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Resolving Policy Chaos in High-Speed Internet Access

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Public policy for high-speed internet access is in chaos. The nation’s primary regulator of the communications sector, the Federal Communications Commission, has pursued “asymmetric regulation” (that is, different rules) for the technologies that can provide some form of high-speed internet access (telephony, cable television, wireless data networks, and satellite distribution systems). Three federal courts (two circuit courts of appeals and one district court) have issued contradictory decisions regarding whether cable modem access can be regulated and, if so, by whom. Two federal regulatory agencies, the Federal Communications Commission and the Federal Trade Commission, have adopted mutually inconsistent policies regarding cable modem access, each in the context of approving a merger. Numerous local franchising authorities have reached mutually vastly different conclusions about whether they can and should impose equal access requirements on cable modem access.

Much has been written about whether high-speed internet access should be regulated, and if so, what those regulations should be and which bodies – whether franchising entities, utility regulators, or antitrust authorities, and whether local, state or federal government – should have front-line responsibility for making the rules. With few exceptions, these analyses are adversarial documents written by individuals who work as consultants for parties that have a major financial stake in this issue. And even the few exceptions usually are defenses of a particular policy position. Although many, if not most, of these arguments are logically correct, they tend to be partial and incomplete.
The purpose of this essay is to step back from this adversarial debate for the purpose of describing the issues on which access policy should turn, and to provide a guide to policy makers about how to sort out the adversarial arguments. The foundation for this essay is the idea that decision theory provides useful framework for thinking about regulatory policy in this domain. Specifically, each regulator is one player in a sequential game with incomplete information that involves other regulators, the courts, state and federal legislatures, the firms in the industry, customers of internet services, and nature. Nature’s role is periodically to deliver random technology shocks that disrupt the relative costs and performance characteristics of communications technologies and the competitive positions of the firms that supply access, navigating and operating services, and end-use services.

The structure of the essay is as follows. Section I reviews the current state of policy chaos, the policy choices to be made, and the arguments for and against these choices. Section II reviews the debate about high-speed access policy using the analytical framework of antitrust policy. Section III explores the relationship between the timing of decisions and the net benefits of a decision to impose an equal access requirement. Section IV provides a brief conclusion.

I. THE TECHNOLOGIES AND THEIR ACCESS POLICIES

High-speed access policy refers to the rules that apply to companies that supply the physical connections to the world-wide network that is used for all telecommunications, including internet transmissions. The present chaos arises from the adoption of different rules for like circumstances for both substitute technologies and for providers that use the same technology in different localities. This section describes these four technologies, their regulatory
environments, and the contradictory policies that apply to them.

**Access Technologies**

Theoretically, four technologies can provide these connections: local wire-line telephone networks, cable television networks, wireless data networks, and satellite systems.

**Local telephone networks.** The conversion of local telephone networks to digital technology vastly increases their capacity and speed, and thereby enables wire-line telephone companies to provide a variety of connections that have higher speed than ordinary telephone service. At present, two of these services, although far from ubiquitous, are available to millions of customers: ISDN, which offers about a fivefold improvement over ordinary telephone service, and DSL, which is about five times as fast as ISDN. DSL is sufficiently fast that subscribers can make efficient use of the internet for all services except full-motion video. In principle, telephone lines could provide even full-motion video, but in practice this technology is not yet available, and may not be offered at a reasonable cost for several years. In addition, the quality of DSL service diminishes with the distance of the subscriber to the central office switch, which limits the number of subscribers that can be offered service. When DSL was first rolled out in the late 1990s, the distance limit was about two miles, and by 2001 this limit has been extended to three miles. Technically feasible but as yet not cost-effective technology is available for expanding this distance to seven to ten miles. Whereas technical experts disagree about when this technology will become commercially attractive, with estimates ranging from the year 2001 to almost a decade later, several companies have entered the business, intending to lease existing telephone lines at wholesale. This entry indicate that these companies believe that successful
commercial deployment of ubiquitous DSL is imminent.

If DSL succeeds in becoming a widely available and used source of high-speed access, the cost structure and sunk investments of local telephone carriers imply that relatively few companies will supply the lines over which DSL is transmitted. Although U.S. telecommunications policy is based on the hope that local telephone service will become sufficiently competitive that regulation will become unnecessary, as yet progress in achieving this objective has been slow. Only in large urban areas with high user density have facilities-based competitive access providers entered to compete with incumbent carriers. Nevertheless, the existing, and highly controversial, policy to require that local telephone companies lease the “last mile” customer connection to retail competitors provides an opportunity for entrants to combine least copper wire lines with their own facilities to offer competition in DSL service.

**Wireless.** The technology for providing high-speed access over wireless networks is a few years behind digital telephone technology, and so is more costly and less widely available. Current wireless technology can provide higher speeds than telephone lines but at roughly twice the cost. Although experts disagree about when this technology will be commercially feasible, a few companies are providing this service (albeit on a limited basis), and others have announced plans to do so.

The main problem with wireless technology is that it suffers from interference problems, some of which are due to the signal propagation characteristics of the spectrum that has been allocated to wireless telecommunications. For the next few years, at least, this form of high-speed access will be made available, at best, in densely populated areas and even there only to subscribers whose transmissions are not blocked by topography or large buildings.
Among the technologies that may succeed in becoming important providers of high-speed access, wireless is most likely to be structurally competitive. Wireless technology does not have strong economies of scale. Unlike cable and telephone service no single incumbent is entrenched with nearly all of the market, and unlike satellites spectrum allocation policy has not seriously restricted the number of independent service providers because the FCC has facilitated competition by allocating the spectrum for wireless telecommunications in a manner that allows many companies to offer service. Hence, if wireless becomes reasonable substitute for high-speed access over cable or telephone networks, the access market is almost certain to be highly competitive, and regulation of access is unlikely to have any useful role.

