

The Year in Economics at the FCC: A National Plan for Broadband

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Abstract

The past year in economics at the Federal Communications Commission (FCC) has focused on encouraging the adoption and deployment of high capacity Internet access and the associated networks, commonly termed “broadband.” Our article sketches important economic themes in the FCC’s National Broadband Plan to show how the application of basic principles of regulatory economics takes account of rapid technological change. We discuss natural monopoly regulation, externalities and cross-subsidies, network effects and interconnection, the allocation of scarce inputs, protecting and fostering competitive markets, and consumer protection and transparency as they apply to the development of broadband.

Keywords: broadband, communications, FCC, regulatory policy

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In early 2009, Congress directed the Federal Communications Commission (FCC) to develop a plan to ensure that every American has “access to broadband capability.” That planning exercise resulted in the development of a National Broadband Plan (NBP), which was issued in March 2010 (FCC, 2010a).

“Broadband” means high-capacity Internet access and the associated networks, devices, content, and applications.¹ The NBP describes its development as “the great infrastructure challenge of the early 21st century” (FCC, 2010a, pp. xi, 29), in part because of the Internet’s role as a “general purpose technology” (Bresnahan and Trajtenberg, 1995).

Creating the NBP required the Commission to apply longstanding principles of economics and regulatory policy to an important and emerging sector of the communications industry, in order to encourage the adoption and deployment of broadband. The past year in economics at the FCC has focused on doing so; the upcoming year will involve implementing the plan. Our article sketches important

¹ Although the National Broadband Plan does not explicitly define “broadband,” it sets a broadband availability target for universal access at 4 Mbps download speed and 1 Mbps upload speed. The median actual download speed today is 5-6 Mbps for fiber and cable and 1.5 Mbps for DSL. (FCC, 2010a, Chapter 8).

economic themes in the National Broadband Plan to show how the application of basic principles of regulatory economics takes account of rapid technological change.

I. Natural Monopoly?

Important sectors of the communications industry have long been thought to possess natural monopoly features, which is a familiar basis for economic regulation. Most importantly, economies of scale and density in deploying residential wireline infrastructure mean that both telephone voice service and cable video service have each traditionally been viewed as natural monopolies, at least over the “last mile” between the house and the first switch. For this reason, local residential telephone service has traditionally been subject to rate regulation in the states, and basic cable prices may also be regulated. It can be difficult to regulate natural monopolies in communications industries, however, for a number of reasons, as described below.

A. Changing Technology and Demand

First, technological change – a notable feature of communications since at least the development of the telegraph and radio – may alter the scope of the natural monopoly. During the latter half of the twentieth century, for example, the development of microwave technologies for transmitting telephone calls made competition possible in long distance services, which (like local telephone service) had been regulated as a natural monopoly.

A similar phenomenon is occurring today with the convergence of the technologies for providing voice and video over a wire, as both voice and video become merely data

packets. With two wires to the typical house (the cable television line and the telephone line), it is possible that the last mile could support two providers at anticipated levels of future demand.² And if users come to view wireless technologies – whether mobile or fixed – as substitutes for wireline technologies for data and video services (as they increasingly do for voice services), residential data transmission services could develop a more competitive market structure.

But other, less competitive, scenarios are possible, and the NBP views future broadband market structures as highly uncertain (FCC, 2010a, Chapter 4). Because mobile wireless technologies appear more likely to be constrained in bandwidth than will wireline technologies, the extent to which mobile wireless service will substitute for wireline service depends in part on how demand evolves.³ If demand shifts more to high-speed applications than to mobile applications, the two services may be better viewed as complements rather than as substitutes. In addition, all wireless broadband technologies,

² Historical circumstances may mean that wireline broadband services are provided by two firms in many regions. Even if those services have natural monopoly characteristics, two firms may co-exist in an unregulated market if they can successfully dampen the competition between themselves. A duopoly industry structure could pose a risk to competition even absent a natural monopoly. But if the investments that the cable television and the telephone providers in a locality make as they upgrade their facilities reduce their differentiation, the result may be to encourage competition between the two.

