value in terms of historical cost.

The arguments advanced by Justice Brandeis and later offered by the Court to justify reliance on historical cost when evaluating takings challenges to conventional rate regulation are not to the contrary.[260] At no point did anyone suggest that cost-based methodologies are superior under the principles of economics and fairness embodied in the Takings Clause. Instead, the Court made clear that it was sanctioning the use of cost-based methodologies only because of market-based methodologies were unavailable. Implicit in this argument is the recognition that use of cost-based methodologies was valid only so long as comparable sales did not exist and that the emergence of market-based benchmarks would require a return to the established principles of constitutional law.

The foregoing analysis underscores the constitutional significance of both of the transformations that we have identified. The fundamental shift from rate regulation to access regulation makes it far easier for regulatory authorities to incorporate external reference points that reflect the demand side of the valuation equation. Because conventional rate regulation set the prices charged for the final outputs, any attempt to base rates on the final prices charged was hopelessly circular. Access regulation, in contrast, alleviates much of the circularity problem by allowing market-based competition to determine the prices charged for final goods. It is true that some circularity remains under access regulations. Regulatory authorities must still establish rates to govern the terms under which incumbent firms must provide access to competitors, and the rates set will have some influence on the prices charged for final goods. But the circularity problems will be mitigated to some extent by the fact that network access remains only one of several inputs required in the production of the final good. If network access comprises only a small percentage of the total cost, access rates will not represent a significant determinant of final good prices.

The emergence of direct, facilities-based network competition is also of considerable constitutional moment. Indeed, the emergence of direct competition undercuts the justifications for imposing access regulation as a matter of first principles. But even setting aside the basic policy question about whether access represents good policy, the emergence of substitute network technologies has equally profound implications for the implementation of any access regime. By facilitating the emergence of alternative networks capable of providing market-based indicia of

[260] *See supra* notes 44-50 and accompanying text.

competitive pricing, the convergence of telecommunications technology is in the process of vitiating the justification for using cost-based methodologies to set rates. As competition allows market benchmarks to emerge, precedent indicates that any continued reliance on cost-based methodologies would be improper.

c. Partial Takings of Utility Property — Although the Supreme Court's takings jurisprudence recognizes that the compensation paid by the government should generally reflect earning potential of the property taken, it should be noted that the government generally does not need to pay for the going concern value of the property when the government takes the entire fee and divests the current owner of title, it need not pay compensation for the going concern value of the property.[261] As the Court explained in *Kimball Laundry*, "the denial of compensation in such circumstances rests on a very concrete justification: the going-concern value has not been taken."[262] In such circumstances, "only the physical property has been condemned, leaving the owner free to move his business to a new location."[263] The Court further reasoned that "[i]n such a situation there is no more reason for a taker to pay for the business' going-concern value than there would be for a purchaser to pay for it who had not secured from his vendor a covenant to refrain from entering into competition with him."[264]

The *Kimball Laundry* Court has identified two circumstances in which the compensation for going concern value is nonetheless appropriate. The first occurs when the government takes a public utility that possesses natural monopoly characteristics.[265] "Since a utility cannot ordinarily operated profitably except as a monopoly, investment by the former owner of the utility in duplicating the condemned faculties could have no prospect of a profitable return."[266] In such cases, "[t]he owner retains nothing of the going-concern value that it formerly possessed."[267] Taking over a public utility thus "has the inevitable effect of depriving the owner of the going-concern value of his business," it properly is regarded as a taking for which compensation must be paid.[268]

The second situation identified in *Kimball Laundry* in which a firm must receive compensation for its going concern value arises when the government physically takes less than the fee interest in the owner's property.[269] The Court elaborated further in *United States v. General Motors*

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[261] *See, e.g.*, *Kimball Laundry*, 338 U.S. at 11; United States v. Gen. Motors Corp., 323 U.S. 373, 379 (1945).

[262] 338 U.S. at 11.

[263] *Id*.

[264] *Id.*

[265] *Id.* at 12 (citing City of Omaha v. Omaha Water Co., 218 U.S. 180 (1910); and City of Denver v. Denver Union Water Co., 246 U.S. 178, 191 (1918)).

[266] *Id.* at 12-13.

[267] *Id.* at 13.

[268] *Id.*

[269] *Id*. at 14-16.

Corp.,[270] in which the Court has recognized that, although the government need not pay compensation for a property' going concern value when it takes the full fee interest,[271] "[i]t is altogether another matter when the Government does not take [the owner's] entire interest, but by the form of its proceeding chops it into bits, of which it takes only what it wants, however few or minute, and leaves him holding the remainder."[272] The fact that only part of the property was taken in effect made it impossible for the property owner simply to reestablish its business elsewhere. In such cases, the proper measure of compensation was not just the cost of the property taken, but rather must also reflect the going concern value of the property as reflected by rental for use of the property that could be obtained on the open market.[273]

Both considerations underscore the constitutional problems that would result from basing network access rates solely on cost and counsel in favor of allowing the rates charged to reflect the probable demand for network services. To the extent that access to any particular portion of a network is justified, it must be because that portion bears natural monopoly characteristics. Since it is infeasible for the network owner to establish similar facilities elsewhere, the physical occupation of those facilities requires that the network be compensated for the going concern value of the property taken, which in this case is reflected by the value of the network services provided. In addition, the partial nature of the physical taking effected by access requirements provides yet another reason for requiring the government to compensate network owners for their lost profits. The fact that access necessarily involves a physical taking that is considerably less than the full fee interrupts the owner's use of the property and leaves the property inextricably intertwined with others' use of the property. Because these encumbrances effectively prevent the owner from using its property for other purposes, they require that compensation for such a partial physical taking include compensation for the property's going concern value.

3. Implications

It is no doubt tempting for regulatory authorities and courts to resolve takings challenges to regulations of network industries according to the same principles applied in cases involving conventional rate regulation. Those principles are based on balancing tests that regard regulations backed by strong public policy justifications and having minimal economic impact as constitutionality unproblematic. In addition, adherence to the preexisting approaches allows regulators to continue to employ the cost-based methodologies with which they are by now quite familiar. It would thus

[270] 323 U.S. 373 (1945).
[271] *Id*. at 379.
[272] *Id*. at 382.
[273] *Id*.; *Kimball Laundry*, 338 U.S. at 7.

allow ratemaking authorities to maximize the leverage gained from the regulatory tools developed in relation to their previous ratemaking efforts.

Blind application of existing principles, however, would ignore the constitutional import of the shift from rate regulation to access regulation. As noted earlier, access regulation typically requires network owners to permit permanent physical occupations of their property. Unlike rate regulation, then, access regulation effects a physical taking for which the government *must* pay compensation without regard to the magnitude of the invasion, its impact on investment-backed expectations, or the importance of the policy interests furthered by the regulation. The Court has made clear that the precedents regarding regulatory takings and confiscatory ratemaking upon which regulatory authorities have previously relied in rejecting takings challenges have no application to cases in which a physical taking is involved.[274]

The Court's takings jurisprudence also makes clear that the best measure of just compensation is market value and that, in turn, market value is best determined on the basis of actual market transactions. Although the absence of external, market-determined benchmarks once may have justified reliance on cost-based valuation methodologies, technological convergence and the shift from regulating outputs to regulating inputs have undercut the justification for continuing to do so by making it increasingly possible for regulatory authorities to determine value on the basis of actual market transactions. The implication is that the theoretical and technological transformation of regulated industries law in turn commands a similarly fundamental transformation of the principles used to evaluate takings challenges to the imposition of access regulation to network industries. Since front-line policy makers charged with implementing access regulations have to date largely ignored these implications, the obligation to enforce these principles will fall to the courts as they begin to address the merits of takings challenges to this type of regulation.

III. CURRENT POLICY APPLICATIONS

This Part applies the framework developed above to the three most salient access-related policy issues of the day: (1) access to local telephone networks, (2) access to networks of utility poles, and (3) access to high-speed broadband networks. This analysis will demonstrate how access necessarily involves a permanent physical invasion. It will also show how technological developments and the shift to access regulation have now made market-based pricing possible.

[274] *See supra* notes 164, 173, 192-202 and accompanying text.

A. Access to Local Telephone Networks

Access to local telephone systems represented the keystone to the Telecommunications Act of 1996, which has been lauded as the most sweeping reconceptualization of telecommunications policy since the initial enactment of the Communications Act of 1934. This subpart will provide an overview of the access requirements that have been imposed on local telephone networks. It will then analyze that regulatory regime in light of the economic and constitutional principles developed above. Both sets of principles compel the same conclusion: that the current approach to setting rates for access to elements of local telephone networks are flawed and should be replaced by an approach that better reflects market pricing.

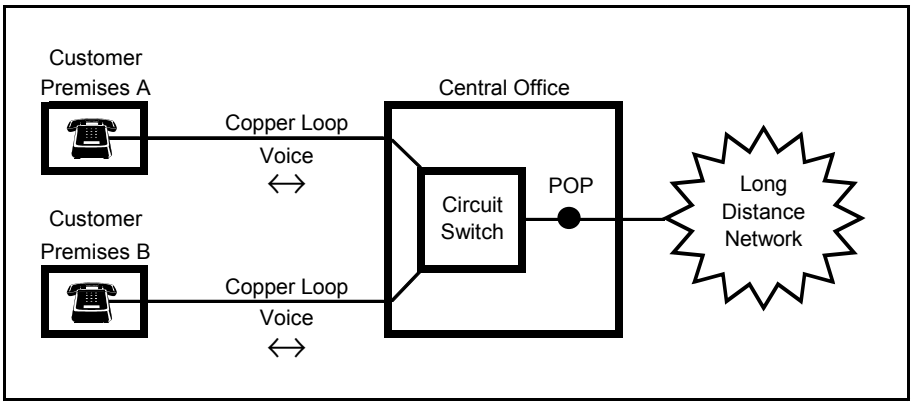
1. Regulatory Framework

In a typical narrowband network, customers connect to the telephone network through a pair of copper wires known as the local loop. The local loops terminate at a circuit switch located in the LEC's central office, which receives calls in analog format and routes them either to another local customer whose loop is also connected to the same switch or conveys the call a designated interconnection point (called a "point of presence" or "POP") where it can hand the call off to a long distance carrier. The typical local telephone network performs two distinct functions. It allows customers to place local calls to other customers in the same geographic area, a function known as "local exchange services" (represented in Figure 1 by the connection between Customer Premises A and Customer Premises B).[275] It also connects customers to long distance carriers by providing what became known as "exchange access services" (represented in Figure 1 by the connection between Customer Premises A and the point of presence maintained by the long distance carrier).

Policy makers initially regarded the entire telephone network as a natural monopoly. First, the significant fixed costs associated with constructing the initial network of wires, switches, and other equipment necessary to provide telephone service caused costs to decline across all relevant volumes. Second, the fact that the value of any local telephone network to any particular user is determined in no small part by the number of other users are connected to the same network caused local telephone systems tend to exhibit network economic effects.

[275] If a local exchange area is particularly large, the LEC may employ more than one central office switch connected together by high-speed trunk lines to serve a single calling area.

FIGURE 1
TYPICAL CONFIGURATION OF A BASIC LOCAL TELEPHONE NETWORK



Over time, policy makers came to realize that portions of the telephone network could be competitive. Usually at the prodding of the courts, the FCC eventually began to allow and encourage competition in various portions of the overall telephone system, such as the markets for telephone-related equipment[276] and long distance services.[277] This initial movement culminated in the breakup of AT&T,[278] which was aimed at preventing the Bell System from using its monopoly control over local telephone service to impede competition in the long distance and equipment markets by preventing any provider of local telephone service from providing long distance or equipment.[279] The decision that ordered the breakup, known as the Modified Final Judgment (MFJ), did not challenge the idea that local telephone service remained a natural monopoly and consequently made no attempt to promote competition at the local level.[280]

Over time, dramatic decreases in the cost of switching and transmission technology led policy makers to question whether local telephone service remained a natural monopoly. The initial step in fostering competition in local telephony was the FCC's *Expanded Interconnection* proceeding,[281]

[276] *See, e.g.*, Hush-A-Phone Corp. v. United States, 238 F.2d 266, 268 (D.C. Cir. 1956); Use of Carterfone Device in Message Toll Tel. Serv., Decision, 13 F.C.C.2d 420, 424 (1968).

[277] *See, e.g.*, MCI Telecomms. Corp. v. FCC, 561 F.2d 365 (D.C. Cir. 1977); MTS and WATS Market Structure, Report and Third Supplemental Notice of Inquiry and Proposed Rulemaking, 81 F.C.C.2d 177 (1980).

[278] United States v. Am. Tel. & Tel. Co., 552 F. Supp. 131 (D.D.C. 1982) ("*MFJ*"), *aff'd mem. sub nom.* Maryland v. United States, 460 U.S. 1001 (1983).

[279] For a complete discussion of the theories underlying the breakup of AT&T, see Roger Noll & Bruce M. Owen, *The Anticompetitive Uses of Regulation:* United States v. AT&T, *in* THE ANTITRUST REVOLUTION 290, 295-326 (John E. Kwoka, Jr. & Lawrence J. White eds., 1989).

[280] Implementation of Local Competition Provision in Telecomms. Act of 1996, Notice of Proposed Rulemaking, 11 F.C.C.R. 14171, 14173-74 ¶ 4 (1996).

[281] *See* Expanded Interconnection with Local Tel. Co. Facilities, Report and Order and Notice of Proposed Rulemaking, 7 F.C.C.R. 7369 (1992) ("*Special Access Order*"); Expanded Interconnection with Local Tel. Co. Facilities, Second Report and Order and Third Notice of Proposed Rulemaking, 8 F.C.C.R. 7374 (1993) ("*Switched Transport Order*").

which attempted to promote competition in local telephone service by nurturing the development of a new category of carriers known as Competitive Access Providers (CAPs). The increasing feasibility of competition in local telephony eventually culminated with the enactment of the local competition provisions of the 1996 Act.

a. The Expanded Interconnection *Proceeding* — When they first emerged, CAPs focused on offering corporate customers dedicated connections with long distance carriers that allowed those customers to bypass the incumbent LEC's facilities by transporting calls all the way from the customer's premises to the long distance carrier's.[282] CAPs also began to offer partial bypass services that covered either the segment running from the customer's location to the incumbent LEC's central office (a service known as "special access") or the segment running from the central office to the long distance carrier's POP (a service known as "switched transport").

CAP-provided services possessed many advantages over those provided by the incumbent LECs. First, CAP networks tended to employ more modern technology, such as fiber optic rings, which allowed them to offer a greater range of features and a more attractive price structure than could the incumbent LECs.[283] Unlike incumbent LECs, moreover, CAPs were not required to provide uniform services according to published tariffs approved by the FCC. As a result, they were able to respond more quickly to the market and to tailor pricing and terms of service to each customer's particular needs. Lastly, the untariffed nature of CAP services also allowed them to avoid the cross subsidies embedded in the system of access charges created by the FCC.

CAPs were important for a far more fundamental reason, however. The deployment of CAP networks did not only allow for the emergence of competition in the market for access to long distance services. The eventual expansion of CAP networks to cover the entire core business districts of major metropolitan areas made it possible for CAPs to begin to offer local telephone service in direct competition with the incumbent LECs.[284]

The FCC recognized that if CAPs were to compete with the major LECs,[285] they needed to interconnect with the incumbent LECs' networks on

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[282] For a detailed description of regulations designed to encourage the development of CAPs, see Alexander C. Larson & Douglas R. Mudd, *Collocation and Telecommunications Policy: A Fostering of Competition on the Merits?*, 28 CAL. W. L. REV. 263, 274-84 (1992).

[283] Specifically, use of fiber optics provided dramatic improvements in amount of bandwidth available. It also decreased service costs in general and made them much less distance sensitive. Fiber optics also allowed CAPs to take advantage of the efficiencies made possible by computer processing, such as improved switching and digital compression.

[284] *See* David J. Teece, *Telecommunications in Transition: Unbundling, Reintegration, and Competition*, 1 MICH. TELECOMM. & TECH. L. REV. 47, 66, 78 (1994-1995) (describing CAP entry into local telephone service in New York, Chicago, and Grand Rapids).

[285] The FCC limited these expanded interconnection requirements to Tier I LECs, which they defined as LECs with revenues of at least $100 million who were not NECA pool members. *See Special*

the same terms and conditions that the LECs provided for their own circuits. As a result, the FCC gave CAPs the right to place any equipment needed to terminate calls in the LECs' central offices.[286] The FCC believed that this right, which the FCC dubbed "physical collocation," was necessary to ensure that the interconnection provided to the CAPs was comparable to that used by the LEC for itself. If the LEC's central office lacked the physical space to accommodate physical collocation, the LEC could instead provide "virtual collocation," which required the LEC to install and maintain on its property equipment that allowed the requesting carrier to interconnect with the LEC's network through a location outside of the LEC's central office.[287] Interconnection prices for both physical and virtual collocation would be governed by price caps. As in other price cap regimes, initial rates would be based historical cost.[288] The FCC also rejected arguments that the physical collocation requirement violated the Takings Clause on the grounds that physical takings doctrine was not applicable to public utility property, which was governed exclusively by the framework applied to regulatory takings.[289] Even assuming that physical collocation did constitute a taking, the FCC argued in the alternative that the compensation provided was sufficient to

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Access Order, 7 F.C.C.R. at 7372 n.1, 7398 ¶ 57; *Switched Transport Order*, 8 F.C.C.R. at 7376 ¶ 1 & n.1.

[286] *See Special Access Order*, 7 F.C.C.R. at 7389-90 ¶ 39, 7391 ¶ 42; *Switched Transport Order*, 8 F.C.C.R. at 7391-92 ¶ 29. This requirement applied only to central office equipment needed to terminate basic transmission facilities. It did not cover equipment (such as enhanced services or customer premises equipment) unrelated to the competitive provision of transmission services. *See Special Access Order*, 7 F.C.C.R. at 7413-14 ¶ 93; *Switched Transport Order*, 8 F.C.C.R. at 7412-13 ¶ 63. This was by no means the only obstacle that hindered CAPs from emerging as direct competitors to the LECs. The existing tariffs required customers purchasing partial bypass services from the CAPs to pay for both the special access and switched transport segments even though they were using the CAP to bypass one of legs. This had the effect of forcing CAP customers to pay twice for the same service, which in turn rendered CAP pricing uneconomical. In order to cure this problem, the FCC ordered Tier I LECs to unbundle their special access and switched transport tariffs. *See Special Access Order*, 7 F.C.C.R. at 7424-25 ¶ 120; *Switched Transport Order*, 8 F.C.C.R. at 7418 ¶ 75.

[287] *See Special Access Order*, 7 F.C.C.R. at 7390-91 ¶ 41; *Switched Transport Order*, 8 F.C.C.R. at 7393-94 ¶ 31. The FCC also approved virtual collocation should both parties agree that such arrangements were preferable to physical collocation or if state regulatory authorities determined either that virtual collocation was preferable to physical collocation or that the decision about which form of collocation to allow should be made by the LEC. *See Special Access Order*, 7 F.C.C.R. at 7390-91 ¶¶ 40-41; *Switched Transport Order*, 8 F.C.C.R. at 7393-95 ¶¶ 31-32. The FCC added specific conditions on LEC provision of virtual collocation to minimize any technical differences between physical and virtual collocation. First, the FCC required that LECs permit interconnectors using virtual collocation to designate the type of equipment dedicated to their use, although the interconnectors would have to bear any additional costs associated with their choice of equipment. In addition, the FCC required that the LECs install, maintain, and repair virtually collocation equipment under at least the same time intervals and with the same failure rates that apply to the LEC's own equipment. Lastly, LECs must allow interconnectors to monitor and control the equipment remotely. *See Special Access Order*, 7 F.C.C.R. at 7392-94 ¶¶ 44-46; *Switched Transport Order*, 8 F.C.C.R. at 7392 ¶ 30.

[288] *See Special Access Order*, 7 F.C.C.R. at 7428-29 ¶ 127; *Switched Transport Order*, 8 F.C.C.R. at 7419 ¶ 79; Expanded Interconnection with Local Tel. Co. Facilities, Notice of Proposed Rulemaking and Notice of Inquiry, 6 F.C.C.R. 3259, 3267 ¶¶ 52-53 (1991).

[289] *See Special Access Order*, 7 F.C.C.R. at 7476-83 ¶¶ 230-40; *Switched Transport Order*, 8 F.C.C.R. at 7475 ¶ 144.

render it constitutional.[290] State regulatory authorities issued similar orders in order to facilitate CAP entry into local telephone service.[291]

The D.C. Circuit struck down the FCC's collocation rules in *Bell Atlantic Telephone Cos. v. FCC*[292] on the grounds that it exceeded the FCC's statutory authority. The court reasoned that giving CAPs the right to place equipment in the LECs' central offices represented precisely the type of permanent physical occupation that constituted a per se taking under *Loretto*.[293] As a result, the physical collocation requirement ran afoul of the principle that statutes should not be construed so as to create " 'an identifiable class of cases in which application of a statute will necessarily constitute a taking.' "[294]

The FCC responded to the *Bell Atlantic* decision by ceasing to make physical collocation mandatory and by giving the LECs the option of providing virtual collocation instead. The FCC continued to maintain that mandatory physical collocation did not constitute a per se taking, but argued that, regardless of whether that were true, offering the LECs virtual collocation as an option eliminated any such constitutional infirmity.[295] Before the courts could address the validity of these revised regulations, the entire scheme was rendered moot by the collocation provisions of the 1996 Act.[296]

b. The Local Competition Provisions of the 1996 Act — The local competition provisions of the 1996 Act were designed to "open[ ] all communications services to competition," including local telephone service, by eliminating local providers' bottleneck control over the elements needed to originate or terminate telephone calls.[297] Rather than regulating the retail prices charged for local telephone service, the local competition provisions of the 1996 Act focused instead on regulating the price at which new entrants could obtain access to key elements of the incumbent LEC's network. As such, it represents a prime example of the shift from output regulation to input regulation taking place throughout regulated industries.

Congress envisioned that competition in local telephone markets might emerge through one of three paths.[298] First, a new entrant might obtain *all* of

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[290] *Special Access Order*, 7 F.C.C.R. at 7482-83 ¶ 240; *Switched Transport Order*, 8 F.C.C.R. at 7475 ¶ 144.