³ A study conducted for the FCC in connection with the development of the NPB, based on the analysis of a consumer survey, estimates that a representative household would be willing to pay \$20 per month for more reliable Internet service (service that goes down once or twice a year rather than once or twice a month) holding constant speed, and \$45 per month for an upgrade from dialup connection speed to a high-speed connection holding constant reliability (Rosston et al. 2010).

whether fixed or mobile, may be more prone than wireline to the possibility that congestion would degrade its quality or raise its marginal cost and price.

Even if wireless technologies become important substitutes for wireline broadband, moreover, it is unclear how much competition that sector will provide. For example, the wireless sector could grow more competitive than today through the implementation of a business plan to create a new national wireless provider that would employ combined satellite and terrestrial technologies, made possible by a recent FCC merger decision (FCC 2010b).⁴ But there are also reasons for concern about the prospects for wireless competition (General Accounting Office 2010). The four national wireless service providers and regional firms are facing an expensive upgrade to the next generation of technologies (so-called fourth generation, or 4G) and the number of providers could decline if some choose not to make that investment. And most of the leading wireless service providers also offer wireline services,⁵ which may dampen their incentive to compete aggressively with wireline providers.

The National Broadband Plan also points to a substantial uncertainty about the extent of future competition among wireline broadband providers. By one forecast, 11% of households in 2012 will have only one broadband wire to the home, another 45% of households will choose between a cable provider that offers high-speed service and a telephone provider that has not upgraded beyond DSL service to offer broadband on high capacity fiber, and 30% more will choose between a cable provider with high speed

⁴ The new venture has been named LightSquared.

⁵ Verizon and AT&T also offer wireline telephone services, and Sprint's 4G wireless venture, Clear, is co-owned by large cable television companies.

service and a telephone provider that has upgraded only to fiber-to-the-node (essentially the neighborhood) and not to fiber to the home (FCC, 2010a, p. 42 Exhibit 4-G). If this forecast proves correct, 86% of households may have limited wireline competition for high-bandwidth broadband services.⁶

B. Uncertainty and Natural Monopoly Regulation

Uncertainty about the scope of a natural monopoly creates a number of problems for a regulatory agency. The most obvious problems involve the difficulties of applying an error cost framework from decision theory when the probabilities and social benefits or costs of a range of possible outcomes are hard to assess. In modern times, the FCC, spurred by Congress, has generally made the necessary tradeoffs by choosing policies that aim to encourage competition.⁷

In addition to evaluating uncertainty about the likely costs and benefits of alternative regulatory decisions, the regulator must consider the costs and benefits of delay. A regulator, like a firm that makes an investment decision under uncertainty, obtains an option value from delaying its decision. Waiting until uncertainty about the world is

⁶ More generally, the extent of growth in demand for high-speed applications will likely affect whether and how quickly cable providers upgrade to higher speed (DOCSIS) technologies, telephone providers upgrade (from DSL to fiber), and wireless providers build out 4G networks. Under some scenarios, these providers could differentiate – some offering higher speed services with others unable to do so, which would limit competition for high speed broadband.

⁷ This bias may in part reflect the traditional public choice concern that large regulated incumbent firms may have greater ability to influence political processes than do small rivals, entrants and consumers, and consequently may capture regulatory agencies to act in their private interest.

clarified avoids the possibility of locking-in what could turn out to be a suboptimal regulatory strategy, and thus avoids inducing firms to make sunk investments conditional on that strategy.

But regulatory delay also creates costs. When a firm's investment decisions would vary with the regulator's choice of strategy and involve substantial sunk costs, uncertainty as to regulation can lead firms to defer investments – in this case potentially slowing the deployment of broadband technology. With respect to residential broadband competition, the National Broadband Plan seeks to resolve this tradeoff by boosting the prospects for wireless competition (through spectrum and other policies discussed below) while simultaneously delaying regulatory action in favor of collecting better data to monitor trends.⁸ This approach permits the FCC to act later to foster competition if it seems viable or to regulate as necessary if the last mile of the emerging broadband industry turns out to have natural monopoly characteristics or competition is otherwise limited.

C. Scope Economies and Natural Monopoly Regulation

⁸ The NBP recommends that the government make more spectrum available for wireless providers (FCC 2010a, Recommendation 4.1) and that it collect and analyze more information about broadband availability, penetration, prices, churn and bundles offered by service providers (FCC 2010a, Recommendation 4.2). The FCC issues an annual report analyzing the competition in the mobile wireless industry; e.g., FCC (2010c).

If residential wireline broadband turns out to be a natural monopoly but there are scope economies in the provision of wireless and wireline services⁹ or in the provision of residential and business services, natural monopoly regulation could be forced to deal with a familiar complication: multi-product firms offering both regulated and unregulated services. Multi-product firms can make it difficult for the regulator to observe the costs of regulated services, most notable by making it hard to allocate joint and common costs. Pre-breakup AT&T was thought to have exploited this problem to distort competition in unregulated services (as well as to evade regulatory constraints).

The cost allocation problem would be exacerbated if two-sided markets are layered onto regulated markets. Accordingly, regulatory price-setting would likely become even more difficult if multi-product firms incorporate regulated services into two-sided platforms. It is conceivable that this could occur for broadband – if, hypothetically, residential broadband access were regulated as a natural monopoly, and if access providers’ managed platforms assemble content (like video programming) to attract subscribers and put together subscribers to attract advertisers in unregulated markets. Local cable regulators have not confronted this problem, notwithstanding that cable providers both manage a two-sided platform (selling both to consumers and to content providers, who attract advertisers) and provide last-mile access (thought to have natural monopoly characteristics).

⁹ AT&T and Verizon likely benefit from scope economies in the provision of wireless and wireline service in their wireline territory. To a substantial extent, their wireless and wireline services share a common infrastructure.

II. Externalities and Cross-Subsidies

Another feature of communications markets also provides an additional basis for some regulatory initiatives: the large external benefits that are generated by the provision of communications services. These benefits go beyond network effects (demand-scale economies arising from each consumer's increased opportunities to interact with others) to include innovation and economic growth – think of the Internet as a General Purpose Technology (FCC, 2010a, p. 29, Box I-1).¹⁰ They also include non-market values: enhancing free speech and fostering civic engagement.

All of these external benefits will likely grow as technology increasingly permits rapid transmission of data, and not simply voice and video communications services. These external benefits, along with distributional considerations, historically led regulators to subsidize voice telephony services to lower income users and users with high costs to serve (such as rural users). Decades ago, regulators sought to encourage increased telephone subscribership through a system of implicit subsidies. The regulated monopolist, which offered a full range of telephone services, set low rates for local telephone service, particularly for residential customers in high cost and rural areas (as through geographic rate averaging). Under this scheme, the higher rates for long distance service and for business customers covered a relatively large share of the fixed, joint, and common costs of telephone system operation. Moreover, telephone providers were subjected to universal service or carrier-of-last-resort obligations, and compensated for

¹⁰ By one account, the Internet is in select company, joining technologies like printing, the steam engine, the factory system, railways, electricity, and the computer as one of only twenty-four “transforming general purpose technologies” developed over the entire span of human history (Lipsey et al., 2005, p. 133).

providing this service by setting higher prices to their customers (particularly, again, business and long distance customers).

The shrinking natural monopoly led Congress in 1996 to introduce competition into local telephone service, putting pressure on this informal regulatory compact. The cross-subsidies were not sustainable against partial line entry by firms that were “cherry-picking” to undercut prices on high-margin services. In consequence, regulators have been led to unwind the old cross-subsidies and to replace them with direct transfers to subsidized customers or the carriers that serve them, paid for by service charges on all customers. The National Broadband Plan recommends that the FCC examine the possibility of using market-based mechanisms, perhaps including reverse auctions, to minimize the costs of providing subsidized service (FCC, 2010a, p. 145 and n.79).