[291] *See Special Access Order*, 7 F.C.C.R. at 7374-75 ¶ 7 & nn.10-12.

[292] 24 F.3d 1441 (D.C. Cir. 1994).

[293] *Id.* at 1445-47.

[294] *Id*. (quoting United States v. Riverside Bayview Homes, Inc., 474 U.S. 121, 128 n.5 (1985)).

[295] Expanded Interconnection with Local Tel. Co. Facilities, Memorandum Opinion and Order, 9 F.C.C.R. 5154, 5163 ¶¶ 22-23 (1994).

[296] *See* Pac. Bell Co. v. FCC, 81 F.3d 1147 (D.C. Cir. 1996) (table) (opinion available at 1996 WL 175198).

[297] *See* H.R. REP. NO. 104-204, pt. I, at 48-49, *reprinted in* 1996 U.S.C.C.A.N. 1, 11-13.

[298] *See* Implementation of Local Competition Provisions of Telecomms. Act of 1996, First Report and Order, 11 F.C.C.R. 15499, 15509 ¶ 12 (1996) ("*Local Competition Order*"); Verizon Communications, Inc. v. FCC, 122 S. Ct. 1646, 1662 (2002);

the necessary elements from the incumbent LEC and resell them.[299] Second, a new entrant might construct an entirely new network. Because the inability to complete calls to the incumbent LEC's customers would render any new network relatively unattractive, the 1996 Act required that incumbent LECs allow any requesting telecommunications carrier to interconnect with their networks "at any technically feasible point."[300] It also required that the interconnection be equal in quality to the interconnection that the incumbent LEC provides to itself[301] and be provided according to "rates, terms, and conditions that are just, reasonable, and nondiscriminatory."[302]

Congress recognized, however, that not every facilities-based entrant would be able to have its entire network in place at the time it began to offer local service.[303] In order to allow competition to emerge before entrants had fully established their networks, Congress established a third path for entering local telephone markets by requiring every incumbent LEC to provide other carriers with access to all of its network elements on an unbundled basis. Such access must be provided at any technically feasible point under rates, terms, and conditions that are just, reasonable, and nondiscriminatory.[304]

By their nature, both interconnection and access to unbundled network elements typically require the requesting carrier to place some of its equipment on the incumbent LEC's property. For example, mandatory interconnection necessarily presupposes that competitors will establish physical connections to the incumbent LEC's network.[305] In addition, access to elements of the incumbent LEC's network necessarily presupposes some ability to combine those elements with facilities supplied by the new entrant. In either case, requesting carriers must be allowed to establish physical connections between their equipment and the incumbent LEC's network. The element most likely to be accessed in this manner is the local loop, which possesses the characteristics of a natural monopoly more than perhaps any other network element. A carrier who requests unbundled access to the local loop needs to be able to terminate that loop by connecting it to the requesting carrier's switching equipment.

As result, the 1996 Act included collocation requirements that were quite similar to those adopted by the FCC in its *Expanded Interconnection*

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[299] *See* 47 U.S.C. § 251(c)(4).

[300] *Id*. § 251(c)(2)(B).

[301] *Id*. § 251(c)(2)(C).

[302] *Id*. § 251(c)(2)(D).

[303] S. CONF. REP. NO. 104-230, at 147 (1996).

[304] 47 U.S.C. § 251(c)(3). In determining which network elements would be subject to the unbundled access requirement, the statute required the FCC to consider whether "access to such network elements as are proprietary in nature is *necessary*" and whether "the failure to provide access to such network elements would *impair* the ability of the telecommunications carrier seeking access to provide the services that it seeks to offer. *Id*. § 251(d)(2)(A) & (B) (emphasis added).

[305] *See Local Competition Order*, 11 F.C.C.R. at 15514 ¶ 26 (defining interconnection as "the physical linking of two networks for the mutual exchange of traffic").

proceedings.[306] Specifically, the statute requires incumbent LECs to permit "physical collocation of equipment necessary for interconnection or access to unbundled network elements."[307] When technical considerations or space limitations render physical collocation impractical, incumbent LECs need only provide virtual collocation.[308]

The 1996 Act required that prices for interconnection and access to unbundled network elements be determined through voluntary negotiations between the incumbent LEC and the requesting carrier, at times aided by mediation by a state public utility commission.[309] If the parties are unable to reach a voluntary agreement, the statute gives state public utility commissions the authority to set rates through binding arbitration, which would be governed by one of two statutory mandates. First, rates for interconnection and access to unbundled network elements set by arbitration shall be "based on the cost . . . of providing the interconnection or network element," provided that cost is "determined without reference to a rate-of-return or other rate-based proceeding."[310] Second, the statute required that compensation for traffic originating on the network of one LEC and terminating on the network of another be governed by the principle of "reciprocal compensation,"[311] which "provide[s] for the mutual and reciprocal recovery by each carrier of costs associated with the transport and termination on each carrier's network facilities of calls that originate on the network facilities of the other carrier."[312] Such costs must be determined "on the basis of a reasonable approximation of the additional costs of terminating such calls."[313]

c. Implementation of the 1996 Act — The FCC implemented the local competition provisions of the 1996 Act in a massive order issued just three months after the statute's enactment.[314] Although that order dealt encyclically with a wide range of implementation-related issues, including the scope of the unbundling requirements that gave rise to the Supreme Court's decision in *AT&T Corp. v. Iowa Utilities Bd.*,[315] for our purposes it is

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[306] *See supra* Part II.A.1.a.

[307] 47 U.S.C. § 251(c)(6).

[308] *Id*.; *see also supra* notes 287, 295 and accompanying text (describing similar virtual collocation provision with respect to CAPs).

[309] 47 U.S.C. § 252(a)(1).

[310] *Id*. § 252(d)(1)(A)(i). The statute further requires that rates must be "nondiscriminatory," *id*. § 252(d)(1)(A)(ii), and "may include a reasonable profit, *id*. § 252(d)(1)(B).

[311] *Id*. § 251(b)(5).

[312] *Id*. § 252(d)(2)(A)(i).

[313] *Id*. § 252(d)(2)(A)(ii). The statute specifically allowed carriers to waive mutual recovery in favor of other arrangements, such as bill-and-keep systems. *Id*. § 252(d)(2)(B)(i).

[314] Implementation of Local Competition Provisions of Telecomms. Act of 1996, First Report and Order, 11 F.C.C.R. 15499, 15509 ¶ 12 (1996) ("*Local Competition Order*").

[315] 525 U.S. 366 (1999). The FCC initially defined the elements subject to unbundled access broadly without considering whether equally cost-effective inputs were otherwise available. *Local Competition Order*, 11 F.C.C.R.. at 15642 ¶ 283, 15643 ¶ 285. The FCC gave a similarly broad interpretation to the equipment subject to physical collocation. *Id.* at 15628 ¶ 250, 15794 ¶ 579. The Supreme Court struck

sufficient to focus on the aspects of that decision regarding the methodology for setting rates for interconnection, unbundled access, and physical collocation.

The FCC has implemented the provisions governing rates for interconnection and access to unbundled network elements by adopting a methodology known as Total Element Long Run Incremental Cost (TELRIC). TELRIC bases rates on the element's "economic costs," which the FCC defined as the sum of the incremental costs directly attributable to the specified element and a reasonable allocation of common costs.[316] TELRIC's most distinctive feature was the fact that it assessed both the incremental and common costs on a forward-looking basis by focusing on what it would cost to replace a particular network element rather than its historical cost.[317] The FCC believed that basing rates on forward-looking incremental cost represented the best way to replicate, to the extent possible, the conditions of a competitive market.[318] In addition, TELRIC further accommodates technological change by requiring that costs be determined on the basis of the most efficient technology available and the lowest cost network configuration given the existing location of the incumbent LEC's current wire centers.[319] It declined to incorporate an element to reflect the opportunity cost borne by the network owner providing unbundled access to network elements to competitors.[320]

Although the statutory mandate underlying TELRIC on its face applied only to compensation for interconnection and access to unbundled network elements, the FCC determined that compensation for physical collocation

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the FCC's interpretation of the scope of the unbundled access requirements as an improper construction of the statutory requirement that a network element must be "necessary" to providing telecommunications service before it is subject to unbundled access and that withholding access to that element would "impair" the requesting carrier's ability to provide such service. *Iowa Utils. Bd*., 525 U.S. at 387-92. The D.C. Circuit applied similar reasoning in striking down the FCC's initial collocation orders. GTE Serv. Corp. v. FCC, 205 F.3d 416, 422-24 (D.C. Cir. 2000) (citing *Iowa Utils. Bd.*, 525 U.S. at 389-90). On remand, the FCC reinterpreted the "necessary" and "impair" standards in a way designed to give substance to those terms. Implementation of Local Competition Provision of Telecomms. Act of 1996, Third Report and Order and Fourth Notice of Proposed Rulemaking, 15 F.C.C.R. 3696, 3712 ¶ 22 (1999) ("*UNE Remand Order*"). The FCC also revised its rules to limit collocation to equipment whose primary purpose is to provide the requesting carrier either with interconnection that is "equal in quality" to the that provided by the incumbent LEC for its own services or with "nondiscriminatory access" to an unbundled network element. Deployment of Wireline Servs. Offering Advanced Telecomms. Capability, Fourth Report and Order, 16 F.C.C.R. 15435, 15452-60 ¶¶ 32-44 (2001) ("*Collocation Remand Order*"). A judicial challenge to the revised collocation rules is pending before the D.C. Circuit. *See* Verizon Cal., Inc. v. FCC, No. 01-1371 (D.C. Cir. filed Aug. 23, 2001).

[316] 47 C.F.R. § 51.505(a). TELRIC properly refers only to the first of these two components. For simplicity, however, we will refer to both parts of the methodology collectively as TELRIC.

[317] *Local Competition Order*, 11 F.C.C.R. at 15857-59 ¶¶ 704-707 (citing 47 U.S.C. § 252(d)(1)(A)(i)). TELRIC avoids the problems caused by the distinction between fixed and variable costs by measuring incremental costs from a "long run" perspective, which is defined to be a period long enough that all of a firm's costs become variable or avoidable. *Id*. at 15845 ¶ 677, 15851 ¶ 692.

[318] *Id.* at 15847 ¶ 679.

[319] 47 C.F.R. § 51.505(b)(1).

[320] *Local Competition Order*, 11 F.C.C.R. at 15859 ¶ 709.

should also be governed by the same pricing rules.[321] In addition, the FCC determined that TELRIC represented the appropriate interpretation of the "the additional costs of terminating such calls" that govern reciprocal compensation.[322] TELRIC thus governs all of the important pricing aspects of the access regime created by the 1996 Act.

In so ruling, the FCC rejected arguments that imposition of TELRIC violated the Takings Clause. In contrast to the reasoning advanced in its *Expanded Interconnection* proceedings, which argued that takings of public utility property are governed by the Court's regulatory takings jurisprudence,[323] the FCC argued that the guiding principle for determining whether regulation of public utilities violates the Constitution depends on whether the rates are confiscatory.[324] Alternatively, assuming for the sake of argument that physical collocation constitutes a physical taking, the FCC found that its ratemaking methodology satisfies the just compensation standard, since the constitutional requirement that the government pay the fair market value of the property taken as compensation did not permit recovery of monopoly rents.[325] The FCC reaffirmed this reasoning in its *Collocation Order* and its *Collocation Reconsideration Order*.[326]

The Supreme Court upheld TELRIC as a matter of statutory construction in *Verizon Communications, Inc. v. FCC*.[327] As several lower courts had done previously,[328] the Court declined to reach the merits of the underlying

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[321] *Id.* at 15816 ¶ 629. The FCC reasoned that physical collocation is simply a method of obtaining interconnection and access to unbundled network elements and, as such, should be priced in the same fashion. *Id.*

[322] *Id*. at 16025-26 ¶ 1058 (ruling that that a reasonable allocation of common costs represent an appropriate "additional cost" under the standard for reciprocal compensation); 47 C.F.R. § 51.705(a)(1) (requiring that reciprocal compensation be determined on the basis of forward-looking economic costs pursuant to the methodology governing pricing for interconnection and access for unbundled network elements). The FCC allowed for two alternatives. State public utility commissions could either adopt a proxy range set by the FCC (at 0.2 and 0.4 cents per minute for termination) or impose "bill and keep" arrangements where the traffic flowing in each direction is roughly equal. *Id*. at 16024 ¶ 1055, 16026-28 ¶¶ 1060-62, 16054-58 ¶¶ 1111-18. The Eighth Circuit struck down the use of proxy prices in *Iowa Utilities Board v. FCC*, 219 F.3d 744, 756-57 (8th Cir. 2000), *rev'd on other grounds sub nom.* Verizon Communications, Inc. v. FCC, 122 S. Ct. 1646 (2002). This portion of the Eighth Circuit's decision does not appear to have been challenged before the Supreme Court.

[323] *See supra* notes 289, 295 and accompanying text.

[324] *Local Competition Order*, 11 F.C.C.R. at 15869-70 ¶ 733 (citing Duquesne Light Co. v. Barasch, 488 U.S. 299, 307 (1989)).

[325] *Id*. at 15872 ¶ 740 (citing Lord Mfg. Co. v. United States, 84 F. Supp. 748, 755-56 (Ct. Cl. 1949)); *see also id.* at 15811 ¶ 617, 15811 ¶ 818.

[326] Deployment of Wireline Servs. Offering Advanced Telecomms. Capability, First Report and Order and Notice of Proposed Rulemaking, 14 F.C.C.R. 4761, 4778-79 ¶ 31 (1999) ("*Collocation Order*"); Deployment of Wireline Servs. Offering Advanced Telecomms. Capability, Order on Reconsideration and Second Further Notice of Proposed Rulemaking in CC Docket No. 98-147 and Fifth Further Notice of Proposed Rulemaking in CC Docket No. 96-98, 15 F.C.C.R. 17806, 17838 ¶ 68 (2000) ("*Collocation Reconsideration Order*").

[327] 122 S. Ct. 1646 (2002).

[328] *See* Iowa Utils. Bd. v. FCC, 120 F.3d 753, 818 (8th Cir. 1997), *rev'd in part on other grounds sub nom.* AT&T v. Iowa Utils. Bd., 525 U.S. 366 (1999); Tex. Off. of Pub. Util. Counsel v. FCC, 183 F.3d 393, 428-29 (5th Cir. 1999), *cert. granted sub nom.* GTE Serv. Corp. v. FCC, 530 U.S. 1213, *cert. dismissed*, 531 U.S. 975 (2000); US West Communications, Inc. v. Minn. Pub. Utils. Comm'n, 55 F.

takings claim. Instead, it explicitly adopted the clear implication of its previous decisions and held that takings challenges to ratemaking methodologies were generally inappropriate until the methodology in question had been embodied in an actual rate order. Although the Court entertained the possibility that a ratemaking methodology might have such sweeping implications that would justify addressing the constitutionality of a methodology on its face, the facts of the case before the Court did not justify doing so.[329]

2. Economic Arguments in Favor of Market-Based Pricing

As Part I demonstrated, the best way to promote economic efficiency when compelling access to an input is to price the input at its market value. Doing so promotes allocative efficiency by providing the signals that firms need in order to calibrate the amount of each input purchased and to ensure that they are employing the optimal mix of possible inputs. Employing market-based pricing also promotes dynamic efficiency by signaling incumbents and new entrants alike of the need to invest in additional capacity. As Justice Breyer noted in his separate opinion in *Iowa Utilities Board*:

> [A] sharing requirement may diminish the original owner's incentive to keep up or to improve the property by depriving the owner of the fruits of value-creating investment, research, or labor. And as one moves beyond the sharing of readily separable and administrable physical facilities, say, to the sharing of research facilities, firm management, or technical capacities, these problems can become more severe. . . . [One cannot] guarantee that firms will undertake the investment necessary to produce complex technological innovations knowing that any competitive advantage deriving from those innovations will be dissipated by the sharing requirement. The more complex the facilities, the more central their relation to the firm's managerial responsibilities, the more extensive the sharing demanded, the more likely these costs will become serious. And the more serious they become, the more likely they will offset

Supp. 2d 968, 990 (D. Minn. 1999); Southwestern Bell Tel. Co. v. AT&T Communications of Southwest, Inc., No. A. 97-CA-132 SS, 1998 WL 657717, at *12 (W.D. Tex. Aug. 31, 1998).

[329] *Verizon*, 122 S. Ct. at 1679-80.

> any economic or competitive gain that a sharing requirement might otherwise provide.[330]

In addition, "compulsory sharing can have significant administrative and social costs inconsistent with the Act's purposes."[331] If taken to an extreme, "[r]ules that force firms to share *every* resource or element of a business would create, not competition, but pervasive regulation, for the regulators, not the marketplace, would set the relevant terms."[332]

The best way to promote economic efficiency would thus be to base access rates on the price the input in question would command on the open market. Such prices are easy to determine when comparable inputs are purchased in external markets.[333] Although local telephone service has long been regarded as a natural monopoly in which direct competition is impossible, technological convergence has begun to provide a wide range of possible external markets that can serve as bases for determining market value. Over the last several years, providers of wireless telephone services, which carry the formal designations of Commercial Mobile Radio Services (CMRS), have emerged as the most successful direct competitor to the incumbent LECs. Because wireless telephone providers are not considered "local exchange carriers," the 1996 Act does not govern the terms under which they provide interconnection and access to their networks.[334] Although Congress has given the FCC the authority to regulate the terms under which wireless carriers interconnect with each other, the FCC has declined to do so.[335]

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[330] 525 U.S. at 428-29 (Breyer, J., concurring in part & dissenting in part) (citation omitted); *accord Verizon*, 122 S. Ct. at 1693 (Breyer, J., concurring in part & dissenting in part) (noting that compelling incumbents to share the cost-reducing benefits of a successful innovation destroys the incumbent's incentives to innovate in the first place).

[331] *Iowa Utils Bd.*, 525 U.S.. at 428.

[332] *Id*. at 429.

[333] SIDAK & SPULBER, *supra* note 31, at 275, 319, 321.

[334] *Local Competition Order*, 11 F.C.C.R. at 15995 ¶ 1001, 15995-96 ¶¶ 1004, 1006. Although CMRS providers are under no obligation to *provide* interconnection or access to their network elements, the FCC has ruled that CMRS providers are "telecommunications carriers" who are eligible to *request* interconnection and access to unbundled network elements from the incumbent LECs. *Id.* at 15998-16000 ¶¶ 1012-13.

[335] Interconnection & Resale Obligations Pertaining to Commercial Mobile Radio Servs., Fourth Report and Order, 15 F.C.C.R. 13523, 13534 ¶ 28 (2000) ("*CMRS Interconnection Order*"). This order culminated protracted regulatory proceedings dating back to 1993, when the FCC issued a notice requesting comment whether it should require CMRS providers to provide interconnection to other CMRS providers. Implementation of Sections 3(n) & 332 of Communications Act, Regulatory Treatment of Mobile Servs., Notice of Proposed Rulemaking, 8 F.C.C.R. 7988, 8001-02 ¶ 71 (1993). When the FCC issued the order resulting from this notice, however, it declined to resolve the issue. Implementation of Sections 3(n) & 332 of Communications Act & Regulatory Treatment of Mobile Servs., Second Report and Order, 9 F.C.C.R. 1411, 1499-1500 ¶¶ 237-238 (1994). Instead, the FCC opted to seek further comment on the issue in a subsequent proceeding. Equal Access and Interconnection Obligations Pertaining to Commercial Mobile Radio Serv., Notice of Proposed Rule Making and Notice of Inquiry, 9 F.C.C.R. 5408, 5458-69 ¶¶ 121-143 (1994). In the interim, the FCC indicated that it would entertain requests for interconnection on a case-by-case basis. *Id*. at 5458 n.213. When these proceedings also matured into a formal decision, the FCC again postponed ruling on the issue on the grounds that, although

As a result, the terms of interconnection between wireless carriers are determined through arms-length negotiations that can provide precisely the type of external benchmark needed to determine the market value of transport and call termination services. Admittedly, interconnection between wireless carriers does involve somewhat different considerations than interconnection with incumbent LECs. Direct comparisons are complicated by the significant differences in utilization rates as well as the emergence of wireless pricing schemes that do not differentiate between local and long distance service. The analysis is further obscured by the fact that such interconnection between wireless carriers is often accomplished indirectly through the LECs.[336] Still, as wireless and other facilities-based competitors grow, rates charged for interconnection between wireless competitors will continue to emerge as a market-based reference point that can be used to resolve most pricing problems. The number of external benchmarks will only continue to grow as local cable operators and other types of broadband providers begin to offer local telephone service.

On a more fundamental level, technological convergence raises serious questions about whether compelling access to local telephone networks represents sound economic policy. To the extent that substitute networks are available, it is far from clear that the facilities of the incumbent LEC can properly be regarded as a monopoly bottleneck.[337] Even setting such considerations aside and conceding the existence of compelled access, the emergence of alternative facilities capable of providing the same functions has a dramatic impact on the manner in which such access should be priced. Simply put, the emergence of comparable transactions provides external benchmarks that should enable regulatory authorities to establish access rates based on market prices that are more likely to promote efficiency.

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requiring wireless-to-wireless interconnection would appear to promote efficiency, such regulation was premature. Interconnection & Resale Obligations Pertaining to Commercial Mobile Radio Servs., Second Notice of Proposed Rulemaking, 10 F.C.C.R. 10666, 10681-82 ¶¶ 28-29 (1995). An association of equipment manufacturers brought suit to compel the FCC to act. Although the D.C. Circuit expressed dismay over the fact that five years had lapsed while the FCC continued to investigate the issue, the court nonetheless upheld the FCC's decision to defer resolution of the issue. Telecomms. Resellers Ass'n v. FCC, 141 F.3d 1193, 1197 (D.C. Cir. 1998). Final resolution did not occur until issuance of the *CMRS Interconnection Order* two years later. 15 F.C.C.R. at 13534 ¶ 28. It thus took seven years before these proceedings were finally resolved. For an overview of the early history of these somewhat protracted proceedings, see PETER HUBER, MICHAEL KELLOGG, & JOHN THORNE, FEDERAL TELECOMMUNICATIONS LAW 953-55 (2d ed. 1999).