Voice traffic is increasingly provided in the same way as other data, and data providers now include cable, wireless, and satellite companies as well as traditional telephone firms. Accordingly, the NBP proposes to extend the modern approach to providing universal service from telephony to broadband by introducing a new program that focuses on subsidizing broadband infrastructure buildout in high cost areas that are unlikely to be served by the private sector (FCC 2010a, Recommendation 8.2). To fund these programs, the NBP proposes to broaden the requirement for contribution to the universal service fund beyond the current base (FCC 2010a, Recommendation 8.10).

III. Network Effects and Interconnection

Communications networks are characterized by strong network effects: the value of participation increases when the number of other participants rises. The network effects

that are associated with telephony and email are commonly viewed as direct effects: They are associated with the ability of each party to communicate with each other. The Internet adds indirect network effects: Even if most users do not communicate directly, the content and applications that are available to each user are richer because of the number of other users on the system.

The network effects that arise in communications markets depend upon the interconnection of users and their sub-networks. The value of interconnection is not necessarily a reason for regulation on its own, as firms that participate in communications networks generally have strong private incentives to interconnect. But this is not always the case. Standards wars can slow interconnection, as can the development of separate networks (with different standards) in separate geographic areas. As an example of the latter, think of early railroads in the U.S. laying track with different gauges, or the absence of compatibility between U.S. and European systems in electrical appliances and televisions; as an example of the former, think of the absence of customers' wireless roaming between carriers using the GSM standard and those that adopted CDMA. Moreover, dominant firms may have an incentive to deny or impede interconnection to rivals (or, to similar effect, overcharge them for interconnection) in order to preserve their market power. Before the Bell System was broken up in early 1980s, for example, AT&T was frequently embroiled in disputes about interconnection with firms that sought to provide competing long distance service.

In light of this history, competition regulators must be concerned about the potential for similar problems to arise in interconnection involving the Internet. The NBP does not discuss the possibility that the leading backbone providers could harm competition by

raising the costs of peering for smaller rivals – in the current environment, this specific problem appears entirely theoretical – but it does note complaints that some rural incumbent carriers are resisting interconnection with competitive telecommunications carriers; it recommends that the FCC review interconnection obligations as part of a proceeding that asks for comment on various aspects of the transition from circuit switched to packet based networks; and it notes that the FCC is now considering a proposal to require broadband Internet access service providers to treat lawful content, applications and services in a nondiscriminatory manner (FCC 2010, Recommendation 4.10 and pp. 58-59). The NBP also does not take a view as to the benefits and costs of a possible standards competition in the development of fourth generation (4G) wireless networks among technologies such as “high speed packet access” (HSPA), WiMAX, and “long term evolution” (LTE).

The benefits of interconnection also lie behind the NBP’s recommendation that the FCC move forward with its open proceeding on roaming obligations for mobile providers that offer data services (FCC, 2010a, Recommendation 4.11). Roaming arrangements for voice service allow a wireless telephone customer to stay connected when traveling outside the reach of his or her provider’s network by using the network of another provider; the NBP recommendation concerns roaming obligations for wireless data services. This proceeding is concerned with ensuring interconnection without discouraging the mobile broadband providers from building out and upgrading their own facilities.

IV. Allocation of Scarce Inputs

Spectrum is an essential input into wireless communication. It is scarce in the sense that there appears to be a fixed range of useable frequencies, although technological developments such as cell splitting have made it possible over time to use the spectrum that has been set aside for communications more intensively and to use a wider range of spectrum for that task. Still, given today's technology, the existing allocations of spectrum, and the ongoing rapid growth rate of wireless services, the NBP takes the view that the marginal cost of this input will likely soon be steeply increasing for wireless providers.

New technologies and changing FCC priorities have led in the past to alterations in the way spectrum is used – for example, to facilitate the introduction of cellular phones or digital television. The best use of spectrum may change from one decade to the next, which raises the importance of developing mechanisms to identify higher valued uses and to reallocate spectrum to those uses.

Input scarcity and changing valuations are not by themselves necessarily reasons for regulation; the allocation and reallocation of scarce resources may be what markets do best. But spectrum usage raises unusually complex coordination problems that may justify regulatory intervention to support the market. In particular, spectrum must be allocated in a way that avoids interference across frequency bands and across geographic boundaries.¹¹ Moreover, it may be necessary technologically, or at least confer substantial cost savings, to permit spectrum users to employ contiguous blocks of frequencies (both across frequencies and geographic regions). Markets may not

¹¹ Even worse, spectrum may be subject to “intermodulation” problems, by which two broadcasters do not interfere until a third comes in.

successfully move underutilized spectrum to higher value uses even if incumbents are permitted greater flexibility in spectrum use because of the need to assemble large contiguous blocks for new uses and the incentives of incumbents to hold out for a significant share of the gain.

The coordination difficulties that arise from interference may be exacerbated by the path dependence that arises from past investments. For example, had satellite radio broadcasters chosen to deploy more expensive receivers that are more resistant to interference, it might now be possible to allow higher limits on the power that is employed by users of adjoining spectrum blocks, increasing the value of that adjoining spectrum.

The NBP's spectrum discussion is premised on a view that recent technological change has likely made wireless services a higher valued use for some spectrum, at appropriate frequencies, than its current use (Kwerel and Williams, 1992). The NBP notes a range of reallocation possibilities, including changes in the use of some spectrum that is now allocated to satellite, broadcast television, and federal uses. To determine whether this is so, and to reallocate spectrum if it is, the NBP encourages the use of market mechanisms (FCC 2010a, Chapter 5).

One NBP proposal is already moving forward: The FCC has proposed changing the rules regarding spectrum that is allocated to mobile satellite uses in order to facilitate the deployment of complementary terrestrial networks that share the frequency, thereby enhancing coverage in urban areas or inside buildings, where the satellite signal is attenuated or unavailable (FCC, 2010d; FCC, 2010a, Recommendation 5.8.4). This

particular spectrum is tied to mobile satellites because its allocation is coordinated internationally, and thus lies beyond the ability of the FCC to alter on its own.

Another spectrum reallocation problem that is highlighted in the NBP involves UHF broadcast television spectrum. If some other use, such as wireless broadband, now has a higher value than does broadcast television for some of that spectrum, and if today's broadcasters are not the best parties to provide the alternative service, the spectrum could be put to better use by encouraging the movement of spectrum from the broadcasters to other firms. To find out whether this switch makes sense, and if it does, to facilitate it, the NBP proposes to develop a market mechanism that would permit incumbent broadcasters to receive compensation if they voluntarily release spectrum by discontinuing over-the-air broadcasting or "channel share" (multicast on the same channel) with other broadcasters (FCC, 2010a, Recommendation 5.8.5).¹² If any spectrum is voluntarily given up by broadcasters, moreover, that spectrum must then be

¹² Although spectrum is a public asset, and the government has the legal right to reallocate it at will, incumbents are generally treated as though they have quasi-property rights in their spectrum license in order to provide appropriate incentives for licensees and their customers to make long term investments. Reallocation under such circumstances requires that compensation be paid to the incumbent licensee. If compensation is set through negotiation, the process of spectrum reallocation could become mired in bargaining impasses; if it is set through regulatory determination, it will likely involve substantial administrative costs. A market mechanism employs a third approach: enlisting competition to determine the appropriate level of compensation.

repacked into contiguous blocks to make it more valuable for alternative uses.¹³ Finally the repackaged spectrum must be auctioned to new providers.

The NBP contemplates developing an “incentive auction” mechanism to accomplish these tasks (FCC, 2010a, Recommendation 5.4). As a design problem, it poses several challenges. It is necessary to develop a procedure for constructing both a supply curve (from the broadcasters) and a demand curve (by bidders such as broadband providers) in order to clear the market, while simultaneously defining the scope of the repackaged product. This might be accomplished simultaneously in a single exchange.