[336] *CMRS Interconnection Order*, 15 F.C.C.R. at 13533-34 ¶¶ 26-27. Historically, such comparisons were complicated still further by the FCC's decision to award one of the two available first-generation cellular licenses to the incumbent LEC, which in turn produced reasons to question whether in fact interconnection agreements between wireless carriers in fact represented arms-length transactions. The deployment of competitive wireless network on a national scale, the subsequent emergence of PCS, and the impending arrival of third-generation wireless devices should eliminate this problem in the near future, if it has not done so already.

[337] *See Iowa Utils. Bd.*, 525 U.S. at 389 (holding that the FCC must consider whether a network element is available from other sources before compelling access to that element under the 1996 Act).

In the absence of external benchmarks based on actual market transactions, resort to some cost-based, second-best measure of market value becomes necessary. As noted earlier, economic theory suggests that cost based measures should follow ECPR, which sets rates as the sum of the direct incremental costs of providing an input and the opportunity costs that the incumbent incurs when the new entrant provides the services instead of the incumbent.[338] TELRIC includes elements designed to reflect the first of these two components.[339] The key problem with the FCC's analysis is its refusal to include any factor to reflect opportunity cost. In setting prices without considering the value of foregone alternatives, TELRIC in essence ignores the insights of neoclassical economics by basing value solely on cost without taking any demand-side effects into consideration. As such, TELRIC is fundamentally inconsistent with the insights of the neoclassical approach that serves as the foundation for all modern economic theory.

Although the FCC considered and rejected arguments that it should base access rates on ECPR, its reasons for doing so do not withstand analysis. The first reason was that it believed that the statutory requirement that prices be based on "cost" precluded it from considering opportunity cost.[340] The Court specifically rejected this reasoning when it found the term, "cost," to be "too protean" to support any such plain language argument.[341] If anything, the FCC's argument is directly undercut by the fact that it is now an economic truism that opportunity costs represent a true economic cost borne by the incumbent LEC.[342] Indeed, the Supreme Court in effect recognized as much when cited "opportunity cost" as an example of a forward-looking "cost" that fell within the purview of the statute.[343]

The FCC's second reason for rejecting ECPR is equally misplaced. The FCC asserted that because ECPR calculates opportunity cost on the basis of current retail prices, it simply locks in monopoly rents without providing a mechanism for moving prices towards competitive levels.[344] This argument suffers from two fundamental flaws. First, it ignores the fact that the

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[338] *See supra* Part I.C.3. One of us has elsewhere advanced the argument that, in addition to ECPR, the rates charged for access to unbundled network elements should also include a nonbypassable end-user charge to compensate incumbent LECs for costs stranded by deregulatory innovations that caused investment-backed expectations to fail. *See* SIDAK & SPULBER, *supra* note 31, at 334-35. Extended discussion of these issues fall outside the scope of this Article. For the time being, it suffices to point out that the argument advanced in this article, while consistent with the imposition of such user charges, does not require it.

[339] *See id.* at 320.

[340] *Local Competition Order*, 11 F.C.C.R. at 15859 ¶ 709.

[341] Verizon Communications, Inc. v. FCC, 122 S. Ct. 1646, 1667 (2002).; *accord id.* (calling the term, "cost," "a chameleon" and a "virtually meaningless term" that "say[s] little about the method employed to determine a particular rate" (internal quotation marks omitted)).

[342] *See* SIDAK & SPULBER, *supra* note 31, at 322-23, 404-10.

[343] *Verizon*, 122 S. Ct., at 1666 n.17.

[344] *Local Competition Order*, 11 F.C.C.R. at 15859 ¶ 709; *see also Special Access Order*, 7 F.C.C.R. at 7426 ¶ 123, 7430 ¶ 129 (rejecting the use of "net revenue" test proposed by Alfred Kahn in setting interconnection rates in the FCC's *Expanded Interconnection* proceeding).

emergence of competition will cause retail prices to drop and that as this occurs, ECPR will dynamically readjust the opportunity-cost factor to reflect those changes in retail price. Second, the existence of any monopoly rents in retail prices is more properly regarded as the result of the failure of rate regulation at the state level rather than any theoretical flaw in ECPR. Such a failure would justify improving the manner in which state regulatory authorities establish retail prices. It does not provide a justification for incurring the myriad problems that would result from distorting access prices.[345]

Although the Supreme Court upheld the FCC's ratemaking methodology in *Verizon*,[346] it would be a mistake to construe Court's action as a specific endorsement of TELRIC and a rejection of ECPR as a matter of economic policy. On the contrary, the Court carefully eschewed expressing any opinion about the relative merits of any particular economic approach to ratemaking.[347] Instead, the Court based its decision on the deferential standard of review that gives agencies a wide range of discretion in resolving any interpretive ambiguities that exist in the statutes that they administer so long as the construction advanced falls within a wide zone of reasonableness.[348] As a result, the Court's decision does not necessarily foreclose the possibility that the FCC might justifiably apply a ratemaking approach based on market prices or ECPR in the future.[349]

3. Constitutional Arguments in Favor of Market-Based Pricing

In addition to the problems with the FCC's implementation of the 1996 Act as a matter of economic theory, the adoption of a methodology focused solely on replacement cost also raises serious constitutional problems. The takings implications of the interconnection and unbundled access provisions of the local competition provisions have largely escaped significant attention. Like most forms of rate regulation, for the most part TELRIC simply limits the prices that can be charged for the use of the incumbent LECs' network elements. As such, although courts and the FCC have generally stopped short of resolving the issue directly until a state regulatory issues an actual

[345] *See* SIDAK & SPULBER, *supra* note 31, at 351-58, 362-63.

[346] 122 S. Ct. at 1666-78.

[347] *See id*. at 1670 ("As a reviewing Court we are, of course, in no position to assess the precise economic significance of [various economic aspects of the incumbent LECs' arguments]. Instead it is enough to recognize that the incumbents' assumption may well be incorrect."), 1678 ("We cannot say whether the passage of time will show competition prompted by TELRIC to be an illusion, but TELRIC appears to be a reasonable policy for now, and that is all that counts.").

[348] *Id.* at 1667 (citing Chevron U.S.A. Inc. v. Natural Res. Def. Council, Inc., 467 U.S. 837, 843-45 (1984)).

[349] *See Iowa Utils. Bd.*, 525 U.S. at 426 (Breyer, J., concurring in part & dissenting in part) (noting that in rejecting ECPR, the FCC "did not claim, nor did its reasoning support the claim, that the use of such a system would be arbitrary or unreasonable").

rate order, they have suggested that the principles of confiscatory ratemaking[350] or regulatory takings[351] are likely to govern such challenges.

The problem with this analysis is that it focuses on TELRIC as a general matter without focusing on the unique constitutional implications of the 1996 Act's physical collocation provisions. As the FCC has itself recognized, both interconnection and access to unbundled network elements typically require the network owner to permit requesting carriers to place equipment in its central office on an indefinite basis. As a matter of first principles, the physical collocation associated with interconnection and unbundled access provisions represent the type of permanent physical invasion deemed to constitute a per se taking under *Loretto*.[352] This conclusion is reinforced from the D.C. Circuit's decision in *Bell Atlantic* holding that the physical collocation regime upon which the FCC modeled its implementation of the 1996 Act constituted a physical taking.[353] This conclusion draws further support from the D.C. Circuit's decision overturning the FCC's *Collocation Order* in *GTE Service Corp. v. FCC*,[354] in which the court repeatedly emphasized its concern that the FCC's interpretation of the physical collocation provisions may result in "unnecessary takings" of LEC property.[355]

Most instructive of all is the decision of the Court of Federal Claims in *Qwest Corp. v. United States*,[356] which is one of the few decisions to address the merits of a takings challenge to the 1996 Act. In that case, a requesting carrier obtained access to fourteen loops that served one particular customer and connected those loops to its own switching equipment contained in a collocation cage located in the incumbent LEC's central office. The incumbent LEC brought a takings challenge arguing the compensation that it received was constitutionally insufficient. The incumbent did circumscribe its argument in one, somewhat unusual way. It conceded that it was already receiving adequate compensation for the space occupied by the collocation cage. As a result, it restricted its takings claim to the loops leased by the new entrant.[357]

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[350] *See Verizon*, 122 S. Ct. at 1679; *MFS Intelenet*, 35 F. Supp. 2d at 1236; *Local Competition Order*, 11 F.C.C.R. at 15871-72 ¶¶ 737-738.

[351] *See Tex. Off. of Pub. Util. Counsel*, 183 F.3d at 429 n.59; *Special Access Order*, 7 F.C.C.R. at 7479-81¶¶ 235-237.

[352] *See supra* notes 147-164 and accompanying text. Even scholars who are skeptical of broader readings of *Loretto* accept that regulations that require physical collocation effect per se takings. *See* Leonard M. Baynes, *Swerving to Avoid the "Takings" and "Ultra Vires" Potholes on the Information Superhighway: Is the New York Collocations and Telecommunications Policy a Taking Under the New York Public Service Law?*, 18 HASTINGS COMM/ENT L.J. 51, 73-74 (1995); Chen, *supra* note 46, at 1551.

[353] *See supra* notes 292-294 and accompanying text.

[354] 205 F.3d 416 (D.C. Cir. 2000).

[355] *Id*. at 421, 423, 426

[356] 48 Fed. Cl. 672 (2001).

[357] *Id.* at 689-90, 691, 693.

The court resolved the case by relying on the distinction between physical and nonpossessory takings. In particular, the court accepted the notion that "government-mandated co-location of one party's equipment on another party's premises constitutes a physical taking of the occupied space."[358] As a result, it acknowledged that requesting carrier's collocation cage "is analogous to the rooftop equipment in *Loretto*" and emphasized that it would have had little trouble holding that the restriction represented a per se taking had the incumbent LEC focused on the collocation cage itself.[359] In contrast to the equipment contained in the collocation cage, however, the leasing of loops by the new entrant by itself simply involved restrictions on the use of the incumbent LEC's property and did not require the incumbent LECs to submit to the permanent physical occupation of its property by any equipment. As a result, the court concluded that the claim based on the loops did not constitute a physical taking.[360] The court once again emphasized that in holding that access to the loops did not constitute a physical taking did not negate its prior conclusion that "the implementation of mandatory access provisions requiring a telecommunications provider or utility to make space available on its premises for a competitor to affix its own equipment . . . constitut[ed] a physical taking under *Loretto*."[361]

The FCC has attempted to avoid this conclusion by asserting that takings claims involving public utility property are governed by the more permissive principles embodied in the Supreme Court's confiscatory ratemaking[362] and regulatory takings[363] precedents. The fundamental problem with this analysis is that ignores the distinction between physical and nonpossessory takings drawn by the Supreme Court in *Loretto* and *Florida Power* and reaffirmed in *Tahoe-Sierra*.[364] Since the 1996 Act's physical collocation mandate unambiguously requires incumbent LECs to permit competing carriers to place equipment on their property, it constitutes a classic physical taking under *Loretto*. Thus, in sharp contrast to what would be true under the Court's confiscatory ratemaking or regulatory takings jurisprudence, the magnitude of the regulation's economic impact and the public purposes served by the regulation are of no consequence.

It thus follows that the owners of local telephone networks are entitled to just compensation for the physical invasion mandated by the 1996 Act. As discussed above, to the extent that external markets for a particular input exist, the principles of just compensation require that the incumbent LECs are entitled to the market value of the inputs that are physically taken.[365]

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[358] *Id.* at 694.
[359] *Id*. at 691.
[360] *Id.* at 691, 693.
[361] *Id*. at 693.
[362] *See Local Competition Order*, 11 F.C.C.R. at 15871-72 ¶¶ 737-738.
[363] *See Special Access Order*, 7 F.C.C.R. at 7479-81¶¶ 235-237.
[364] *See supra* notes 162-163, 169, 202 and accompanying text.
[365] *See* Part II.B.2.a.

Although the absence of direct competition in local telephony previously deprived regulators of any such market-based benchmarks,[366] the emergence of cellular telephony and other forms of wireless communications as direct competitors to local telephone companies has now created an external basis for determining the value of the services provided by the local loop.[367] Under such circumstances, basing access pricing on replacement cost contradicts the Court's established takings jurisprudence. Perhaps sensing the weakness of its position, the FCC offered the alternative argument that, assuming that a taking had occurred, fair market value does not properly include monopoly rents.[368] The legal support for this claim, however, is suspect.[369] And even if the FCC's legal conclusion were somehow proven to be sound, there is also reason to doubt the factual premises underlying the argument. The emergence of direct facilities-based competition and the fact that retail prices for local telephone service are subject to rate regulation indicate that it is unlikely that there were any monopoly rents included in the prices set by the open market.

Although we find the conclusion that the physical collocation requirements of the 1996 Act effect a physical taking inescapable, we recognize that virtual collocation poses a much closer question. The Supreme Court specifically reserved this in *Loretto*, observing that regulations requiring property owners to install certain types of network-related equipment might present a different question. In such a case, the property owner would own the equipment, which would give it full authority

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[366] *See* Leonard M. Baynes, *How Much Is the Toll to Access the Information Superhighway? An Analysis of the Appropriate Measure of Compensation for the Partial Taking of Public Utility Property*, 62 TENN. L. REV. 141, 149-50, 163-64 (1994).

[367] *See supra* notes 334-336 and accompanying text.

[368] *Local Competition Order*, 11 F.C.C.R. at 15872 ¶ 740; *see also* Baynes, *supra* note 366, at 173-76.

[369] The FCC cites but a single lower court decision as its authority for the proposition that just compensation does not permit recovery of monopoly rents. *See Local Competition Order*, 11 F.C.C.R. at 15872 ¶ 740 (citing Lord Mfg. Co. v. United States, 84 F. Supp. 748 (Ct. Cl. 1949)). A perusal of *Lord Mfg.* reveals that it does not in fact stand for the proposition for which the FCC cites it. In that case, a manufacturer of patented rubber and metal mountings critical to allowing aircraft to fly in adverse weather conditions had developed a dominant market position that allowed it to earn profits ranging from fifty-nine to one hundred forty-seven percent. During World War II, the federal government ordered the manufacturer to sell its products to the government at prices determined by the government to be "fair and reasonable," which allowed the manufacturer a profit of only ten and one-half percent. The manufacturer challenged the action under the Takings Clause. 84 F. Supp. at 751-54. The court conceded that "[i]f these were ordinary times," the manufacturer would have been allowed to earn supracompetitive profits. *Id*. at 755. "[T]hese were not ordinary times," however, because the war had in effect caused the free and untrammeled market necessary for a fair market value determination to disappear. The true holding of *Lord Mfg.* is thus that circumstances may exist during which current market price is no longer a good indicator of fair market value, which is defined as the price to which a willing seller and a willing buyer would agree after ample time to find a purchaser. *See also BFP v. Resolution Trust Corp.*, 511 U.S. 531, 537-38 (1994) (discussing how transient exigencies can force prices below or above fair market value). *Lord Mfg.* assuredly does not stand for the proposition that monopoly profits are not properly considered part of fair market value. On the contrary, in the language quoted above, the Court of Claims explicitly recognized that the opposite was true. *See also* City of Tucson v. El Rio Water Co., 415 P.2d 872, 875 (Ariz. 1966) (recognizing that monopoly profits are properly regarded as part of fair market value).

over the placement, manner, use, and possibly the disposition of the equipment outside of the mandate of the specific regulation in question. In addition, the property owner would have the latitude to decide how to comply with the applicable regulations and therefore "could minimize, the physical, esthetic, and other effects of the installation."[370] The FCC followed this reasoning in its *Expanded Interconnection* proceeding. Without conceding that that mandatory physical collocation would constitute a per se taking, the FCC argued that offering the LECs virtual collocation as an option eliminated any remaining constitutional infirmities.[371]

Unfortunately, the courts have never had the opportunity to address whether virtual collocation effects a physical taking, since before the courts could address the issue, the virtual collocation provisions of the *Expanded Interconnection* proceeding were rendered moot by the physical collocation provisions contained in the 1996 Act.[372] The 1996 Act, however, obviated any need to resolve whether a bare virtual collocation requirement constituted a physical taking, since section 251(c)(6) clearly gives requesting carriers the right to physically collocate their equipment in most circumstances.[373] As a result, it is directly analogous to the type of regime found to constitute a physical taking in *Loretto*, *Qwest*, and *Bell Atlantic*.

Language in the D.C. Circuit's *Bell Atlantic* opinion, moreover, suggests that virtual collocation poses the same takings concerns as physical collocation. Both virtual and physical collocation allow CAPs to physically connect their networks to the LECs' networks. Requiring a physical interconnection is enough to constitute a physical taking, regardless of who owns the property on which the interconnection occurs.[374] Indeed, a subsequent court drew largely the same conclusion when it held that that an administrative order requiring an incumbent LEC to reconfigure the wires it was using to provide telephone service to a multi-building complex in order to accommodate an competitive service provider constituted a physical taking.[375] The fact that the owner of the apartment complex rather than the LEC owned the land on which the LEC was obligated to build its wires played no role in the decision.

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[370] Loretto v. Teleprompter Manhattan CATV Corp., 458 U.S. 419, 440 n.19 (1982); *see also* GTE Serv. Corp. v. FCC, 205 F.3d 416, 419 (D.C. Cir. 2000) ("Virtual collocation therefore minimizes the takings problem, because competitors do not have physical access to a LEC's property.").

[371] Expanded Interconnection with Local Tel. Co. Facilities, Memorandum Opinion and Order, 9 F.C.C.R. 5154, 5163 ¶¶ 22-23 (1994); *see also* Baynes, *supra* note 352, at 74-75.

[372] *See supra* note 296 and accompanying text.

[373] *See supra* notes 307-308 and accompanying text.

[374] 24 F.3d at 1446.

[375] GTE Southwest Inc. v. Pub. Util. Comm'n, 10 S.W.3d 7, 9, 11 (Tex. Ct. App. 2000).

B. Access to Networks of Utility Poles

The analysis we have developed helps illuminate the economic and constitutional considerations underlying the second emerging policy problem that we would like to address: compelled access to networks of utility poles. This subpart will describe the manner in which regulations requiring such access have been implemented and then apply the analytical framework that we have developed to evaluate that regime from the standpoint of both economic policy and constitutional law. As was the case in the first policy problem we address, we conclude that the current manner in which the government has compelled access to networks of utility poles conflict with basic economic theory as well as with the Supreme Court's takings jurisprudence. As a result, we argue that the extant pricing regime should be replaced by an approach that bases access rates on market prices.

1. Regulatory Framework

As discussed earlier, in much of the country, cable television systems depended upon networks of utility poles to establish the wireline connections to individual homes and businesses needed to provide their services.[376] Congress became concerned that the electric and telephone companies who owned the poles were charging monopoly prices that tended to retard cable's deployment. As a result, it enacted legislation known as the Pole Attachments Act of 1978 that gave the FCC the power to regulate the rates charged for pole attachments by cable television systems in any state that did not already regulate such agreements.[377] As originally enacted, the Pole Attachments Act required that the rates, terms, and conditions for pole attachment be just and reasonable[378] and established methodologies for determining the minimum and maximum rates that could be charged.[379] As implemented by the FCC, the so-called "Cable Formula" allowed the pole owner to recover approximately 7.4 percent of the total costs of the pole from each attaching entity.[380] As discussed earlier, the Supreme Court held

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[376] *See supra* notes 161-162 and accompanying text; Nat'l Cable & Telecomms. Ass'n v. FCC, 122 S. Ct. 782, 784 (2002).

[377] 47 U.S.C. § 224(b)(1).

[378] *Id*.

[379] The statute required that at a minimum the rates established by the FCC allow the utilities to recover "the additional costs of providing pole attachments." *Id*. § 224(d)(1). The maximum rate was set by multiplying percentage of the total "usable space" occupied by the attachment by the sum of the operating expenses and actual capital costs attributable to the pole." *Id*. The resulting formula is:

$$\text{Maximum Rate} = \frac{\text{Space Occupied}}{\text{Total Usable Space}} \times \text{Net Cost of a Bare Pole} \times \text{Carrying Charge Rate}$$

Amendments of Comm'n's Rules & Policies Governing Pole Attachments, Consolidated Partial Order on Reconsideration, 16 F.C.C.R. 12103, 12131 ¶ 53 (2001) ("*Consol. Reconsideration Order*").

[380] The FCC established the standard presumptions that the total amount of usable space is limited to thirteen and one-half feet and that each attaching entity occupies one foot of usable space. *See* 47 C.F.R.

in *Florida Power* that the statute as originally enacted did not constitute a per se taking under *Loretto*. Because the Act did not require that any utility enter into such agreement, it represented nothing more than a form of rate regulation, which violated the Takings Clause only if confiscatory.[381]

A provision of the Telecommunications Act of 1996 modified the Pole Attachments Act. As the Supreme Court's decision in *National Cable & Telecommunications Ass'n v. Gulf Power Co*.[382] confirmed, one of the key changes implemented by the 1996 amendments was to broaden the scope of the regulatory scheme to cover telecommunications carriers, including wireless telephony providers, as well as cable television systems. Two other features of the 1996 amendments merit more extended discussion. First, the amendments made access to poles compulsory rather than voluntary.[383] Second, the amendments established a new pricing mechanism to govern attachments by telecommunications carriers that differed from the regime governing attachments by cable television systems.[384]

a. The Shift to Compulsory Access — The most important feature of the 1996 amendments for our purposes is the transformation of Pole Attachments Act into a compulsory access provision. As noted previously, prior to the 1996 amendments, the fact that Pole Attachments Act did not compel any utility to allow any other entity access to its network of utility poles played a critical role in the Supreme Court's refusal in *Florida Power* to treat the Pole Attachments Act as a per se taking under *Loretto*.[385] Although the Court explicitly declined to address what would follow if the statute were modified to compel access to utility poles, the Court's reasoning strongly suggested that such a change would bring the Pole Attachments Act squarely within the ambit of its physical takings jurisprudence.[386]

The Eleventh Circuit followed the reasoning of *Florida Power* to its logical conclusion when it held in *Gulf Power Co. v. FCC* ("*Gulf Power I*")[387] that the 1996 amendments turned the Pole Attachments Act into a per se taking under *Loretto*. Reaffirming the distinction between physical and nonpossessory takings, the Eleventh Circuit held that the Court's confiscatory ratemaking jurisprudence had no application to cases involving the permanent physical occupation of property. Although the *Gulf Power I* court found that a taking had occurred, it anticipated the Supreme Court's conclusion in *Verizon* and held that the logically subsequent question

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§§1.1404(*l*), 1.1402(c). As a result, the pole owner could recover 1/13.5 of the total costs of the pole from each attaching entity, an amount approximately equal to 7.4 percent.