Alternatively, it might be accomplished sequentially, by first conducting a reverse auction to determine the cost of clearing spectrum and then conducting a forward auction for cleared spectrum. By combining information from both auctions, spectrum would be cleared up to the point where the value of a spectrum unit in the new use in a particular market equals the cost of clearing that unit, subject to the requirement of maintaining an acceptable amount of over-the-air broadcasting.

Finally, the NBP proposes reallocating some spectrum that is now devoted to federal uses. That spectrum might include a block that could be combined with other spectrum that is now available in order to make a more valuable package for auction (FCC, 2010a, Recommendation 5.8.3; see Obama, 2010).¹⁴ Relatedly, the NBP proposes to encourage

¹³ In principle one could imagine delegating the repacking to a market mechanism, but such a mechanism is difficult to devise, particularly when the optimal scope of spectrum packages (both in terms of frequencies and geography) varies with the use to which the spectrum would be put.

¹⁴ Some current technologies for mobile wireless rely on utilizing “paired” blocks of frequencies in similar parts of the spectrum.

the reallocation of spectrum that is not licensed for flexible use – whether used by governmental entities or private firms – by seeking authority to impose fees on that spectrum that reflects its opportunity cost (FCC, 2010a, Recommendation 5.6). Such fees promise to induce licensees to use spectrum more efficiently and perhaps, in consequence, reduce their holdings, making more spectrum available for other uses.

V. Protecting and Fostering Competitive Markets

The modern trajectory of federal communications policy has been directed toward creating and protecting competitive communications services markets. This has been the collective import of developments such as the FCC’s 1968 decision that opened the Bell System to competition in customer premises equipment, the FCC’s 1974 decision that required AT&T to allow new private line long distance carriers to connect with the local telephone networks, the 1984 AT&T divestiture that resolved the government’s antitrust case against the firm, the program access rules that were instituted in the 1992 cable legislation that required vertically integrated cable operators to make their own programming available to cable distribution rivals, and the 1996 legislation that allowed local telephone firms to provide long distance when their local markets had become sufficiently competitive.

After decades of change, both regulatory and technological, the industry has grown substantially more competitive, but the work of fostering competition is far from complete. Accordingly, the NBP makes the protection and fostering of competition an important theme; competition is the subject of the first nine recommendations in the Executive Summary (FCC, 2010a, p. xi). One concern arises from the possibility that a

multi-product firm with a dominant position in some markets could take advantage of that position to prevent the growth of competition in complementary markets in which it also participates – either to obtain market power in the complementary market or protect market power in the original market. (Even competition in the original market may be insufficient to protect locked-in buyers of the complement from the subsequent exercise of market power by the seller, if buyers were unaware of that potential at the time of their original purchase and did not obtain a compensating discount then.¹⁵) This issue does not hinge on whether any activities of the multiproduct firm are regulated as natural monopolies, though they could be, as with the pre-breakup AT&T.

This problem is addressed in the NBP. One recommendation would protect unaffiliated (pure-play) wireless carriers from the high costs that could be imposed by vertically integrated wireless rivals that own the high-capacity fiber links to wireless towers that are used for backhaul (FCC 2010a, Recommendations 4.7 and 4.8).¹⁶ This recommendation aims mainly to protect competition on price in the complementary

¹⁵ The economic issue of whether competition in primary markets prevents anticompetitive harm in aftermarkets was extensively analyzed in the context of commentary on the Supreme Court’s antitrust decision in *Eastman Kodak Co. v. Image Tech. Servs., Inc.*, 504 U.S. 451 (1992); see, e.g., McKie-Mason and Netz (1995) and Shapiro (1995).