[381] *See also supra* Part II.A.3 (offering additional analysis of *Florida Power*).

[382] 122 S. Ct. 782, 785 (2002).

[383] 47 U.S.C. § 224(f)(1). The statute created exceptions for situations in which there is insufficient capacity or when refusal to provide access is justified by safety, reliability, or other engineering concerns. *Id*. § 224(f)(2).

[384] *Id*. § 224(e).

[385] *See supra* notes 167-169 and accompanying text.

[386] *See supra* note 172 and accompanying text.

[387] 187 F.3d 1324, 1328-29 (11th Cir. 1999).

whether the statute provided for just compensation was not yet ripe for judicial resolution.[388] The Eleventh Circuit reaffirmed these conclusions when rejecting a facial challenge to the regulations implementing the 1996 amendments the following year in *Gulf Power II*.[389] Although the Supreme Court later vacated this subsequent decision,[390] its action did not call into question the reasoning of *Gulf Power II* on this point and did not weaken the precedential effect of *Gulf Power I*. In addition, the Court's reasoning did not raise any questions about the propriety of the Eleventh Circuit's resolution of the takings issues.

b. The Compensation Regime — The 1996 amendments also provided for a different basis for compensation for telecommunications carriers than for cable television systems, commonly known as the "Telecom Formula."[391] Although the details of the various formulas are somewhat involved,[392] for

[388] *Id.* at 1338. In so holding, however, the court did express some skepticism about whether it would ultimately be persuaded by the utility's takings argument. *Id.* This dicta should carry little weight, since it attempted to employ the Court's confiscatory ratemaking precedents to dispose of a case involving a physical taking without betraying any awareness of the Court's frequent admonitions underscoring the separateness of these two lines of jurisprudence. *See supra* notes 162-163, 169, 202 and accompanying text.

[389] Gulf Power Co. v. FCC, 208 F.3d 1263, 1272-73 (11th Cir. 2000) ("*Gulf Power II*"), *rev'd on other grounds sub nom.* Nat'l Cable & Telecomms. Ass'n v. Gulf Power Co., 122 S. Ct. 782 (2002).

[390] *See* Nat'l Cable & Telecomms. Ass'n v. Gulf Power Co., 122 S. Ct. 782 (2002).

[391] 47 U.S.C. § 224(e). The separate mythology governing telecommunications carriers became effective after February 8, 2001, after which point the Telecom Formula began to phased in over a period of five years. Until that date, the Cable Formula governed pole attachments by telecommunications carriers. Amendment of Rules and Policies Governing Pole Attachments, Report and Order, 15 F.C.C.R. 6453, 6457-58 ¶ 5 (2000) ("*Fee Order*").

[392] In contrast to the methodology governing attachments by cable television systems (known as the "Cable Formula"), which established uniform rates of compensation for all portions of the pole, the methodology governing attachments by telecommunications carriers (known as the "Telecom Formula") allowed for different rates of recovery for the "usable" and "unusable" portions of the pole. Although rates associated with usable portions of the pole follow the approach of the Cable Formula and allocate costs in accordance with the percentage of usable space occupied, 47 U.S.C. § 224(e)(3), recovery rates associated with the unusable portion of the pole are allocated in accordance with the number of attaching entities. *Id*. § 224(e)(2). Specifically, one-third of the costs of the unusable space would be borne by the pole owner, with the remaining two-thirds divided among all attaching entities (with the pole owner being considered one of the attaching entities). *Id*. § 224(e)(3); Implementation of Section 703(e) of Telecomms. Act of 1996, Report and Order, 13 F.C.C.R. 6777, 6799-6800 ¶ 43 (1998). The FCC originally established two different formulas to calculate each part separately. For simplicity, they eventually combined the calculation into a single formula. The combined formula is written as follows:

$$\left|\begin{matrix}\text{Maximum}\\ \text{Rate}\end{matrix}\right| = \left[\frac{\left(\begin{matrix}\text{Space}\\ \text{Occupied}\end{matrix}\right) + \left(\frac{2}{3}\times\frac{\text{Unusable Space}}{\text{No. of Attaching Entities}}\right)}{\text{Pole Height}}\right] \times \text{Net Cost of a Bare Pole} \times \left|\begin{matrix}\text{Carrying}\\ \text{Charge}\\ \text{Rate}\end{matrix}\right|$$

Consol. Reconsideration Order, 16 F.C.C.R. at 12131-32 ¶ 55. If the standard presumptions are applied, the formula is further simplified as follows:

$$\left|\begin{matrix}\text{Maximum}\\ \text{Rate}\end{matrix}\right| = \left[\frac{(1) + \left(\frac{16}{\text{No. of Attaching Entities}}\right)}{37.5}\right] \times \text{Net Cost of a Bare Pole} \times \left|\begin{matrix}\text{Carrying}\\ \text{Charge}\\ \text{Rate}\end{matrix}\right|$$

our purposes it suffices to note that the Cable Formula and the Telecom Formula can lead to significant differences in compensation.[393] For example, in recent litigation Alabama Power has asserted that while application of the Cable Formula leads to an annual compensation rate of $6.30 per pole, application of the Telecom Formula would result in an annual compensation rate of $20.41 per pole.[394]

FIGURE 2
COMPARISON OF RECOVERY RATES UNDER THE POLE ATTACHMENTS ACT

Number of Attaching Entities	Percentage of Pole Costs Recoverable	
	Cable Formula	Telecom Formula
1	7.4%	24.0%
2	14.8%	33.8%
3	22.2%	40.0%
4	29.6%	44.8%
5	37.0%	48.9%
6	44.4%	52.6%
7	51.9%	56.0%
8	59.3%	59.3%

It is also noteworthy that both the Cable and the Telecom Formulas are based on historical cost rather than forward-looking cost. The FCC orders implementing the 1996 amendments reasoned that that the Supreme Court upheld the use of such an approach in *Florida Power*. The FCC further argued that the policies underlying the Pole Attachments Act, the static nature of the technology underlying utility poles, and the fact that utility pole networks were in fact impossible to duplicate justified adopting a methodology that was less focused on stimulating competitive entry. In addition, the FCC emphasized the administrative convenience of maintaining the previous regime.[395]

The FCC declined to resolve whether basing its methodology on historical costs violated the Takings Clause on the grounds that such as-applied takings challenges were not ripe until the methodology was embodied in a specific rate order. Until that occurred, the only type of challenge that could be raised was a facial challenge, and the FCC rejected that challenge because it could not conclude that its methodology would

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Id. at 12132 ¶ 56. The FCC subsequently established a rebuttable presumption that the average number of attaching entities in nonurbanized areas was three and that the average number of attachers in an urbanized area was five. *Id.* at 12139-40 ¶¶ 71-72.

[393] Because the Telecom Formula allows for more generous rates for unusable space, it in effect allows for greater recovery than the Cable Formula for any reasonable number of attaching entities.

[394] Brief of Alabama Power Company and Gulf Power Company, Ala. Power Co. v. FCC, Nos. 00-14763-I & 00-15068-D, at 23 (11th Cir. filed Mar. 5, 2001).

[395] *Consol. Reconsideration Order*, 16 F.C.C.R. at 12116-17 ¶¶ 20-22, 12119 ¶ 25; *Fee Order*, 15 F.C.C.R. at 6460-61 ¶ 9.

deny just compensation in all cases.[396] The FCC reiterated these principles when applying the approach established by its general orders in particular cases.[397] Because these cases arose out of actual rate orders, the FCC addressed the takings issue directly. Citing *Florida Power*, the FCC ruled that the constitutionality of its actions turned solely on whether the rates established were confiscatory. Even assuming that the 1996 amendments constituted a taking for which just compensation must be paid, it was impossible to apply any of the three conventional methodologies for determining fair market value.[398] Appeals of these decisions are currently pending before the Eleventh Circuit.[399]

2. Economic Arguments in Favor of Market Value

Basic economic theory indicates that the most efficient way to implement the Pole Attachments Act would be to base access rates on market-based prices. Using external benchmarks to set access rates would promote allocative efficiency, since market-based pricing provides those who obtain access with the signals they need to make sure that they purchase optimal quantity and overall mix of inputs and tends to help inputs find their way into the hands to those buyers who obtain the greatest benefit from them. Reliance on market prices also promotes dynamic efficiency by providing the appropriate incentives for investment and innovation.

Basing access rates on the price that would be paid for access on the open market thus represents the best way to promote economic efficiency. Although it is arguable that such external benchmarks once did not exist,[400] technological convergence and the shift from output regulation to input regulation as well as improvements in technology have made it possible for regulatory authorities to infer market prices from two different types of transactions. First, regulators may consider the revenue that could be earned from other attaching entities. Second, they may infer market value from the price of any substitute technologies of which an attaching entity can avail itself.

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[396] *Consol. Reconsideration Order*, 16 F.C.C.R. at 1215-16 ¶ 18; *Local Competition Order*, 11 F.C.C.R. at 16087-88 ¶ 1192.

[397] *See* Ala. Cable Telecomms. Ass'n v. Ala. Power Co., Order, 16 F.C.C.R. 12209 (2001); Teleport Communications Atlanta, Inc. v. Ga. Power Co., Order, 16 F.C.C.R. 20238, 20240-41 ¶ 7 (2001). The FCC subsequently ordered that a series of identical complaints against Georgia Power be held in abeyance pending attempts to negotiate a mutually acceptable rate using the information provided by the FCC's opinion in this opinion. *See* Knology, Inc. v. Ga. Power Co., Order Granting Temporary Stay, 16 F.C.C.R. 20413 (2001); City of Sanderville v. Ga. Power Co., Order Granting Temporary Stay, 16 F.C.C.R. 20417 (2001); City of Dublin v. Ga. Power Co., Order Granting Temporary Stay, 16 F.C.C.R. 20421 (2001).

[398] *Ala. Power*, 16 F.C.C.R. at 12229-35 ¶¶ 46-57.

[399] Ala. Power Co. v. FCC, Nos. 00-14763-I & 00-15068-D (11th Cir. filed Sept. 13, 2000); Ga. Power Co. v. FCC, No. 02-10222-B (11th Cir. filed Jan. 11, 2002).

[400] Baynes, *supra* note 366, at 177.

a. Unregulated Pole Attachments — The years since the enactment of the Pole Attachments Act have witnessed periods during which the rates for certain types of pole attachment were determined through arms-length transactions. For example, the Pole Attachments Act as originally enacted only extended to cable television systems. It was not until 1996 that it was extended to cover telecommunications carriers as well. As a result, pole attachment agreements negotiated by local telephone companies seeking access to utility poles owned by electric companies were unregulated by the federal government prior to 1996. Indeed, such agreements were necessarily quite common, since electric companies owned the majority of utility poles.[401] Thus, until 1996 the terms of pole attachment agreements obtained by local telephone companies in states that did not regulate such contracts necessarily represented market-based transactions that regulatory authorities could use to establish efficient pricing. Proceedings before the FCC suggest that these rates were substantially higher than those authorized under the Pole Attachments Act.[402]

In addition, it is possible that some arms-length transactions might have been negotiated during regulatory gaps following judicial challenges to the Pole Attachments Act. For example, it appears that uncertainty about the constitutionality of the Cable and Telecom Formulas in the aftermath of *Gulf Power I* led the FCC to make statements that many parties believed indicated that it would not require that pole attachment rates comply with the Cable and Telecom Formulas until after the courts had made a final determination of what constituted just compensation.[403] Until the FCC subsequently disavowed that position,[404] the parties negotiating pole attachment agreements may well have believed that such agreements were temporarily unregulated and negotiated arms-length transactions during that time.[405]

Interestingly, the fact that such market benchmarks are no longer available underscores the extent to which the absence of a well-established market is the direct result of state and federal regulation.[406] The absence of a market, however, does not imply that a product or service would lack market value, only that the market value has yet to be determined.

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[401] *See* S. REP. NO. 95-580, at 21 (1977).

[402] *Compare Ala. Power*, 16 F.C.C.R. at 12224 ¶ 35 (reporting that joint use agreements between local telephone companies and electric companies incorporated rates ranging between $26.29-$30 per pole), *with* Brief of Alabama Power Company and Gulf Power Company, Ala. Power Co. v. FCC, Nos. 00-14763-I & 00-15068-D, at 23 (11th Cir. filed Mar. 5, 2001) (arguing that the Cable Formula and the Telecom Formula allowed for rates of $6.30 and $20.41 respectively).

[403] *See Ala. Power*, 16 F.C.C.R. at 12221-23 ¶ 23.

[404] *See id.* at 12221-23 ¶¶ 29-31.

[405] The Eleventh Circuit's decision in *Gulf Power II* holding that the Pole Attachments Act did not cover Internet services could have created a window during which arms-length transactions could have been negotiated between broadband providers and pole owners. Apparently, the Eleventh Circuit immediately stayed the mandate of *Gulf Power II* pending Supreme Court review. *See Ga. Power*, 16 F.C.C.R. at 12213 ¶ 9; *Ala. Power*, 16 F.C.C.R. at 12214-15 ¶¶ 11-12.

[406] For a discussion of the problems with allowing other features of a regulatory regime to render a particular restriction constitutional, see Yoo, *supra* note 31, at _.

b. Alternative Network Technologies — Regulatory authorities may also infer market prices from the rates charged for access to alternative technologies that provide the same functionality as networks of utility poles. This is because, according to basic economic theory, the prices for substitutes for a particular good represent useful proxies for determining market value of that good.

Attachments by Wireless Carriers—For example, wireless carriers who wish to attach their equipment to utility poles have the option of attaching their equipment to a wide variety of alternative facilities. In fact, tall buildings, communications towers, and indeed any location that is sufficiently high can provide a direct substitute for the pole owner's facilities. It is for this reason that the Supreme Court has questioned whether attachments by wireless carriers truly fall within the economic rationale of the Pole Attachments Act, which is directed towards preventing monopoly pricing in bottleneck facilities.[407] In addition to raising questions whether access represents good economic policy, the existence of substitutes also provides an external benchmark for setting rates in the event that policy makers nonetheless decide to impose access requirements. Given that surveys suggest that the rental rates charged to wireless companies for the placement of attachments on communications towers exceed the rates allowed by the Pole Attachments by several hundred percent,[408] there is reason to question whether the cost-based rates currently in place are effectively promoting either allocative or dynamic efficiency.

Multichannel Video Programming Distributors (MVPDs)—In addition, the emergence of viable spectrum-based technologies for delivering video programming to the home is making it possible to estimate the value of access to networks of utility poles by cable television systems. Although technologies that provide multichannel video programming distribution via spectrum, up until recently none has been able to provide effective competition with cable television.[409] It is only in the last few years that digital broadcast satellite systems (DBS) have emerged as a viable competitor to cable television. DBS penetration has approaching the levels

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[407] Nat'l Cable & Telecomms. Ass'n v. Gulf Power Co., 122 S. Ct. 782, 790 (2002). The Court nonetheless held that the plain language of the statute included wireless carriers within its scope. Even if some ambiguity existed, the Court would defer to the FCC's construction of the statute. *Id*.

[408] Fryer's TowerSource, The TowerSource/Tower Summit Survey, *at* http:://www.towersource.com/survey.html (last visited May 16, 2002) (reporting survey indicating that as of October 31, 2000, communications towers receive an average annual rent of over $12,000 from each attaching entity).

[409] Early spectrum-based MVPD technologies include multichannel multipoint distribution services (MMDS), which employ microwave transmission facilities to provide multichannel programming; satellite master antenna television systems (SMATV), which establish private cable systems that service individual apartment buildings; home satellite dishes (HSD), comprised of the large, C-band satellite dishes that were the first to be deployed. Annual Assessment of Status of Competition in Market for Delivery of Video Programming, Eighth Annual Report, 17 F.C.C.R. 1244, 1277-82 ¶¶ 67-77 (2002) ("*Eighth Annual Report on Video Programming Delivery*").

that, under current law, would represent sufficient competition to justify eliminating rate regulation of basic cable services.[410] Recent empirical studies have confirmed that consumers are beginning to regard DBS as a substitute for cable.[411]

The value of the transmission service provided by DBS can thus provide an external benchmark that can be used in determining the market value of access to networks of public utility poles. There are a number of factors that will complicate any direct comparison. The geographic structure of the two media is, of course, quite different, since DBS, by its very nature, is necessarily national in scope, while cable television service is necessarily limited to serving specific localities. In addition, the quality of the various services differs somewhat. That said, the existence of these substitutes can provide useful guidance as to the value of the services being provided under a regime of compelled access.

Broadband—Furthermore, a wide array of alternative technologies are emerging through which broadband providers can reach consumers without using pole attachments.[412] Although cable modem and digital subscriber line (DSL) providers have taken the early lead in the broadband race, there are a number of alternative broadband technologies that are in various stages of deployment.[413] DBS providers are already offering satellite-based broadband technologies that are beginning to vie directly with wireline broadband services.[414] Again, by its very nature, DBS is necessarily national in scope, while cable television service is necessarily limited to serving specific localities. In addition, the quality of the various services differs somewhat. Although these differences can make direct comparisons difficult to make, they do not completely vitiate the usefulness of these substitutes in helping to determine the value of the services being provided through utility pole networks. Other providers are deploying spectrum-based technologies whose geographic footprints are similar to that of cable operators. For example, providers of Personal Communications Services (PCS) are already providing mobile wireless broadband services, and other companies are preparing to use Multipoint Distribution Service (MDS) to provide fixed wireless broadband services.[415] Digital television broadcasters are

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[410] *See* Yoo, *supra* note 9, at 228-30.

[411] *See* Implementation of Section 3 of Cable Television Consumer Protection & Competition Act of 1992, Report on Cable Industry Prices, 16 F.C.C.R. 4346, 4363 ¶ 48, 4364-65 ¶ 53 (2001).

[412] *See generally* Appropriate Framework for Broadband Access to Internet over Wireline Facilities, Notice of Proposed Rulemaking, 17 F.C.C.R. 3019, 3037-38 ¶¶ 36-37 (2002); Yoo, *supra* note 9, at 253-58.

[413] Inquiry Concerning Deployment of Advanced Telecomms. Capability to All Ams. in Reasonable & Timely Fashion & Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of Telecomms. Act of 1996, Third Report, 17 F.C.C.R. 2844, 2864 ¶ 44, 2865 ¶ 48 (2002) ("*Third § 706 Report*").

[414] *Id*. at 2869 ¶ 60, 2879-80 ¶ 85, app. B at 2926-27 ¶¶ 45-49.

[415] *Id*. at 2867-69 ¶¶ 55-59, 2901 ¶ 146, app. B at 2921-26¶¶ 31-44; Inquiry Concerning Deployment of Advanced Telecomms. Capability to All Ams. in Reasonable & Timely Fashion & Possible Steps to

considering proposals to use part of the increased efficiency provided by digital transmission to provide broadband services.[416] And finally, the promise of third generation wireless devices (3G) hangs over the entire competitive arena.[417] Each of these technologies provide network transmission services on a geographic scale that is much more comparable to utility poles than DBS.

The growth of direct facilities-based competitors to utility poles raises serious questions about whether compelling access represents sound economic policy. This is because access harms dynamic efficiency both by forcing the pole owner to share any benefits that result from investments in its own facilities and by rescuing those who need access to such facilities from having to invest in alternative networks capable of providing similar functions. Thus access both attenuates the pole owner's incentives to invest its own facilities as well as deprives the owner's of substitute facilities of their natural strategic partners. In so doing, access requirements can forestall the emergence of alternative facilities-based competition to utility poles, which represents the only viable solution to any bottleneck problem.

If access is to be compelled, however, the best way to mitigate these effects is through the establishment of access rates that mimic market-based pricing. Doing so not only encourages existing participants to employ appropriate levels of network inputs, it also provides appropriate signals to those deciding on whether to enter particular markets and those deciding whether to invest in network facilities. Granting access to utility poles at submarket rates, in contrast, threatens to make those alternative transmission technologies appear artificially unattractive. Regulation threatens to cause investment in those technologies to fall below efficient levels.

Finally, with respect to broadband, it is possible that the rates allowed under the Telecom Formula can serve as a reference point for market-based pricing for cable television systems. Admittedly, the prices determined by the Telecom formula are not established in open markets. Nonetheless, the fact that application of the Cable Formula will typically lead to a significant shortfall compared to the Telecom Formula[418] provides good reason to question whether the rates established under the Cable Formula can properly be regarded as fair market value. Indeed, the net result impairs allocative efficiency by establishing significantly different cost structures for cable modem service and DSL and impedes dynamic efficiency by distorting the

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Accelerate Such Deployment Pursuant to Section 706 of Telecomms. Act of 1996, Second Report, 15 F.C.C.R. 20913, 20932-37 ¶¶ 42-55 (2000) ("*Second § 706 Report*"); *Eighth Annual Report on Video Programming Delivery*, 17 F.C.C.R. at 2873-74 ¶¶ 69-71.

[416] Advanced Television Sys., Fifth Report and Order, 12 F.C.C.R. 12809, 12820-21 ¶ 29 (1997) (authorizing digital television stations to provide "ancillary and supplementary services," including data transmission); Annual Assessment of Status of Competition in Market for Delivery of Video Programming, Seventh Annual Report 16 F.C.C.R. 6005, 6052 ¶ 102 (2001).

[417] *Third § 706 Report*, 17 F.C.C.R. at 2878 ¶ 80, 2900 ¶¶ 141-143, 2901-02 ¶ 147.