¹⁶ The NBP also recommends equalizing the rates that electric utilities charge cable television companies and telephone companies for attachments to utility poles in their right of way (FCC, 2010a, Recommendation 6.1). In general, the telephone companies pay more than do cable companies, which distorts incentives to invest in broadband deployment. The source of the price differential is not exclusionary conduct by the cable companies, however; it is instead a legacy of differing past regulatory regimes.

market. Other recommendations are targeted more at fostering innovation competition in complementary products. These include requiring multi-channel video programming distributors (MVPDs), including cable companies, to install an inexpensive gateway device with a standard interface that allows consumer products manufacturers to develop and market televisions, set-top boxes, and other in-home devices independently of the MVPD firm.

The FCC's Open Internet rulemaking proceeding similarly aims, in part, to protect incentives for innovation "at the edge" of the network by firms that offer content and applications that are complementary to broadband Internet access (FCC, 2010a, pp. 36-49). That is, one concern at issue in the rulemaking is the possibility that the transaction costs of contracting, spillover benefits of applications innovation, and perhaps the market power of Internet service providers may limit innovation in applications that are complementary to the network. Yet any rules that address this possibility must also ensure adequate incentives for investment and innovation in the network – or the platforms, if wireless and wireline service are viewed as imperfect substitutes. The latter issue raises a recurring question for policy-makers of when to emphasize greater appropriability versus greater competition as a means of fostering innovation and investment.¹⁷

¹⁷ This tradeoff is analyzed with respect to innovation in the context of antitrust rules in Baker (2007). The Open Internet rulemaking raises still other economic issues, including the social welfare effects of price discrimination on both sides of two-sided platforms (particularly how these effects depend on the extent to which mobile Internet service substitutes for fixed service for different types of customers or on the number

VI. Consumer Protection and Transparency

Consumer protection provides another longstanding justification for economic regulation (Armstrong, 2008; Beales et al., 1981). If the market does not provide consumers with inexpensive, clear, and reliable information, and the government can do so without bearing or imposing substantial costs – as through requiring disclosure – consumers may be able to match purchases better with their preferences.¹⁸ If, in addition, buyers are able to search more effectively among sellers, firms may experience more elastic demand for their products, leading to lower consumer prices. These are not the only possible consequences of improving the information that is available to buyers – the increased information exchange could instead reduce seller discounting, for example (Albæk et al., 1997; Baker, 1996)¹⁹ – but it is likely in general that improved seller disclosure will benefit buyers. Consumer protection also involves policing deceptive seller marketing practices, discouraging seller fraud, and protecting consumer privacy when market forces like seller reputations are inadequate to do the job on their own.

The NBP highlights several areas in which consumer information appears less than ideal, given the ease in which it could be provided. It emphasizes that actual broadband

of fixed and mobile providers that are available in a region) and how best to provide incentives for efficient network operation (perhaps through congestion pricing or network management).

¹⁸ Bar-Gill and Stone (2009) argue that disclosures can discourage firms from taking advantage of systematic consumer misjudgments about their mobile phone usage.

¹⁹ Improved information to buyers could also undermine certain outcomes in which informed consumers benefit from the presence of uninformed buyers (Armstrong, 2008, pp. 119-25).

speeds are less than half the advertised speed (FCC, 2010a, p. 21). To address this problem, it calls on the FCC to establish technical standards for key attributes of broadband performance, measure how broadband providers stack up against the standards, and publish the results (FCC, 2010a, Recommendations 4.3 and 4.4). The FCC has already begun to do so.²⁰

VII. Conclusion

The FCC's National Broadband Plan contains much more than has been emphasized here. Many recommendations are designed to encourage the private sector to take advantage of the opportunities for innovation that widespread broadband deployment will provide in health care, education, energy and the environment, job training and community development, government performance, civic engagement, and public safety. But the core of the plan involves the traditional concerns of economic regulation: targeting limited government intervention to address market failures in order to create and support a robust competitive marketplace for communications services. During the past year, the FCC relied on economic analysis to develop a plan for broadband; in future years the agency will rely on economic analysis to implement it.

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²⁰ For example, the FCC's Consumer Broadband Test application enables consumers to test the speed of their broadband connection and other quality attributes. (FCC, Consumer Broadband Test, n.d.).

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