[418] *See supra* notes 393-394 and accompanying text.

investment and entry decisions of these two types of providers. Allowing such a significant differential to persist allows the government far too great a role in determining which of these platforms will eventually emerge as the technological winner.

c. ECPR as a Second-Best Valuation Method — The growing availability of alternative telecommunications networks is making it increasingly possible for regulatory authorities to base access pricing on actual transactions for comparable services. We acknowledge, however, that many of these technologies are not yet fully deployed and that differences in utilization levels and geographic scope may further limit the current usefulness of transactions involving these technologies as external benchmarks. If that is the case, the appropriate step would be for regulators to base rates on ECPR, which requires that rates be set equal to the sum of the direct incremental costs and the opportunity costs associated with providing access.[419]

The methodologies currently employed to set rates for pole attachments deviates from ECPR in two significant ways. First, the current approach to pole attachments calculates direct incremental costs on the basis of historical cost rather than forward-looking cost. The FCC has itself acknowledged that reliance on forward-looking costs would better promote allocative efficiency. As the FCC observed, "a firm compares forward-looking costs with existing market prices, in making decisions about entry, expansion, and price"; as a result, ratemaking methodologies based on forward-looking cost help "to ensure the efficient use of telecommunications network facilities, and to encourage new entrants to make economically rational decisions about whether or how to enter a local telecommunications market."[420] In addition, "[a] forward looking cost pricing methodology reflects the cost of replacing the functions of an asset using the most efficient technology available so as to appropriately capture the technological changes that are occurring."[421] Use of forward-looking costs would also promote dynamic efficiency, since setting prices on the basis of forward-looking economic costs would "giv[e] the appropriate signal for new entrants to invest in network facilities."[422]

Despite its acknowledged benefits that would result from applying a methodology based on forward-looking cost, the FCC nonetheless offered several justifications for continuing to rely on historical cost. For example, the FCC reasoned that the Pole Attachments Act was designed to stem anticompetitive pricing and not to stimulate competitive entry.[423] The FCC

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[419] *See supra* Part I.C.2.

[420] *Consol. Reconsideration Order*, 16 F.C.C.R. at 12103, 12116 ¶ 20.

[421] *Id*. at 12118-19 ¶ 24.

[422] *Id*. at 12119 ¶ 25 (citing *Fee Order*, 15 F.C.C.R. at 6453, 6460-61 ¶ 9); *accord id.* at 12118-19 ¶ 24 (noting that methodologies based on forward-looking costs give new entrants "the proper cost signals to decide whether to construct their own networks or to use the incumbent's").

[423] *Id.* at 12116-12117 ¶¶ 20-21; *see also* Baynes*, supra* note 366, at 177.

also suggested that continued application of a historical cost methodology was justified in part by the fact that the technology underlying utility poles was relatively static.[424] In addition, the FCC pointed out that investment incentives are less important in the pole attachment context, since local zoning and other right of way restrictions prevent the construction of duplicative networks of poles.[425]

The problem with the FCC's reasoning is that it fails to accord sufficient weight to the arrival of alternative technologies that compete directly with utility pole networks. In terms of static efficiency, the FCC's reliance on the need to control monopoly pricing ignores the fact that the emergence of substitute facilities will generally cause any monopoly rents to dissipate. In focusing too narrowly on the network of utility poles as a universe unto itself, the FCC's approach ignores the fact that substitute facilities, such as digital broadcast satellite (DBS) systems and to a lesser extent wireless cable systems, exist that can support transmission of both multichannel video program distribution. In addition, wireless telephony has emerged as a viable alternative to wireline communications. Over time, the growing importance of these substitute media grow in importance will erode any monopoly power possessed by utility pole owners, if it has not done so already. The most dramatic illustration of this point exists with respect to wireless providers, which the FCC and Supreme Court have concluded fall within the ambit of the Pole Attachments Act.[426] In fact, wireless providers have readily available an extensive array of alternative places in which to locate their equipment, including communications towers and rooftop placements, that eliminates any supposed monopoly power possessed by utility pole owners. In forcing pole owners to provide access to wireless carriers at rates below those that they would reach through arms-length negotiations, current regulatory policy is interfering with allocative efficiency.

More importantly, the FCC's reasoning ignores the impact that pricing of access to utility poles has on dynamic efficiency by disregarding the impact that the price of access to utility poles can have on the levels of investment in alternative technologies. For example, it is true that because reconstructing the existing network is very costly and not desirable, high access prices to utility poles may not spur any additional investment in duplicate networks of poles. The price of access to poles does, however, have a direct impact on the level of investment in communications towers and other spectrum-based technologies that operate as substitutes for utility poles. This is true even if the technology underlying utility poles remains relatively static, since the dramatic changes in substitute technologies will influence the economics of

[424] *Consol. Reconsideration Order*, 16 F.C.C.R. at 12118-19 ¶ 24.
[425] *Id.*; *see also Fee Order*, 15 F.C.C.R. at 6460-61 ¶ 9.
[426] *See supra* note 382 and accompanying text.

distributing telecommunications services to individual residences and businesses even if the technology underlying utility poles does not change. It is only by taking an artificially truncated view of the scope of the relevant technologies that makes these considerations seem unimportant.

This effect will be particularly dramatic with respect to broadband technologies. As noted earlier, companies are in the process of deploying a wide range of broadband technologies, including PCS, fixed wireless broadband systems, 3G wireless devices, and ancillary and supplementary services provided via spectrum assigned to digital television broadcasting.[427] The manner in which access to pole attachments are priced will have a direct and dramatic impact on the timing and level of investment in deploying these new technologies.

The second way in which the current methodology used to set rates for pole attachments deviates from ECPR is the absence of any element that reflects opportunity cost. This omission reflects the FCC's failure to understand that, since networks are a capital asset that is not consumed, the price for using of the assets is properly based is the value of the services created with those assets and not the costs used to construct them. In addition, focusing solely on historical costs fails to reflect the contribution of the demand-side of the economic equation that has become a fundamental consideration ever since neoclassical theory emerged as the consensus economic paradigm. In addition, opportunity costs would be relatively easy to implement in this context, since the all of the relevant markets—wireless telephony, MVPDs, and broadband—are or are becoming extremely competitive.[428]

Together these arguments underscore the extent to which access regulations represent something of an anomaly in competition policy.[429] Rather than breaking up a monopoly position, compelled access simply forces a monopolist to share an input, which has the effect of rescuing other firms from having to invest in developing an alternative source of supply of that input. In effect, then, compelled access cuts off emerging alternative network technologies from their natural strategic partners. As a consequence, it preempts the development of a viable alternative to the bottleneck facility, which represents the only viable long-term solution to the monopoly problem. This is particularly problematic in technologically dynamic industries such as wireless telephony, video distribution, and the Internet, in which the prospects of developing new ways either to circumvent or to compete directly with the bottleneck are the greatest.

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[427] *See supra* notes 412-417 and accompanying text. One of the parties in *Alabama Power* has also offered expert testimony asserting that railroad and highway rights of way have emerged as still another way in which broadband providers can bypass the network of utility poles. *See* 16 F.C.C.R. at 12224 ¶ 34.

[428] *See* Yoo, *supra* note 9, at 227-30, 253-58; *supra* notes 412-417 and accompanying text.

[429] *See supra* note 25 and accompanying text.

Indeed, access requirements applied in industries characterized by high fixed costs can represent a form of regulatory opportunism. Firms deciding whether to enter such industries *ex ante* will, of course, do so only if they can expect to recover their fixed cost investments. Economists have long recognized that once fixed costs are sunk, firms remain vulnerable to *ex post* opportunistic behavior that can push them down towards marginal cost pricing, since once costs are sunk, they are no longer taken into account. Such opportunism is mitigated in competitive markets by the law of contracts, the desire to maintain business relationships, and market reputation effects. To the extent that regulators access requirements push prices below the levels needed to guarantee full investment, they remain problematic.

The FCC's attempts to evade this logic are unpersuasive. In arguing that the relatively static nature of utility pole technology and the practical impossibility of replacing the network renders investment incentives less important, the FCC focuses too narrowly on utility poles as a distinct technological universe and fails to give appropriate significance to the ongoing emergence of substitute technologies. The relevant investment incentives go as much to stimulating investment in alternative networks as it does to stimulating investment in alternative sets of poles. Pricing access to networks of poles below market for cable television, for example, threatens to reduce the incentives for television networks to invest in DBS and other alternatives to cable television below efficient levels. Similarly, allowing broadband providers to obtain transmission via utility poles threatens to deprive non-wireline broadband technologies of the support that they need to finance their deployment.

In the end, the only justification for the FCC's position is administrative convenience. The FCC argued that the historical cost approach had "provided a stable and certain regulatory framework, that may be applied 'simply and expeditiously' requiring 'a minimum of staff paperwork and procedures consistent with fair and efficient regulation' " for over two decades, and Congress had not given any indication that it wanted the FCC to deviate from it.[430] The FCC further argued that switching to a methodology based on forward-looking cost would cause significant disruption and would force the FCC to undertake extensive proceedings to establish the new approach.[431]

The alleged simplicity of historical costs is far from an argument for accuracy. As Justice Breyer has acknowledged, although continued reliance on historical costs may provide some administrative advantages, "[w]hen the economic problems created by the use of historical cost valuation become serious, special modifications must be made in the process."[432] Specifically,

[430] *Fee Order*, 15 F.C.C.R. at 6460-61 ¶ 9 (quoting S. REP. NO. 95-580, at 21 (1977)); *Consol. Reconsideration Order*, 16 F.C.C.R. at 12117 ¶ 22, 12119 ¶ 25 (same).

[431] *Fee Order*, 15 F.C.C.R. at 6460-61 ¶ 9.

[432] BREYER, *supra* note 32, at 40.

in making this evaluation, the proper inquiry for the FCC is whether the administrative advantages of retaining the existing regulatory regime outweigh the long-term benefits of efficient pricing in current transactions as well as in fostering the emergence of direct facilities-based competition to utility poles, which remains the only solution to the problems of bottleneck control that is truly viable in the long run. Under such circumstances, the FCC should be very careful not to let what would amount to transient, short-term inconvenience exert too great an influence over the substantial benefits that would accrue in the long run.[433] Indeed, allowing the FCC to adhere to outmoded methodologies in the name of administrative convenience would ignore the fact that the shift from rate regulation to access regulation was intended to revolutionize the approach to utility regulation. Maintaining the status quo runs the risk of causing cause all of the benefits resulting from the transformation of regulatory policy to come to naught.

3. Constitutional Arguments in Favor of Market Value

The Supreme Court's takings jurisprudence provides another consideration cutting against the FCC's decision to base pole attachment rates on historical cost. As the FCC concedes, the 1996 amendments are "not reasonably susceptible of a reading that gives the pole owner the choice of whether to grant telecommunications carriers or cable television systems access."[434] As the Eleventh Circuit recognized in *Gulf Power I*, by transforming the Pole Attachments Act from a rate regulation scheme into a compulsory access requirement, the 1996 amendments brought the entire scheme squarely within the ambit of *Loretto*.[435] It makes no difference that the pole owners may have originally taken the property in question with the understanding that they would have to put it to a public use.[436] Nor did the fact that the utilities knew that its property would be subject to extensive regulation for the public use justify forcing the utilities to subject themselves to physical invasions without just compensation. On the contrary, the court concluded that such an argument had things "backwards," in that "[a]

[433] For other examples in which the FCC has inhibited the emergence of competition by permitting itself to be unduly swayed by one-time costs associated with regulatory change, see Yoo, *supra* note 31, at _.

[434] *See Local Competition Order*, 11 F.C.C.R. at 16087 ¶ 1191.

[435] *See supra* notes 387-389 and accompanying text.

[436] Gulf Power Co. v. FCC, 187 F.3d 1324, 1329-30 (11th Cir. 1999) ("*Gulf Power I*") (citing W. Union Tel. Co. v. Pa. R.R., 195 U.S. 540, 573 (1904) (noting that even though "[t]he right of way of a railroad is property devoted to a public use," "it has been recognized . . . that a railroad right of way is so far private property as to be entitled to that provision of the Constitution which forbids its taking, except under the power of eminent domain and upon payment of [just] compensation"); and United Rys. & Elec. Co. v. West, 280 U.S. 234, 249 (1930) (noting that "the property of a public utility, although devoted to the public service and impressed with a public interest, is still private property and neither the corpus of that property nor the use thereof constitutionally can be taken for a compulsory price which falls below the measure of just compensation"), *overruled on other grounds by* FPC v. Hope Natural Gas Co., 320 U.S. 591 (1944).

property owner is entitled to expect that the property it acquired via eminent domain . . . came with the right that all property has—not to be subject to government-coerced, permanent, physical occupation without just compensation."[437]

The FCC contended that this argument was foreclosed by *Florida Power*, which they construed as establishing the constitutional sufficiency of the compensation provided by the existing approach to setting pole attachment rates.[438] Indeed, the FCC maintained that *Florida Power* definitively established that the proper standard for resolving takings challenges to all pole attachments was the confiscatory ratemaking standard as elaborated in *Duquesne Light* and *Hope Natural Gas*.[439] The FCC's position ignores the sharp distinction between physical and nonpossessory takings drawn by the Supreme Court.[440] In the words of the Eleventh Circuit:

> Characterizing the mandatory access provision as a regulatory condition, even one allegedly designed to foster competition, cannot change the fact that it effects a taking by requiring a utility to submit to a permanent, physical occupation of its property. However laudatory its motive, Congress' power to regulate utilities does not extend to taking without just compensation the right of a utility to exclude unwanted occupiers of its property.[441]

Indeed, the Supreme Court underscored this precise point when it explicitly recognized that " '[a] permanent physical occupation authorized by government is a taking *without regard to the public interest that it may serve*.' "[442]

More specifically, the FCC's conclusion was inconsistent with the binding precedents holding that the principles of confiscatory ratemaking had no application in determining whether a physical taking had occurred. As the Eleventh Circuit reasoned, "*Duquesne*'s discussion of utilities was not in the context of a takings case dealing with the permanent occupation of property. Nothing in *Duquesne* suggests a utility's property is less subject to protection against permanent, physical occupation than anyone else's property. It is not."[443] Nor could the 1996 amendments be upheld under a regulatory taking analysis. "[A]lthough property is subject to broad

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[437] *Id.* at 1330.

[438] *Ala. Power*, 16 F.C.C.R.. at 12229-30 ¶¶ 45-46; *see also Consol. Reconsideration Order*, 16 F.C.C.R. at 12217 ¶ 18; *Fee Order*, 15 F.C.C.R. at 6460-61 ¶ 9.

[439] *Ala. Power*, 16 F.C.C.R.. at 12230-31 ¶¶ 47-48.

[440] *See supra* notes 162-163, 169, 202 and accompanying text.

[441] *Gulf Power I*, 187 F.3d at 1331.

[442] *Id*. (quoting Loretto v. Teleprompter Manhattan CATV Corp., 458 U.S. 419, 426 (1982)).

[443] *Id*.

regulatory power, a regulation becomes a taking when the government authorizes permanent, physical occupation by a third party.[444] Since the 1996 Act effects a per se taking, the government is obligated to ensure that the pole owners receive compensation that reflects the earning potential of the property taken, and fair market value represents the accepted basis for determining what that earning potential is.[445]

In apparent recognition of the weakness of its position, the FCC entertained the possibility that the Takings Clause required that pole owners receive market value as compensation for access to their poles. Even so, the FCC concluded that "the unusual nature of pole attachments, and the nature of the property interest conveyed," made it impossible to apply the standard techniques for determining market value.[446] Specifically, the absence of viable alternatives to the networks of utility poles made it impossible base market value on comparable sales, since the actual market transactions that existed either included monopoly rents or involved property rights that were "too different to draw any meaningful conclusions."[447] In addition, the FCC found the income capitalization approach too speculative, since access to utility poles represented only one of many inputs needed to provide cable television and telecommunications services, a fact that made it virtually impossible to determine how much of the income earned to attribute to any one particular input.[448] Finally, the FCC rejected the replacement cost approach in part on the grounds that access did not completely destroy the pole owner's property interests, but instead simply imposed an occupation that was "restricted in duration, primacy, exclusivity, and physical manner of use."[449] The FCC also reasoned that the replacement cost approach should not be used because it is infeasible to replace the existing network of utility poles.

None of the FCC's arguments are convincing. As discussed earlier, the emergence of substitute network technologies has made it possible to establish access rates that are a reflection of actual market transactions. Indeed, in the context of attachments by wireless carriers, it is possible to compare what amount to identical transactions. The FCC's objection to the income capitalization approach ignores the fact that the Supreme Court has sanctioned its use under circumstances in which an asset was simply one of many inputs in a productive process.[450] Furthermore, the grounds offered by the FCC for rejecting the replacement cost approach are factually incorrect in one important respect. The access requirement is not limited in the manner

[444] *Id.* at 1328 (citing *Loretto*, 458 U.S. at 439-40).
[445] *See supra* notes 212-220 and accompanying text.
[446] *Ala. Power*, 16 F.C.C.R. at 12233 ¶ 53.
[447] *Id*. at 12234 ¶ 55.
[448] *Id*. at 12234 ¶ 56.
[449] *Id*. at 12234-35 ¶ 57.
[450] *See supra* notes 154-155 and accompanying text.

in which the FCC envisions. It in fact authorizes occupations that are indefinite, not temporary, and that in effect deprive the pole owner of the right to possess, use, and dispose of the property occupied. Thus, the Supreme Court has recognized that access requirements do in fact completely destroy all of the property owner's interests with respect to that particular portion of the property occupied.[451] The fact that replicating a network of utility poles was infeasible might have been relevant had no technological alternatives existed. Under such circumstances, investment incentives might well be largely irrelevant. In this case, however, numerous alternative technologies exist that can perform the same functions as utility poles. Thus, the fact that direct replication of utility poles is impossible does not justify the disruption of investment signals that occurs when access rates are based on historical cost.

In short, the only way the FCC could justify its position is by making two fundamental analytical errors. First, it ignored the fundamental change in the takings analysis required by the shift to access regulation recognized in *Gulf Power I* and *II*. Second, it ignored the fundamental change in the just compensation analysis required by the emergence of facilities-based competition to networks of utility poles. To date, courts have properly declined to address the merits of the just compensation argument, since all of the challenges to date have occurred in facial challenges to the regulatory scheme rather than in the context of an actual rate. It thus remains to be seen whether the principles we advance will emerge in the judicial challenges currently pending before the Eleventh Circuit.[452]

C. Access to Broadband Networks

The Internet has emerged as a significant development of the last several years and has exerted an ever-growing influence on telecommunications media, competing variously as a substitute for telephones, fax, television, radio, postal services, and private data transmission networks. Initially, the vast majority of U.S. households received Internet service through "narrowband" technologies employing an analog modem attached to a conventional telephone line. Although conventional telephone-based connections permit theoretical connection speeds of 56.6 thousand bits per second (kbps), in practice typical connection speeds fall in the neighborhood of thirty kbps.[453]

More and more, however, U.S. consumers have been turning to "broadband" technologies that allow subscribers to achieve actual speeds in

[451] *See Loretto*, 458 U.S. at 435-36.

[452] *See supra* note 399 and accompanying text.

[453] Although most conventional modems are technically capable of carrying up to 56.6 kbps, the physical characteristics of the telephone lines that those modems use to connect to the Internet limit speeds to the 30-40 kbps range.

excess of one million bits per second (1 Mbps).[454] Broadband transmission facilities provide advantages for customers seeking telecommunications and Internet access services including speeds of up to 100 times faster than standard dial-up services. Moreover, broadband services will permit bandwidth-intensive multimedia content with enriched entertainment features such as video and interactive computer games. The high-bandwidth system will further allow "always on" service without the inconvenience of repeatedly logging on to connect to the Internet. The FCC estimated in 2000 that over one-third of all U.S. households would subscribe to some form of broadband service in a matter of a few years.[455] Econometric studies indicate that broadband is not simply a substitute for dial-up service, but instead constitutes a separate market.[456] The FCC declared that the widespread deployment of broadband infrastructure was a central communications policy objective.[457]

There is one key difference between narrowband and broadband connections to the Internet that has emerged as the flash point for these policy debates. In the narrowband world, customers can use their telephone lines to connect to any one of a large number of Internet service providers (ISPs). Broadband providers, in contrast, typically require their customers to employ a proprietary ISP.[458] Policy makers and commentators have begun to explore whether they should compel broadband providers to allow unaffiliated ISPs to employ their transmission networks. Thus, of all the issues surrounding broadband deployment, the controversy over this issue has made access to broadband networks "among the most compelling issues in the communications industry."[459]

This subpart explores the manner in which any such access requirement should be implemented. It begins by reviewing the existing regulatory

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[454] Most DSL and cable modem users can expect speed somewhere in the neighborhood of 1.5 Mbps. Theoretical speeds are much higher. *See* Speta, *supra* note 87, at 52, 56 (noting that ADSL and cable modems have a theoretical maximum of 10 Mbps and 27 Mbps respectively).

[455] Inquiry Concerning Deployment of Advanced Telecomms. Capability to All Ams. in a Reasonable & Timely Fashion, & Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of Telecomms. Act of 1996, Second Report, 15 F.C.C.R. 20,913, 20,983 ¶ 186 (2000) ("*Second § 706 Report*").

[456] Jerry A. Hausman et al., *Cable Modems and DSL: Broadband Internet Access for Residential Customers*, 91 AM. ECON. REV. 302, 303-04 (2001).

[457] Appropriate Framework for Broadband Access to Internet over Wireline Facilities, Notice of Proposed Rulemaking, 17 F.C.C.R. 3019, 3020-21 ¶ 1 (2002).

[458] For example, before its collapse, Excite@Home, which was the largest ISP serving cable modem subscribers, was owned by such major cable modem providers as AT&T, Comcast, Cox Communications, Cablevision Systems, and Shaw Cablesystems, and was the exclusive ISP for those systems. Time Warner, which is the second largest high-speed broadband provider, has previously required all of its users to use a proprietary ISP called "RoadRunner." *See* Applications for Consent to Transfer of Control of Licenses & Section 214 Authorizations from MediaOne Group, Inc., Transferor, to AT&T Corp., Transferee, Memorandum Opinion and Order, 15 F.C.C.R. 9816, 9863 ¶ 107 (2000) ("*AT&T-MediaOne Merger*").

[459] DEBORAH A. LATHEN, BROADBAND TODAY: A STAFF REPORT TO WILLIAM E. KENNARD, CHAIRMAN, FEDERAL COMMUNICATIONS COMMISSION 10 (Oct. 1999), at http://ftp.fcc.gov/Bureaus/Cable/Reports/broadbandtoday.pdf.

regimes governing the two principal broadband technologies: digital subscriber lines (DSL) and cable modem systems. It then explores the proper manner in which access to such systems should be priced. We conclude that economic and constitutional considerations both indicate that such access should be priced at market value.

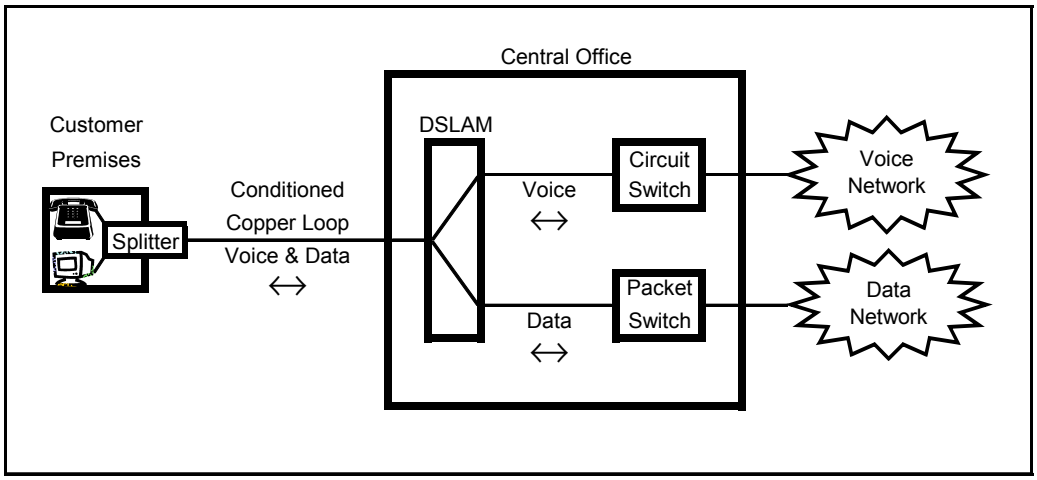
1. Regulatory Framework

a. Digital Subscriber Lines (DSL) — As noted earlier, DSL represents one of the two principal current technologies for delivering broadband services to residential customers. DSL takes advantage of the fact that conventional voice communications only occupy the lower transmission frequencies (typically those ranging from 300 to 3400 hertz). It is thus possible to use the higher frequencies (i.e., those above 20,000 hertz) to convey data communications through the same telephone line without interfering with voice communications. Although there are numerous types of DSL technology,[460] for simplicity, we shall use the term "DSL" as the generic reference to all of the various DSL technologies.

Several technical changes must be made to a local telephone network before it can be used for DSL. First, the loops used for DSL must be "conditioned." This is because it is not uncommon for incumbent LECs to have added devices to their loops, such as bridge taps, low-pass filters, and range extenders, which designed to improve the performance and functionality of their networks for transmitting voice calls. Unfortunately, these devices also cause the quality, and in particular the speed, of DSL service to degrade. Thus, before loops can be used for DSL, all devices that have accumulated on the loop must be removed. In addition, if a single telephone line is to be used for both voice and data traffic, the carrier must install equipment in its central office that can separate voice traffic from data traffic. This typically involves the installation of a device known as a digital subscriber line access multiplexer (DSLAM) in the incumbent LEC's central office. The relevant loops are connected to the DSLAM, which routes voice

[460] The most popular form of DSL is asymmetric DSL ("ADSL"), in which download transmission rates are higher than upload rates. Other forms include high bit-rate DSL ("HDSL"), which has the same data transmission capacity in each direction and provides the same capacity as a T1 line; very-high-speed DSL ("VDSL"), which is the fastest DSL technology, fast enough to deliver digital video programming, but is expensive to deploy and cannot function over sustained distances; Rate-Adaptive DSL ("RADSL"), which allows software to adjust the rate of data transmission. *See* LATHEN, *supra* note 459, at 20-21 & tbl.2. The newest form is G.SHDSL, which is a new standard recently announced by the International Telecommunications Union that allows for a symmetric, multi-rate service capable of reaching speeds up to 2.3 Mbps in both directions as well as deployment nearly twice as far form the central office as other forms of DSL. Inquiry Concerning Deployment of Advanced Telecomms. Capability to All Ams. in Reasonable & Timely Fashion & Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of Telecomms. Act of 1996, Third Report, 17 F.C.C.R. 2844, 2879 ¶ 83 (2002) ("*Third § 706 Report*"). The FCC refers to these various technologies as "xDSL," with the "x" serving as a generic placeholder for the designation of the particular type of DSL involved.

FIGURE 3
TYPICAL CONFIGURATION OF LOCAL TELEPHONE NETWORK PROVIDING DSL SERVICE



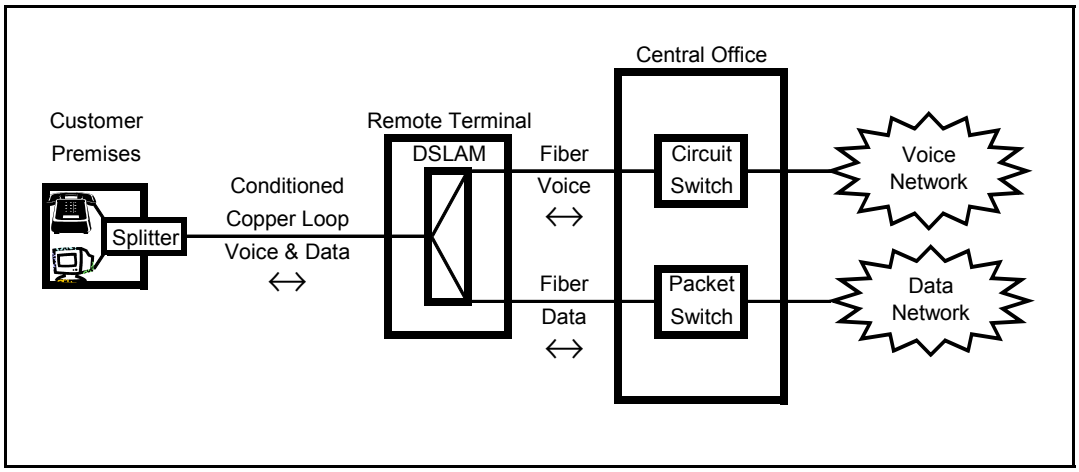
communications into a conventional circuit-switched network and routes data communications into a packet-switched network.

This scenario changes somewhat in situations in which incumbent LECs have deployed fiber optics to increase the efficiency of their networks through a technology known as digital loop carriers (DLCs).[461] Instead of using a all-copper loop to transmit analog signals between the central office and the customer's premises, DLC systems use fiber optics to establish a digital connection between the central office and a satellite facility known as a remote terminal, where the transmission is converted into an analog format and distributed to the customer's premises through a copper subloop.[462] The improved efficiency and range provided by the fiber optic connection greatly enhances the performance and quality of voice transmissions. DLCs, however, can impede the deployment of DSL. This is because DSL depends on the ability to send and receive signals in an analog format through an all-copper connection. Since the portion of the DLC system between the central office and the remote terminal employs digital transmissions through a fiber optic connection, carriers who wish to provide DSL services on a network that employs DLCs must either deploy DSLAMs in remote terminals or find an alternative copper loop running between the customer and the central office.

[461] *See* William P. Rogerson, *The Regulation of Broadband Telecommunications, the Principle of Regulating Narrowly Defined Input Bottlenecks, and Incentives for Investment and Innovation*, 2000 U. CHI. LEGAL F. 119, 125, 141-42 (2000).

[462] For simplicity, Figure 4 omits the fact that remote terminals are actually deployed in a ring configuration.

FIGURE 4
CONFIGURATION OF DSL SERVICE PROVIDED THROUGH DIGITAL LOOP CARRIERS



Policy makers have created two different sets of regulations that provide for some degree of access to elements of a LEC's DSL network. The first has its origins in a series of FCC proceedings known as the Computer Inquiries.[463] The second was created by the section of the Telecommunications Act of 1996 requiring incumbent LECs to provide unbundled access to certain network elements.[464]

The Structural and Nonstructural Safeguards Enacted by the Computer Inquiries — The first regulatory regime implemented by the FCC to govern broadband services provided by local telephone companies is the one created during the FCC's Computer Inquiries. Telecommunications companies began to do more than just provide customers with a pure transmission path, a function that came to be known as "basic services."[465] Instead, companies began to offer what became known as "enhanced services," which used computer processing to modify the information provided by the customer before routing it to its final destination.[466] Common contemporary examples

[463] *See generally* Robert Cannon, *Where Internet Service Providers and Telephone Companies Compete: A Guide to the Computer Inquiries, Enhanced Service Providers and Information Service Providers*, 9 COMMLAW CONSPECTUS 49 (2001).

[464] 47 U.S.C. § 251(c)(6).

[465] The regulations define "basic telecommunications services" as "the offering of a pure transmission capability over a communications path that is virtually transparent in terms of its interaction with customer supplied information." Amendment of Section 64.702 of Comm'n's Rules and Regulations (Second Computer Inquiry), Order, 77 F.C.C.2d 384, 419-20 ¶¶ 95-96 (1980) ("*Computer II Final Decision*"), *aff'd sub nom.* Computer & Communications Indus. Ass'n v. FCC, 693 F.2d 198 (D.C. Cir. 1982), *cert. denied*, 461 U.S. 938 (1983).

[466] The regulations define "enhanced services" as "services, offered over common carrier transmission facilities used in interstate communications, which employ computer processing applications that act on the format, content, code, protocol or similar aspects of the subscriber's transmitted information; provide the subscriber additional, different, or restructured information; or involve subscriber interaction with stored information." 47 C.F.R. § 64.702(a).

include voice mail, electronic mail, electronic store-and-forward, fax store-and-forward, and gateways to online databases such as Westlaw, Lexis, and the Internet. Although the LECs were in a position to offer both the additional functionality provided by the computer processing and the transmission of those services to the end users as a single, integrated product, other enhanced service providers (ESPs) could not offer the telecommunications services to deliver the modified information to the end users. These "pure ESPs" instead depended on the incumbent to provide such transmission services.

Policy makers soon became concerned that the incumbent LECs who were formally part of the Bell network (known as the Bell Operating Companies or "BOCs")[467] would be able to use their monopoly control over basic services to favor their own, proprietary enhanced services over those offered by unaffiliated ESPs in much the same manner that AT&T had favored its own long distance offerings prior to its breakup. The FCC's response in its First and Second Computer Inquiries ("*Computer I* and *II*") was to require that BOCs wishing to provide enhanced services do so through a separate corporate subsidiary.[468] The order that memorialized the

[467] The regulatory regime established by *Computer III* applied only to those LECs who were originally part of the Bell system. The FCC initially applied the *Computer III* rules to both AT&T and the BOCs. Amendment of Sections 64.702 of the Commission's Rules and Regulations (Third Computer Inquiry), Report and Order, 104 F.C.C.2d 958 (1986) ("*Computer III Phase I Order*"). The FCC eventually relieved AT&T of most *Computer III* requirements. *See, e.g.*, Amendment of Sections 64.702 of the Commission's Rules and Regulations (Third Computer Inquiry), Memorandum Opinion and Order on Reconsideration, 2 F.C.C.R. 3035 (1987) ("*Computer III Phase I Reconsideration Order*"); Competition in Interstate Interexchange Marketplace, Report and Order, 67 F.C.C.R. 5880 (1991); Competition in Interstate Interexchange Marketplace, Memorandum Opinion and Order on Reconsideration, 10 F.C.C.R. 4562 (1995). *But see* Filing & Review of Open Network Architecture Plans, Memorandum Opinion and Order, 4 F.C.C.R. 2449 (1988) ("*AT&T ONA Order*") (ruling that AT&T remains subject to a modified ONA plan the FCC approved in 1988). The FCC later extended some ONA requirements to GTE. Application of Open Network Architecture & Nondiscrimination Safeguards to GTE Corp., Report and Order, 9 F.C.C.R. 4922 (1994) ("*GTE ONA Order*"). The FCC never imposed CEI requirements on GTE. *See Computer III Further Remand Notice*, 13 F.C.C.R. at 6049 n.30.

[468] In its First Computer Inquiry, the FCC drew a distinction between "communications services" and "data processing services." Regulatory & Policy Problems Presented by the Interdependence of Computer & Communication Servs. & Facilities, Tentative Decision of the Commission, 28 F.C.C.2d 291, 295 ¶ 15(a) (1970). The FCC also required common carriers aside from AT&T who wished to furnish data processing services do so through a separate corporate subsidiary. Regulatory & Policy Problems Presented by the Interdependence of Computer & Communication Servs. & Facilities, Final Decision and Order, 28 F.C.C.2d 267, 270-74 ¶¶ 11-22, 391 n.2 (1970), *aff'd sub nom.* GTE Serv. Corp. v. FCC, 474 F.2d 724 (2d Cir. 1973). AT&T was precluded from offering data processing services altogether by the 1956 consent decree that terminated antitrust litigation against it. *Id*. at 282 ¶ 39 & n.13.

The FCC redefined the relevant regulatory categories in its *Computer II* to distinguish between "basic services," which it defined to be pure transmission capability with little or no interaction with customer supplied information, and "enhanced services," which it defined to be communications services which employ computer processing that interacts with information provided by the customer. *Computer II Final Decision*, 77 F.C.C.2d at 387 ¶¶ 5-7. The FCC ruled that the 1956 consent decree did not preclude AT&T from providing enhanced services, but required AT&T to do so through a separate corporate subsidiary. *Id*. at 475-86 ¶¶ 233-60. Following divestiture, the FCC extended the separate subsidiary requirement to the BOCs. Policy & Rules Concerning Furnishing of Customer Premises Equip., Enhanced Servs. & Cellular Communications Equip. by Bell Operating Cos., Report and Order,

breakup of AT&T similarly prohibited the BOCs for providing "information services,"[469] a category determined by the courts and the FCC to be coterminous with "enhanced services,"[470] and ordered the BOCs to nondiscriminatory access to all information service providers.[471]

The FCC eventually concluded in its Third Computer Inquiry ("*Computer III*"), however, that the costs of the separate subsidiary requirement outweighed the benefits and that nonstructural safeguards would protect against anticompetitive activity just as effectively.[472] Consequently, it created a two-phase system of nonstructural restrictions that would allow the BOCs to avoid the separate subsidiary requirement and provide enhanced services on an integrated basis. The first phase, known as comparably efficient interconnection (CEI), required LECs who wished to provide enhanced services without establishing a separate corporate entity to provide unaffiliated ESPs with access to the same basic services employed by the LEC in providing its own enhanced service offerings.[473] The second phase, known as open network architecture (ONA), in essence required unbundled access to all of the LEC's network elements. ONA is substantially broader than CEI in that it is not limited to LECs who are offering advanced services.[474] It also requires the LECs to provide access to all of its network elements and not just those that the LECs were using to provide its own enhanced services.[475]

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95 F.C.C.2d 1117, 1120 ¶ 3 (1984) ("*BOC Separation Order*"), *aff'd sub nom.* Ill. Bell Tel. Co. v. FCC, 740 F.2d 4765 (7th Cir. 1984). Carriers not associated with the Bell system were not subject to the separate subsidiary requirement.

[469] United States v. Am. Tel. & Tel. Co., 552 F. Supp. 131, 189-90 (D.D.C. 1982) ("*MFJ*"), *aff'd mem. sub nom.* Maryland v. United States, 460 U.S. 1001 (1983). The MFJ defined information services as "the offering of a capability for generating, acquiring, storing, transforming, processing, retrieving, utilizing or making available information which may be conveyed via telecommunications." *Id*. at 179, 229. Although the MFJ absolutely prohibited the BOCs from offering information services, the MFJ did allow AT&T to offer most information services after the local telephone companies had been divested. The only exception was electronic publishing, from which AT&T was to be barred for seven years. *Id*. at 178-85.

[470] *Id*. at 178 n.198; *Non-Accounting Safeguards Order*, 11 F.C.C.R. at 21955-56 ¶ 102. As a result, the FCC has used the terms interchangeably. *See, e.g.*, *Computer III* Further Remand Proceedings: Bell Operating Co. Provision of Enhanced Servs., Further Notice of Proposed Rulemaking, 13 F.C.C.R. 6040, n.4, 6040, 6042 n.4, 6066 ¶ 40 (1998) ("*Computer III Further Remand Notice*"); *Computer III* Further Remand Proceedings: Bell Operating Co. Provision of Enhanced Servs., Report and Order, 14 F.C.C.R. 4289, 4291 n.3 (1999).

[471] *MFJ*, 552 F. Supp. at 141 n.40, 195-97.

[472] Amendment of Sections 64.702 of Comm'n's Rules and Regulations (Third Computer Inquiry), Report and Order, 104 F.C.C.2d 958, 1002-11 ¶¶ 79-97 (1986) ("*Phase I Order*"), *on reconsideration*, 2 F.C.C.R. 3035 (1987) (Memorandum Opinion and Order) ("*Phase I Reconsideration*"), *vacated and remanded sub nom.* California v. FCC, 905 F.2d 1217 (9th Cir. 1990S).

[473] *Computer III Phase I Order*, 104 F.C.C.2d at 1035-42 ¶¶ 147-166.

[474] Ameritech's Comparably Efficient Interconnection Plan for Elec. Vaulting Serv., Order, 13 F.C.C.R. 80, 85 n.18 (1997); *BOC's Joint Petition*, 10 F.C.C.R. at 13763 ¶ 26.

[475] Amendment of Sections 64.702 of Comm'n's Rules and Regulations (Third Computer Inquiry), Report and Order, 104 F.C.C.2d 958, 1064-66 ¶¶ 214-217 (1986) ("*Computer III Phase I Order*"), *on reconsideration*, 2 F.C.C.R. 3035 (1987) ("*Computer III Phase I Reconsideration Order*"), *vacated and remanded sub nom.* California v. FCC, 905 F.2d 1217 (9th Cir. 1990). As originally conceived, ONA appeared to offer their networks to unaffiliated ESPs on an element-by-element basis. The FCC

In requiring LECs to provide unbundled access to elements of their networks, the FCC refused to require physical collocation under either CEI or ONA.[476] Instead, the FCC simply mandated that the LECs minimize transmission costs. Although the FCC recognized that collocation would often represent the most efficient form of equal access available, when space was extremely limited other means might well prove to be more cost effective.[477]

During 1992 and 1993, the FCC lifted the structural separation requirement as soon as individual BOCs had shown that the plans that they had filed met the various ONA requirements.[478] A series of judicial challenges has failed to resolve the legality of the FCC's *Computer III* regime.[479] In the meantime, the FCC has continued to require the BOCs and

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eventually stopped short of such "fundamental unbundling," instead approving a "common ONA model" that did not require the LECS to disaggregate its network into individual facilities and instead allowed the LECs to provide access of somewhat larger aggregations of network elements. *BOC ONA Order*, 4 F.C.C.R. at 13 ¶¶ 5-8, 41 ¶ 69.

[476] *See Computer III Phase I Order*, 104 F.C.C.2d at 1037 ¶¶ 151-153, 1042 ¶ 164 (ruling that CEI did not require mandatory collocation); *id.* at 1066 ¶ 218 (extending the same principles to ONA); *accord* Filing and Review of Open Network Architecture Plans, Memorandum Opinion and Order, 4 F.C.C.R. 1, 41 ¶ 69 (1988) ("*BOC ONA Order*") (recognizing that the *Computer III Phase I Order* did not order "mandated interconnection on carriers' premises of faculties owned by others"), *on reconsideration*, 5 F.C.C.R. 3084, 3092 ¶¶ 69-72 (1990), *aff'd sub nom.* California v. FCC, 4 F.3d 1505 (9th Cir. 1993) ("*California II*").

[477] *See Computer III Phase I Order*, 104 F.C.C.2d at 1037 ¶¶ 151-153, 1042 ¶ 164 (ruling that CEI did not require mandatory collocation); *id.* at 1066 ¶ 218 (extending the same principles to ONA). The FCC has reaffirmed this decision on numerous occasions. *See, e.g.*, Application of Open Network Architecture and Nondiscrimination Safeguards to GTE Corp., Memorandum Opinion and Order, 11 F.C.C.R. 1388, 1414 ¶ 57 (1995); *Computer III* Remand Proceedings: Bell Operating Co. Safeguards & Tier 1 Local Exchange Co. Safeguards, Report and Order, 6 F.C.C.R. 7571, 7600-01 ¶ 64 (1991); Filing and Review of Open Network Architecture Plans, Memorandum Opinion and Order, 4 F.C.C.R. 1, 94 ¶¶ 181-183 (1988), *on reconsideration*, 5 F.C.C.R. 3084, 3092 ¶¶ 69-72 (1990), *aff'd sub nom.* California v. FCC, 4 F.3d 1505 (9th Cir. 1993) ("*California II*").

[478] *See Computer III Further Remand Notice*, 10 F.C.C.R. at 8366 n.22 (citing cases).

[479] The Ninth Circuit initially overturned the *Computer III* regime as arbitrary and capricious on the grounds that the FCC had not adequately justified its decision to rely on nonstructural safeguards. *See California I*, 905 F.2d at 1230-39. In response, the FCC strengthened ONA by imposing mandatory price cap regulation on the BOCs and by establishing new cost accounting rules that would make anticompetitive activity easier to detect. The FCC also reaffirmed its conclusion that nonstructural rather than structural safeguards should govern BOC participation in the information services industry. *Computer III* Remand Proceedings: Bell Operating Co. Safeguards & Tier 1 Local Exchange Co. Safeguards, Report and Order, 6 F.C.C.R. 7571, 7578-88 ¶¶ 14-41, 7617-25 ¶¶ 98-109 (1996), *vacated and remanded in part sub nom.* California v. FCC, 39 F.3d 919 (9th Cir. 1994) ("*California III*"), *cert. denied*, 514 U.S. 1050 (1995). As noted earlier, the FCC also simultaneously weakened ONA somewhat by shifting from a "fundamental unbundling" approach in which ISPs could obtain access to the BOCs' networks on an element-by-element basis to a less granular approach to unbundling in which unbundling was defined in terms of network services rather than facilities. *See supra* note 475. The Ninth Circuit again partially vacated the FCC's ONA regime on the grounds that the FCC had failed to explain its shift away from fundamental unbundling. California v. FCC, 39 F.3d 919, 925-30 (9th Cir. 1994) ("*California III*"). The FCC has issued a series of notices attempting to address the concerns raised by the Ninth Circuit. *See Computer III* Further Remand Proceedings: Bell Operating Co. Provision of Enhanced Servs., Notice of Proposed Rulemaking, 10 F.C.C.R. 8360 (1995); *Computer III* Further Remand Proceedings: Bell Operating Co. Provision of Enhanced Servs., Further Notice of Proposed Rulemaking, 14 F.C.C.R. 6040 (1998) ("*Computer III Further Remand Notice*"). These proceedings, however, have

GTE to comply with the ONA plans already filed with and approved by the FCC.[480] Furthermore, courts rejected the FCC's attempt to preclude states from imposing more stringent access requirements on the LECs.[481] States were free to impose more stringent requirements over enhanced services that were provided intrastate. As will be discussed in greater detail later, certain states, such as Oregon, enacted their own ONA regimes that did mandate physical collocation.[482]

The Telecommunications Act of 1996 — As noted earlier, the 1996 Act requires incumbent LECs to interconnect with other telecommunications carriers on just and reasonable terms and to provide other telecommunications carriers with access to all of its network elements on an unbundled basis.[483] In a series of orders, the FCC has determined that these statutory obligations apply to many of the elements needed to provide DSL service. Specifically, the FCC initially ruled that the interconnection obligations of the 1996 Act apply to facilities and equipment used to provide data services as well as voice services[484] and declined to use its forbearance authority to exempt advanced services from those requirements.[485] In addition, the FCC concluded that the high frequency portion of the loop used to carry DSL is a network element subject to unbundled access,[486] as well as most attached electronics.[487] As with all network elements subject to the 1996 Act's unbundled access requirement, the FCC ruled that access to DSL

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yet to be completed. *See Computer III* Further Remand Proceedings: Bell Operating Co. Provision of Enhanced Servs., Report and Order, 14 F.C.C.R. 4289, 4292 n.6 (1999).

[480] Bell Operating Cos.' Joint Petition for Waiver of *Computer II* Rules, Memorandum Opinion and Order, 10 F.C.C.R. 1724 (Common Carrier Bur. 1995) ("*Interim Waiver Order*"); *accord Computer III* Further Remand Proceedings: Bell Operating Co. Provision of Enhanced Servs., Notice of Proposed Rulemaking, 10 F.C.C.R. 8360, 8369 ¶ 11 (1995).

[481] California v. FCC, 905 F.2d 1217, 1239-45 (9th Cir. 1990) ("*California I*").

[482] *See, e.g.*, OR. ADMIN. R. 860-035-0110; *infra* notes 551 and accompanying text.

[483] *See supra* notes 11, 35, 304-310 and accompanying text. The 1996 Act also initially prohibited BOCs from offering in-region alarm monitoring services, 47 U.S.C. § 275(a)(1), and temporarily required the BOCs to offer information services and electronic publishing through a separate subsidiary. *Id*. §§ 272(a)(2)(C), 274(a). These restrictions have since expired. *Id.* §§ 272(f)(2), 274(g)(2), 275(a)(1).

[484] Deployment of Wireline Servs. Offering Advanced Telecomms. Capability, Memorandum Opinion and Order, and Notice of Proposed Rulemaking, 13 F.C.C.R. 24012, 24034-35 ¶¶ 46-47 (1998) ("*Advanced Servs. Order*"), *remanded sub nom.* US West Communications, Inc. v. FCC, No. 98-1410 (D.C. Cir. Aug. 25, 1999) (unpublished disposition available at 1999 WL 728555).

[485] Deployment of Wireline Servs. Offering Advanced Telecomms. Capability, Memorandum Opinion and Order and Notice of Proposed Rulemaking, 13 F.C.C.R. 15280 (1998).

[486] *Advanced Servs. Order*, 13 F.C.C.R.. at 24036-38 ¶¶ 52-54; Deployment of Wireline Servs. Offering Advanced Telecomms. Capability, Third Report and Order in CC Docket No. 98-147 and Fourth Report and Order in CC Docket No. 96-98, 14 F.C.C.R. 20912 (2000) ("*Line Sharing Order*"); 47 C.F.R. § 51.319(h). The FCC later clarified In addition, incumbent LECs must condition (*i.e.*, remove equipment from) loops upon request. 47 C.F.R. § 51.319(a)(3), (h)(5); Implementation of Local Competition Provisions of Telecomms. Act of 1996, Third Report and Order and Fourth Further Notice of Proposed Rulemaking, 15 F.C.C.R. 3696, 3775 ¶ 172, 3783-84 ¶¶ 190-194 (1999) ("*UNE Remand Order*"). The D.C. Circuit affirmed that incumbent LECs' DSL-based advanced services are subject to 47 U.S.C. § 251(c). WorldCom, Inc. v. FCC, 246 F.3d 690, 693-95 (D.C. Cir. 2001). The court did vacate and remand the order so that the FCC could determine whether DSL-based advanced services constituted "exchange access" or "telephone exchange service." *Id.* at 695-96.

[487] *UNE Remand Order*, 15 F.C.C.R. at 3776-77 ¶ 175.

components would be governed by the forward-looking incremental cost approach embodied in TELRIC.[488]

The FCC stopped short of mandating unbundled access to the packet switching technology owned by the incumbent LEC, including DSLAMs. While unbundled access to routing and switching capability was appropriate in the circuit switched market, in which the higher utilization rates enjoyed by the incumbent LECs allowed them to achieve significant economies of scale, incumbent LECs did not maintain a monopoly position in packet switching. In addition, the FCC recognized that investments in facilities used to provide service to nascent markets such as broadband carried significantly greater risks than those in established markets. Therefore, despite the fact that the failure to mandate unbundled access in effect required new entrants to incur the costs associated with collocating their own equipment, the potential adverse effect on investment incentives led the FCC to refuse to mandate unbundled access to DSLAMs and other related technology.[489]

The FCC did allow for one exception to this ruling. The FCC ruled that incumbent LECs that employ DLCs must provide unbundled access to packet switching equipment when the incumbent LEC has placed a DSLAM in a remote terminal without allowing other carriers to do the same through physical collocation.[490] In addition, although incumbent LECs need not provide unbundled access to its own DSLAMs, they must allow requesting carriers to collocate DSLAMs and other equipment needed to route data communications into the requesting carrier's packet switched network.[491]

The FCC's conclusions with respect to collocation largely paralleled its conclusions with respect to interconnection and unbundled access. Transmission and termination equipment, including multiplexers, could be collocated on LEC premises. New entrants were not permitted, however, to collocate packet switches and other equipment used solely to provide

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[488] *Line Sharing Order*, 14 F.C.C.R. at 20973 ¶ 132, 20974-81 ¶¶ 135-157.

[489] *UNE Remand Order*, 15 F.C.C.R. at 3835-37 ¶¶ 306-309, 3839-40 ¶¶ 314-317; *see also Local Competition Order*, 11 F.C.C.R. at 15713 ¶ 427.

[490] The regulations also require that no spare copper loops capable of providing DSL service be available. *UNE Remand Order*, 15 F.C.C.R. at 3838 ¶ 313; 47 C.F.R. § 51.319(a)(5).

[491] Deployment of Wireline Servs. Offering Advanced Telecomms. Capability, Fourth Report and Order, 16 F.C.C.R. 15435, 15460-63 ¶¶ 45-51 (2001) ("*Collocation Remand Order*"), *petition for review pending sub nom.* Verizon Cal., Inc. v. FCC, No. 01-1371 (D.C. Cir. filed Aug. 23, 2001). The FCC originally ruled that new entrants were also entitled to physically collocate any equipment that was "used or useful" for interconnection or access to unbundled network elements, regardless of other functionalities inherent in such equipment. *Collocation Order*, 14 F.C.C.R. at 4776 ¶ 28; *Local Competition Order*, 11 F.C.C.R. at 15794 ¶ 579. The D.C. Circuit struck this ruling down as a violation of the statutory requirement limiting collocation to equipment that is "necessary" for interconnection or unbundled access. GTE Serv. Corp. v. FCC, 205 F.3d 416, 424 (D.C. Cir. 2000). On remand, the FCC limited collocation to equipment whose primary purpose and function is to provide the requesting carrier with "equal in quality" interconnection or "nondiscriminatory access" to an unbundled network element. *Collocation Remand Order*, 16 F.C.C.R. at 15452-60 ¶¶ 32-44. Stand-alone switching and routing equipment fell within this standard. *Id*. at 15460-63 ¶ 45-51. The new collocation provisions would not extend to computer servers, databases, and other equipment used to support a requesting carrier's network. *Id*. at 15463-64 ¶ 53.

enhanced services, since such equipment was unrelated to the transmission and termination of telephone exchange service and exchange access.[492] The FCC later clarified the manner in which these rules applied to multifunction equipment by explaining that incumbent LECs must permit collocation of any equipment that was "used" or "useful for interconnection or access to unbundled network elements, regardless of any other functionalities that may be offered by that equipment.[493] As a result, competitors had the right to collocate such equipment as DSLAMs, routers, ATM multiplexers, and remote switching modules, which are designed both to terminate and switch broadband traffic.[494]

The D.C. Circuit struck down the FCC's decision permitting the collocation of multifunction equipment.[495] Invoking the Supreme Court's admonition that the term "necessary" must be construed according to its ordinary meaning, which is limited to what is *required* to achieve a desired goal and is not so broad as to apply to anything that simply increases the costs faced by the requesting carrier,[496] the court reasoned that the FCC's decision to mandate collocation of any equipment "used" or "useful" for interconnection or access to unbundled network elements conflicted with the statutory requirement that collocation be limited to equipment that was "necessary to achieve reasonable collocation."[497]

A subsequent D.C. Circuit decision also struck down the FCC's decision requiring unbundled access to the high frequency portion of local loops.[498] The court based this decision on the FCC's own findings recognizing that DSL faced robust competition from cable modem providers and (to a lesser extent) satellite broadband providers. In fact, cable modems had established the early lead, having captured fifty-four percent of the market for high-speed lines, with DSL having captured only twenty-eight percent.[499] At this point of the race, however, " 'no competitor has a large embedded base of paying residential customers,' " and as a result the " 'record does not indicate

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[492] *Local Competition Order*, 11 F.C.C.R. at 15794-96 ¶¶ 580-581.

[493] Deployment of Wireline Servs. Offering Advanced Telecomms. Capability, First Report and Order and Notice of Proposed Rulemaking, 14 F.C.C.R. 4761, 4776-79 ¶¶ 28-31 (1999) ("*Collocation Order*").

[494] *Id*. at 4776-77 ¶¶ 27-28.

[495] GTE Serv. Corp. v. FCC, 205 F.3d 416 (D.C. Cir. 2000). For an earlier discussion of this case, see *supra* notes 315, 354, 370 and accompanying text.

[496] AT&T Corp. v. Iowa Utils. Bd., 525 U.S. 366, 389-90 (1999).

[497] *Id*. at 422-24. In so holding, the D.C. Circuit invoked the Supreme Court's admonition that the term "necessary" must be construed according to its ordinary meaning, which is limited to what is *required* to achieve a desired goal and is not so broad as to apply to anything that simply increases the costs faced by the requesting carrier. *Id*. at 423 (citing *Iowa Utils. Bd*., 525 U.S. at 389-90).

[498] United States Telecom Ass'n v. FCC, 290 F.3d 415, 428-29 (D.C. Cir. 2002).

[499] *Id*. at 428-29 (citing Inquiry Concerning Deployment of Advanced Telecomms. Capability to All Ams. in Reasonable & Timely Fashion, & Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of Telecomms. Act of 1996, Notice of Proposed Rulemaking, 17 F.C.C.R. 2844, 2864 ¶ 44, 2865 ¶ 48 (2002)).

that the consumer market is inherently a natural monopoly' "[500] Drawing guidance from Justice Breyer's observation that mandatory unbundling creates disincentives in both innovation and investment and requires network owners to become embroiled in the tangled management inherent whenever a system of well defined property rights is into a common resource subject to shared use,[501] the D.C. Circuit concluded that compelling access to the high frequency portions of loops exceeded the "necessary" and "impair" requirements of the 1996 Act.[502]

The FCC has revised its rules to limit collocation of multifunction equipment to equipment whose primary purpose is to provide the requesting carrier either with interconnection that is "equal in quality" to the that provided by the incumbent LEC for its own services or with "nondiscriminatory access" to an unbundled network element.[503] The FCC asserted that even if the collocation effected a per se taking, any issues relating to just compensation are more properly addressed after the methodology in question had been implemented in an actual rate order.[504] A judicial challenge to the revised collocation rules is pending before the D.C. Circuit.[505]

Reconciling the Two Regimes — Although some commentators have suggested that the Telecommunications Act of 1996 superseded the *Computer III* regime,[506] both regimes continue to govern in slightly different spheres. For example, the range of entities that must *provide* access under the 1996 Act is broader than the range of entities that must provide access under *Computer III*, since the relevant provisions of the 1996 Act cover all incumbent LECs whereas ONA applies only to BOCs and GTE.[507] In addition, the range of entities that may *request* access under the 1996 Act is somewhat narrower than those entitled to access under *Computer III*. Because the interconnection and unbundled access provisions of the 1996 Act only extend to "telecommunications carriers,"[508] which are defined to include only those who offer pure transport services to the public without

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[500] *Id*. (quoting Inquiry Concerning Deployment of Advanced Telecomms. Capability to All Ams. in Reasonable & Timely Fashion, & Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of Telecomms. Act of 1996, Report, 14 F.C.C.R. 2398, 2423 ¶ 48 (1999)).

[501] *Iowa Utils. Bd.*, 525 U.S. at 428-29 (Breyer, J., dissenting).

[502] *United States Telecom Ass'n*, 290 F.3d at 429 (holding that the FCC's Line Sharing Order was tainted by the same error as the provisions discussed in the earlier portions of the opinion, which focused on the "necessary" and "impair" standards). For a more complete description of the "necessary" and "impair" standards, see *supra* notes 315, 500-501 and accompanying text.

[503] *Collocation Remand Order*, 16 F.C.C.R. at 15452-60 ¶¶ 32-44.

[504] Deployment of Wireline Servs. Offering Advanced Telecomms. Capability, Order on Reconsideration and Second Further Notice of Proposed Rulemaking in CC Docket No. 8-147 and Fifth Further Notice of Proposed Rulemaking in CC Docket No. 96-98, 15 F.C.C.R. 17806, 17839 ¶ 69 (2000) ("*Collocation Reconsideration Order*").

[505] *See* Verizon Cal., Inc. v. FCC, No. 01-1371 (D.C. Cir. filed Aug. 23, 2001).

[506] *See* Cannon, *supra* note 463, at 681.

[507] *See supra* note 467.

[508] 47 U.S.C. § 251(c)(2), (3).

making any change in the form or content of the information as sent and received,[509] it does not cover pure ESPs, who use computer processing to modify user-supplied information without providing transmission services to end users.[510] In addition, the two regimes have a different geographic scope.[511]

The FCC launched a series of ongoing proposals reconsidering various features of the current regulatory regime. For example, in one proceeding, the FCC reevaluated whether the high-frequency portion of the loop should continue to be a network element subject to unbundled access.[512] Another proceeding considered comments on the rules governing the unbundling[513] and physical collocation rules of DSLAMs at remote terminals.[514] Finally, the FCC opened a sweeping inquiry attempting to rationalize these two regulatory regimes. In particular, this proceeding explored whether technological changes or the enactment of the 1996 Act justify or require the modification or elimination of part or all of the CEI and ONA regime created by *Computer III*.[515]

For our purposes, the key fact is that, in contrast the federal ONA regime, the local competition provisions of the 1996 Act and certain state ONA regimes gives requesting carriers the right to physically collocate DSLAMs and switching and routing equipment on the incumbent LECs property, whether in central offices or remote terminals.[516] Like all unbundled network elements governed by the 1996 Act, the rates that incumbent LECs may charge for conditioned loops and physical collocation are governed by TELRIC.

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[509] *See id.* § 153(43), (44), (46). The FCC determined telecommunications carriers remain within the scope of the interconnection and unbundled access provisions of the 1996 Act even if they also offer information services through the same arrangement. *Local Competition Order*, 11 F.C.C.R. at 15988-90 ¶¶ 992-995.

[510] *Computer III Further Remand Notice*, 13 F.C.C.R. at 6061 ¶ 32, 6090 ¶ 92.

[511] The separate subsidiary requirements for BOC provision of information services under the 1996 Act are limited to interLATA information services, 47 U.S.C. § 271(a)(2)(C), except for electronic publishing services, which must be provided through a separate subsidiary regardless if offered on an interLATA or an intraLATA basis, 47 U.S.C. § 274(a). The separate subsidiary requirements enacted by *Computer II* and the nonstructural safeguards enacted by *Computer III* do not distinguish between interLATA and intraLATA information services. As a result, interLATA information services are subject to both section 271 of the 1996 Act and ONA/CEI. IntraLATA services (aside from electronic publishing) are subject only to CEI and ONA. *Non-Accounting Safeguards Order*, 11 F.C.C.R. at 21969-71 ¶¶ 132-134.

[512] Review of Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers, Notice of Proposed Rulemaking, 16 F.C.C.R. 22781, 22805-06 ¶ 53 (2001) ("*Triennial UNE Review Notice*").

[513] *Id*. at 22809 ¶ 61 (opening up to reconsideration the rule requiring unbundled access to DSLAMs in remote terminals where collocation is impossible and alternative copper loops are unavailable); *Collocation Reconsideration Order*, 15 F.C.C.R. at 17851-54 ¶¶ 103-112 (opening general inquiry into unbundled access at remote terminals).

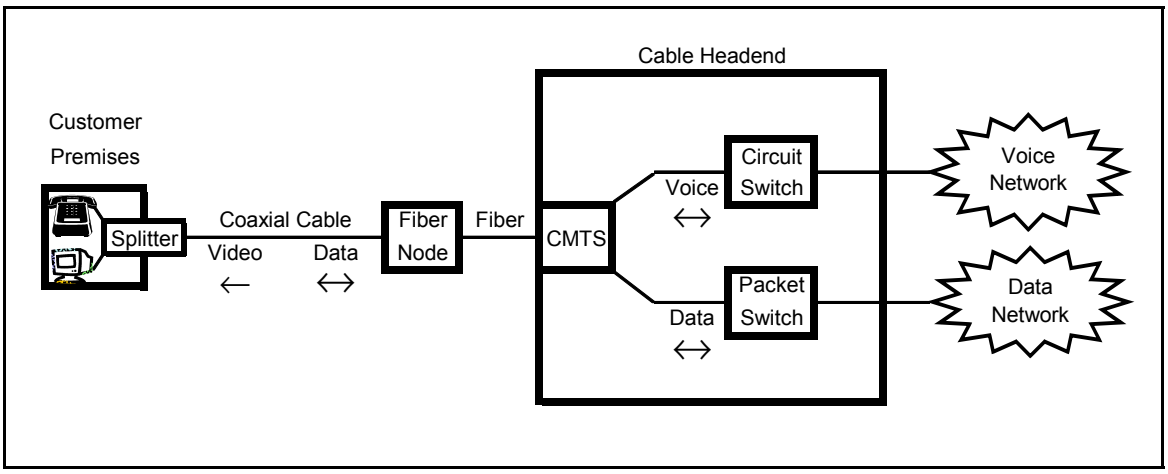
[514] *See* Deployment of Wireline Servs. Offering Advanced Telecomms. Capability, Order on Reconsideration and Further Notice of Proposed Rulemaking, 15 F.C.C.R. 17044 (2000).

[515] Appropriate Framework for Broadband Access to Internet over Wireline Facilities, Notice of Proposed Rulemaking, 17 F.C.C.R. 3019, 3040-43 ¶¶ 43-53 (2002).

[516] *See supra* notes 286-287, 295, 307-308, 481 and accompanying text.

b. Cable Modem Systems — Cable modems represent the other principal technology for providing broadband services to residential customers.[517] Cable modem systems provide data communications through the network of coaxial cables originally designed to provide a uniform stream of video programming in one direction running from the network to all subscribers. Before a cable network can be used to provide cable modem service, it must be transformed from the typical tree-and-branch infrastructure associated with transmitting television programming into a ring or star-type infrastructure. This is usually accomplished through a hybrid fiber-coaxial (HFC) architecture that is quite similar to the DLC architecture discussed above.[518] In an HFC architecture, fiber optic cables are used to connect the cable headend to a satellite facility known as a neighborhood node. The final connection between the neighborhood node and the subscribers is made through copper-based coaxial cables. Cable modem service also requires special equipment at the headend known as a Cable Modem Termination System to manage the flow of data between cable subscribers and various types of broadband services, such as e-mail, IP telephony, content cached locally, and content residing on the World Wide Web.

FIGURE 5
TYPICAL CONFIGURATION OF CABLE MODEM SYSTEM



The principal access-related policy question with respect to cable modem systems has been the extent to which the government should ensure that cable modem customers have some degree of choice among ISPs, an issue to which litigants and commentators have variously referred as either "open access" or "forced access," depending on the particular biases of the party

[517] The ensuing regulatory history draws on the discussion in Yoo, *supra* note 9, at 175-76, 250-51.
[518] *See supra* note 461 and accompanying text.

using the term.[519] In an apparent attempt to sidestep the political overtones associated with either designation, the FCC opted to refer to the issue as "multiple ISP access."[520]

Questions about multiple ISP access first arose during the FCC's review of AT&T's proposed acquisitions of TCI and MediaOne. In those proceedings, a number of parties argued that allowing AT&T to bring both physical transmission and ISP services under the same corporate umbrella would allow AT&T to use its control over cable to harm competition in the market for ISPs. As a result, these parties asked the FCC to force AT&T to allow independent ISPs to interconnect with AT&T's cable modem service network on nondiscriminatory terms.[521] Consistent with its longstanding policy of nonregulation of computer-based services,[522] the FCC refused to impose multiple ISP access as a merger condition in either case.[523]

Since cable operators are subject to municipal as well as federal regulation, advocates of multiple ISP access pressed their arguments before municipal regulators. Some of these municipal authorities were more accommodating than was the FCC, either mandating open access by municipal ordinance[524] or requiring it as a condition for the transfer of a license needed to complete AT&T's acquisitions of TCI and MediaOne.[525] This municipal-based strategy was soon cut short by a series of judicial decisions holding that municipal franchising authorities lacked the jurisdiction to compel multiple ISP access.[526]

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[519] *See* Applications for Consent to Transfer of Control of Licenses & Section 214 Authorizations from MediaOne Group, Inc., Transferor, to AT&T Corp., Transferee, Memorandum Opinion and Order, 15 F.C.C.R. 9816, 9866 ¶ 114 (2000) ("*AT&T-MediaOne Merger*").

[520] Inquiry Concerning High-Speed Access to Internet over Cable & Other Facilities, Declaratory Ruling and Notice of Proposed Rulemaking, 17 F.C.C.R. 4798, 4839 ¶ 72 (2002).

[521] *See AT&T-MediaOne Merger*, 15 F.C.C.R. at 9866 ¶¶ 114-115; Applications for Consent to Transfer of Control of Licenses & Section 214 Authorizations from Tele-Communications, Inc., Transferor, to AT&T Corp., Transferee, Memorandum Opinion and Order, 14 F.C.C.R. 3160, 3197-98 ¶ 75 (1999) ("*AT&T-TCI Merger*").

[522] *See, e.g.*, Amendment of Section 64.702 of Comm'n's Rules and Regulations (Second Computer Inquiry), Order, 77 F.C.C.2d 384, 432-33 ¶¶ 124-127 (1980) ("*Computer II Final Decision*"), *aff'd sub nom.* Computer & Communications Indus. Ass'n v. FCC, 693 F.2d 198 (D.C. Cir. 1982), *cert. denied*, 461 U.S. 938 (1983); Regulatory & Policy Problems Presented by the Interdependence of Computer & Communication Servs. & Facilities, Final Decision and Order, 28 F.C.C.2d 267, 270 ¶ 11 (1970), *aff'd sub nom.* GTE Serv. Corp. v. FCC, 474 F.2d 724 (2d Cir. 1973).

[523] *AT&T-TCI Merger*, 14 F.C.C.R. at 3205-08 ¶¶ 92-96; *AT&T-MediaOne Merger*, 15 F.C.C.R. at 9872-73 ¶ 127.

[524] *See* Comcast Cablevision of Broward County, Inc. v. Broward County, 124 F. Supp. 2d 685, 686-87 (S.D. Fla. 2000).

[525] *See* MediaOne Group, Inc. v. County of Henrico, 257 F.3d 356, 360 (4th Cir. 2001); AT&T Corp. v. City of Portland, 216 F.3d 871, 875 (9th Cir. 2000). *See generally* LATHEN, *supra* note 459, at 14-15.

[526] The Ninth Circuit's decision followed from its conclusion that cable modem service constituted a "telecommunications service. *AT&T*, 216 F.3d at 878-79. The Fourth Circuit was more circumspect about the proper regulatory classification of cable modem service, holding instead that requiring open access violated the statutory provision contained in 47 U.S.C. § 541(b)(3)(D) prohibiting franchising authorities from requiring cable operators to provide telecommunications *facilities*. *MediaOne*, 257 F.3d at 363-64.

It was not until the merger between America Online and Time Warner that multiple ISP access advocates were able to garner sustainable victories. The order of the Federal Trade Commission (FTC) approving the merger required that AOL Time Warner allow cable modem subscribers the option of choosing from among at least three unaffiliated ISPs in addition to its proprietary ISP, America Online and Roadrunner.[527] The order also required AOL Time Warner to provide all of these unaffiliated ISPs with "Access," which the order defined as the right to interconnect at the same connection points that AOL Time Warner provided to its own affiliated ISPs.[528] In addition, the order required that AOL Time Warner not discriminate against the content provided by unaffiliated ISPs and that all ISP service agreements include a "most favored nation clause" that allowed unaffiliated ISPs to avail themselves of the most attractive terms obtained by AOL from other unaffiliated cable systems.[529]

In contradiction to its rejection of similar arguments in AT&T's acquisitions of TCI and MediaOne, the FCC abruptly reversed course and endorsed the FTC's requirement that Time Warner and America Online negotiate open access with at least three unaffiliated ISPs as a condition to their merger.[530] Although the FCC claimed that its decision did not portend how it would eventually resolve multiple ISP access as a matter of general regulatory policy,[531] the breadth of the reasoning contained in its decision approving the merger suggested that it might approve even more sweeping action in the future.[532] Multiple ISP access has also emerged as an issue in the Comcast's proposed acquisition of AT&T's cable holdings.[533] In fact, AT&T and Comcast have voluntarily undertaken to implement multiple ISP access in an apparent attempt to boost chances of regulatory approval for their transaction.[534]

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[527] The FTC order allowed AOL Time Warner to begin providing cable service in twenty specifically identified geographic areas so long as cable modem subscribers had the option of subscribing to Earthlink, so long as AOL Time Warner provided at least two additional unaffiliated ISP options within ninety days. America Online, Inc., No. C-3989, slip op. at 6-7 (F.T.C. Dec. 18, 2000) (Decision and Order), *at* http://www.ftc.gov/os/2000/12/aoldando.pdf. In all other geographic areas, the order did not condition the initial offering of services on the availability of Earthlink as an option. Instead, it simply required AOL Time Warner to provide at least three unaffiliated ISPs within ninety days of making its own, proprietary ISP services available. *Id.* at 8. The FTC also authorized the appointment of a trustee to monitor compliance with its order. *Id.* at 12-17.

[528] *Id.* at 11; *see also id.* at 2 (defining "Access").

[529] *Id.* at 9, 11.

[530] Applications for Consent to Transfer of Control of Licenses & Section 214 Authorizations by Time Warner, Inc. and America Online, Inc., Transferors, to AOL Time Warner Inc., Transferee, Memorandum Opinion and Order, 16 F.C.C.R. 6547, 6568-69 ¶ 57 (2001) ("*AOL-Time Warner Merger*").

[531] *Id*. at 6569 ¶ 58.

[532] *See id.* at 36-57 ¶¶ 81-127.

[533] *See* Yochai J. Dreazen, *AT&T, Comcast Likely to Get Regulators' Nod*, WALL ST. J., Dec. 21, 2001, at A3; Yochai J. Dreazen, *AT&T, Comcast Assert Benefits of Cable Union Outweigh Risks*, WALL ST. J., Apr. 24, 2002, at D4.

[534] Julia Angwin, *AT&T to Offer EarthLink Inc. on Cable Lines*, WALL ST. J., Mar. 13, 2002, at B7; Julia Angwin, *Comcast, United Online Set Deal for Internet*, WALL ST. J., Feb. 27, 2002, at B4.

Since then, however, the FCC's initial reticence to impose multiple ISP access seems to have reasserted itself. The FCC concluded that cable modem service is an interstate "information service."[535] This decision has twofold significance. First, in rejecting the Ninth Circuit's conclusion that cable modem services constituted "telecommunications services," the FCC removed cable modem service from the interconnection, unbundled access, and physical collocation requirements contained in the 1996 Act.[536] Second, the FCC's decision placed cable modems in a regulatory category traditionally associated with nonregulation. Classifying cable modem service as an information service was thus generally regarded as a signal that the FCC was unlikely to mandate multiple ISP access.[537] That said, the FCC explicitly acknowledged that multiple ISP access remained an open issue and specifically requested comments on the relative merits of imposing multiple ISP access[538] and specifically requested comments on the free speech and takings implications of compelling such access.[539]

2. Economic Arguments in Favor of Market Value

If access to broadband inputs is to be mandated, economic theory indicates that access rates should be market price. As we have repeatedly emphasized, doing so would promote allocative efficiency by giving purchasers and providers alike the appropriate signals for calibrating consumption and production levels. In addition, basing access rates on market prices would enhance dynamic efficiency by providing the incentives need to attract the investments needed to finance the deployment of the various broadband technologies. As the FCC has repeatedly recognized, issues surrounding investment and innovation are of the utmost importance when the market involved is nascent one.[540]

Although market prices might have previously been difficult to determine, the emergence of new technologies capable of providing high-speed broadband services are making this task increasingly easy. As noted earlier, communications companies are providing preparing to provide broadband services through a wide variety of wireless technologies,

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[535] Inquiry Concerning High-Speed Access to Internet over Cable & Other Facilities, Declaratory Ruling and Notice of Proposed Rulemaking, 17 F.C.C.R. 4798, 4820-39 ¶ 34-69 (2002) ("*Cable Modem NPRM*").

[536] Interestingly, classifying cable modem service as an information service to some extent reopened the possibility that it might be subject to municipal regulation, as demonstrated by the fact that the FCC actively sought comments on this specific point. *Id*. at 4849 ¶ 100.

[537] Yochai J. Dreazen, *FCC Ruling Frees Cable-TV Firms from Sharing Wires*, WALL ST. J., Mar. 15, 2002, at B2.

[538] *Cable Modem NPRM*, 17 F.C.C.R. at 4840-41 ¶ 74, 4843-47 ¶¶ 83-93.

[539] *Id*. at 4843 ¶¶ 80-81.

[540] *See, e.g.*, Inquiry Concerning High-Speed Access to Internet over Cable & Other Facilities, Declaratory Ruling and Notice of Proposed Rulemaking, 17 F.C.C.R. 4798, 4802 ¶ 5 (2002); Deployment of Wireline Servs. Offering Advanced Telecomms. Capability, First Report and Order and Notice of Proposed Rulemaking, 14 F.C.C.R. 4761, 4763 ¶ 2 (1999) ("*Collocation Order*").

including PCS, MDS, ancillary and supplemental service provided via digital television, and 3G mobile wireless devices.[541] These services are similar in geographic scope to those provided by cable modem and local telephone systems. Although these services are still in their nascent stages, when fully operational they should provide a ready basis for determining the value of the transmission of services.

In addition, DBS companies have begun to provide broadband service via satellite that is beginning to compete directly with cable modem systems and ADSL.[542] These too can provide a market-based benchmark for the value of the network services. Again, the fact that DBS is necessarily national in scope and differences in the quality of the broadband services provided can complicate any direct comparison between DBS and other wireline broadband services that are more regional in scope. That said, the existence of these substitutes can provide useful guidance as to the value of the services being provided under a regime of compelled access.

Should these alternative technologies be insufficiently developed to allow direct determination of market prices, economic theory indicates that regulatory authorities should base rates on ECPR, which sets rates as the sum of the forward-looking incremental cost and the opportunity cost associated with providing access. The opportunity cost of providing network access is determined by subtracting direct incremental costs from the retail price in the final goods market. The primary reason that the FCC has been reluctant for allowing this issue in the context of DSL has been because the retail prices supposedly reflected monopoly returns. Although this position is at least arguable in the case of local telephony,[543] it is unsupportable in the case of broadband. The FCC and the courts have recognized that vibrant competition exists, and the impending arrival of additional competitors should only cause it to intensify.[544]

Indeed, the presence of this competition raises serious questions whether compelling access to high-speed broadband facilities represents sensible economic policy. Access requirements only make sense if there is a true bottleneck facility that in effect gives a company a natural monopoly. When competition exists, compelling access at best accomplishes nothing, since parties who negotiate agreements on other terms will simply negotiate around access rates that are set too high.[545] Access rates that are set too low, however, can harm allocative efficiency by creating the shortages and

[541] *See supra* notes 413, 415-417, 499-500 and accompanying text.
[542] *See supra* note 414 and accompanying text.
[543] *See supra* notes 325, 368-369 and accompanying text.
[544] *See supra* notes 412-417, 499-500 and accompanying text.
[545] This presumes that access rates will follow the model established by the 1996 Act and allow parties to negotiate their own arrangements rather than requiring carriers to provide services on a tariffed basis.

distortions inevitably associated with prices that are not calibrated to balance supply and demand.

Even worse, compelling access can harm dynamic efficiency, by eliminating the need for firms to invest in substitute facilities. By rescuing those who need alternative means of transmission from having to invest in alternative capacity, access requirements can forestall the emergence of competition by depriving other facilities-based competitors of their natural strategic partners. Access requirements can thus have the perverse effect of cementing the existing technologies into place. Indeed, that is the clear import of the FCC's recent notice of proposed rulemaking underscoring the importance of taking a more functional approach from the consumers' perspective[546] and recognizing the emergence of multiple options in providing broadband service, including cable, telephony, wireless, and satellite.[547] Indeed, it was the emergence of this competition that led the FCC to seek comment on whether access requirements should be foregone.[548]

There is thus good reason to question whether the FCC should compel access to broadband networks. If such access requirements are to be imposed, however, economic theory indicates that rates for such access should be based on market prices. Any attempt to base access prices solely on direct cost, as is currently done under TELRIC, fails to acknowledge that market value of network access is determined by the value of the services sold through the network, not the cost of the network itself. Not only is this appropriate in light of the fact that networks are capital assets that are not consumes; it also reflects the demand-side considerations that underlie neoclassical economics. The presence of substitute facilities should permit market value to be determined through a comparison to actual market transactions or through the opportunity cost component mandated by ECPR. The presence of direct competition makes it unlikely that prices set in this manner will allow network owners to recover supracompetitive returns.

3. Constitutional Arguments in Favor of Market Value

The Supreme Court's takings jurisprudence provides another reason for requiring that any access requirement imposed by the FCC be priced at market value. The issues are the clearest with respect to DSL. Although the D.C. Circuit vacated the regulations providing that the high frequency portion of the loop constituted a network element that was subject to unbundled access under the 1996 Act, it left intact the regulations giving requesting telecommunications carriers the right to physically collocate

[546] Appropriate Framework for Broadband Access to Internet over Wireline Facilities, Notice of Proposed Rulemaking, 17 F.C.C.R. 3019, 3023 ¶ 7 (2002).

[547] *Id*. at 3037-38 ¶¶ 36-37.

[548] *Id*. at 3040-42 ¶¶ 44-48.

DSLAMs and other routing equipment on the incumbent LEC's property.[549] It seems clear as a matter of first principles that such a requirement constitutes the type of permanent physical occupation held to constitute a per se taking in *Loretto*.

Lower court precedent supports this conclusion as well. A similar issue arose in *GTE Northwest, Inc. v. Public Utility Commission*.[550] At issue in that case was the regulatory provision enacted by the Oregon Public Utility Commission (PUC) similar to the ONA regime created by the FCC in *Computer III*. The key difference was that Oregon's regime required local telephone companies to permit ESPs to physically collocate on their property.[551] After reviewing the relevant takings analysis contained in *Loretto*, *Florida Power*, and *Yee v. City of Escondido*, the court concluded that the physical collocation requirement was property characterized as the type of permanent physical invasion held to be a *per se* taking in *Loretto*. In so holding, the court rejected the argument that the fact that the PUC had already placed restrictions on the telephone company's ability to use its property deprived it of any historically rooted expectation of compensation. As the court reasoned, "the facts that an industry is heavily regulated, and that a property owner acquired the property knowing that it is heavily regulated, do not diminish a physical invasion to something less than a taking."[552] The court also rejected the argument that physical collocation represented nothing more than a restriction on the use of the telephone company's property that was more properly analyzed as a regulatory taking.[553] According to the court, the PUC lacked the statutory authority to exercise the power of eminent domain. As a result, the Oregon Supreme Court invalidated the PUC's collocation regulations as beyond the PUC's statutory authority.[554]

The analysis with respect to cable modem systems is slightly more ambiguous. Unless it mandates multiple ISP access as a general matter, the FCC need not address precisely how and where the interconnection needed for multiple ISP access should occur or how such access should be priced.[555] None of the municipal ordinances requiring multiple ISP access set forth the

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[549] *See supra* notes 498-502 and accompanying text.

[550] 900 P.2d 495 (Or. 1995). The litigants in *GTE Northwest* framed their challenge in terms of the Takings Clauses embodied in both the federal and the Oregon Constitutions. The court assumed without deciding that the analysis would be the same under either provision. *Id*. at 501 n.6.

[551] *See supra* note 482 and accompanying text.

[552] *Id.* at 504.

[553] *Id.* at 505-06.

[554] *Id.* at 499-501. Note that sections 251 and 252 enacted by the Telecommunications Act of 1996 explicitly give state public utility commissions the right to enforce physical collocation provisions. 47 U.S.C. §§ 251(c)(6), 252. *See generally* Philip J. Weiser, *Towards a Constitutional Architecture for Cooperative Federalism*, 79 N.C. L. REV. 663, 676-77 (2001). Although this in effect overturned the Oregon Supreme Court's holding with respect to the PUC's authority to enforce physical collocation, it did not in any way undercut the court's conclusion that the physical collocation provisions of the Oregon regulatory scheme constituted a per se taking under *Loretto*.

[555] LATHEN, *supra* note 459, at 36

parameters for interconnection or pricing guidelines, no consensus has emerged among industry participants as to where the interconnection needed for multiple ISP access should occur.[556] Accordingly, the only operative multiple ISP access requirements are those imposed as part of the regulatory approval of the AOL-Time Warner merger, which gives certain unaffiliated ISPs the right to interconnect at the same points as AOL Time Warner's proprietary ISPs.[557] As a result, contrary to the suggestion of some scholars,[558] multiple ISP access to cable modem systems will likely require the type of permanent physical invasion held to constitute a per se taking. Consequently, cable modem system operators who are made subject to multiple ISP access requirements would be entitled to fair market value as compensation. As noted in the discussion regarding access to DSL networks, the proliferation of technological alternatives is in the process of greatly simplifying such a determination.[559]

CONCLUSION

There can be little question that compelling access to networks has tremendous intuitive appeal as a potential regulatory response to the growing influence of network technologies. Compelling access would seem to increase the number of options presented to consumers and would appear to offer the prospect of lowering the prices at which network services are available. It goes without saying, however, that there is no free lunch: every regulatory effort that seeks to promote the availability of any particular good necessarily carries costs. Specifically, direct government intervention in establishing access rates all too often fosters allocative inefficiency by

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[556] *Id*. at 38-39. Most of these ordinances simply required that cable modem systems provide nondiscriminatory access by allowing unaffiliated ISPs to obtain carriage on the same terms as affiliated ISPs. Although the ordinances in question failed to address the point, such schemes generally require elaborate accounting and nonaccounting rules to ensure that the terms of the access agreements with affiliated ISPs does not include any cross subsidies. *See id*. at 38, 44 (citing Implementation of Non-Accounting Safeguards of Sections 271 and 272 of Communications Act of 1934, as Amended, First Report and Order and Further Notice of Proposed Rulemaking, 11 F.C.C.R. 21905 (1996); and Implementation of Telecomms. Act of 1996: Accounting Safeguards Under Telecomms. Act of 1996, Report and Order, 11 F.C.C.R. 17539 (1996)). Thus contrary to the suggestion of some advocates of multiple ISP access, *see, e.g.*, Jim Chen, *The Authority to Regulate Broadband Internet Access over Cable*, 16 BERKELEY TECH. L.J. 677, 716 (2001), it is likely that any such scheme would require a significant degree of public utility regulation..

[557] *See supra* notes 527-529 and accompanying text. It should be noted that the multiple ISP access scheme mandated by the FTC originally anticipated that the unaffiliated ISPs would place their own routing and backbone access facilities within the cable headend in a manner that closely resembled physical collocation. As actually implemented, however, multiple ISP access bears a greater resemblance to virtual collocation, with all of the traffic exiting the headend via AOL's backbone and interconnecting with the unaffiliated ISPs network at some location outside the headend. As we have argued earlier, this shift does not take the access regime outside the realm of physical takings, since multiple ISP access would still require every cable modem system operator either to permit unaffiliated ISPs to establish a physical connection to its network. *See supra* notes 370-375 and accompanying text.

[558] *See, e.g.*, Chen, *supra* note 556, at 716.

[559] *See supra* note 544 and accompanying text.

interfering with the mechanism through which consumers of network access calibrate their overall level of purchases. Interference with market pricing simultaneously causes secondary distortions in the markets for substitute inputs by making the regulated input seem artificially attractive. This effect further causes firms to adjust their production functions farther and farther away from the most efficient mix of inputs.

What is even less obvious but no less important is the manner in which government regulation of access pricing can impede dynamic efficiency. Market prices play a critical role in encouraging firms who need access to telecommunications networks to make the financial commitments needed to deploy alternative network technologies. Compelling access at below-market rates only serves to dampen the price signal that normally would stimulate investment in additional network capacity. In addition, by rescuing those firms from having to make such investments, compelled access starves firms seeking to deploy substitute technologies of the financial resources needed to support the buildout of their networks. The arguments that networks are unique economic phenomena to which ordinary economic analysis does not apply simply do not withstand analysis.

Given the economic support for basing access rates on market pricing, it should come as little surprise that the Supreme Court's takings jurisprudence supports the same conclusion. The only reason that policy makers and the courts have sanctioned the use of cost-based rather than market-based rates is that until recently the lack of competition among different network facilities rendered market-based pricing of network access impossible. The emergence of technological alternatives capable of serving as substitutes and the overarching shift in regulatory policy from output regulation to input regulation has in effect caused the justifications for failing to base access rates on market prices to fall away. Indeed, our discussion of the current status of local telephone networks, utility pole networks, and wireline broadband networks identifies the way in technology is now providing the external benchmarks needed to support market-based access pricing that were previously unavailable.

Numerous technical obstacles to implementing such a solution no doubt remain. Many of the technologies to which we refer are only now in the process of being deployed, and if previous policy making in other technologies is any guide, numerous technical and accounting-related difficulties doubtless remain, the final resolution of which exceeds the scope of this Article. The economic and constitutional validity of market-based pricing of access to networks should be sufficient to overcome these administrative costs. Market-based rates correctly identify both the economic costs and the just compensation for takings in the "age of access."