**Satellites.** Satellite systems come in two varieties: low-earth orbiting systems (LEOS) in which forty or more satellites orbit the earth, forcing transmitters/receivers periodically to switch the satellite with which they are communicating, and geosynchronous satellites (GEOS) which orbit the earth at the speed that enables them to remain over the same location on the earth’s surface and so enable a transmitter receiver to communicate with the same satellite indefinitely. The trade-offs are transmitters and receivers can be less powerful for LEOS, but can avoid tracking and switching satellites for GEOS. Both systems offer a technically feasible but, as yet, economically not very attractive means for providing high-speed access.

The advantage of satellite technology is that it is available everywhere without major interference problems, including areas with low population density. The problem is that in order to transmit high-speed signals, customers need to acquire equipment that is more expensive than the customer equipment for other technologies. Thus, the most plausible form of satellite access is a high-speed downlink that is coupled with a low-speed uplink. This service will allow
subscribers to receive all forms of internet information and entertainment services, including full-motion video, but will not allow them to send messages at speeds that differ very much from ordinary telephone lines.

For most internet uses, one-way high-speed access is adequate. For example, e-commerce, information and video services may need to transmit a substantial amount of data for video displays, but the return messages can be relatively simple – place an order or issue a data command using a few key words or box clicks. But if customers want to transmit large data streams on the network, such as to have their own video website or participate in music or video exchange services such as Napster, they need access that provides high speeds in both directions. For this reason, many internet afficionados conclude that satellites technology s likely to serve as an important means of high-speed access only in remote regions where population density or topography cause the other technologies to be commercially infeasible.

The scale economies in satellite systems, while substantial, are not so strong that if the technology were highly successful, many firms probably could operate efficiently. Presently entry into GEOS is limited by international rules regarding the allocation and use of orbital parking spaces, and at present the two U.S. companies that can provide internet access, DirecTV and Echostar, are seeking to merge. For low-speed access, LEOS entrants have projected that their business could be profitable with on the order of ten million users world wide, which is a very small fraction of all telephone connections. Spectrum allocation does limit entry, but not as severely as in GEOS. Several companies have entered the LEOS business, but thus far demand has been insufficient to make any of them commercially viable.

Satellite high-speed access may never be economically viable. The main barrier to the
success of this service is that customers who want only one-way video are likely always to be served more cheaply by either geosynchronous satellites or cable systems, which disadvantages low-earth systems in competing with cable for two-way high-speed access service.

**Cable.** The early leader in high-speed access is cable modem service that is based upon a fiberoptic network with coaxial cable drops to each customer. The advantage of cable arises from the fact that its purpose always has been to provide full-motion video, which requires high-speed transmission. Cable’s disadvantage is that it evolved as a one-way broadcast service. Cable systems were designed with either no or low-speed capability for transmitting signals from the customer to the cable service center. And, unlike wire-line and wireless networks, cable systems were designed to send the same signals to all users, not to permit unique transmission to each.

Whereas both limitations can be overcome, doing so is costly. High-speed cable access technology has solved the first problem, but not the second. Unlike the other technologies, cable modem access does not provide a dedicated connection for each user, and, as a result, the service is subject to degradation due to congestion. Whereas the congestion problem can be solved by adding more capacity. High-speed access capacity can be increased either by expanding total capacity on the cable (usually by adding a second cable) or by substituting high-speed access channels for one-way television signals.

As practical matter cable systems have not yet found it financially attractive to expand access capacity in order to prevent service degradation in periods of peak demand. Hence, current cable modem service varies in quality from better than other alternatives during periods of low use to only a little better than ISDN is periods of peak use. As with other technologies,
experts disagree about the speed with which technological progress and upgrades to the existing plant will enable cable systems to improve dramatically their peak-period service.

The likely market structure of cable is much like that of telephone service. Like telephones, cable has reasonably strong economies of scale that are likely to limit the number of competing cable companies to two or three in densely settled areas, and one smaller cities (see Faulhaber and Hogendorn [2000]). Oligopolistic competition has been feasible in this industry for at least two decades, and the few cities that did not grant exclusive franchises have enjoyed lower prices and better service from the presence of even two companies (Hazlett [1990]). Unfortunately, in nearly all of the nation cities granted exclusive franchises, and incumbent monopolies have signed up seventy percent or more of the households to service. Entry against entrenched cable firms has proved to be difficult. Hence, an optimistic forecast would be that the industry (and hence high-speed cable modem service) eventually will have two or three competitors in each major metropolitan area.

**Implications.** The most important conclusion to reach from the technical features of alternative technologies is that the future performance of each, and hence the ultimate market structure for high-speed access, are uncertain. One can not reach a firm conclusion about which technologies will survive in the market, whether the survivors will be regarded by most users as roughly equivalent substitutes or will each have unique advantages and disadvantages that segment the market among access technologies into largely non-competing niches, and hence where the market will lie between monopoly and highly competitive.

*Access Policy Alternatives*
Access policy refers to the rules that apply to providers of physical network connections with respect to the restrictions that they can place on either customers concerning their use of the internet or providers of other hardware, software and information services. Access policy can vary anywhere between two extremes: complete equality or complete vertical integration and exclusivity.

One extreme policy is to require equal access for each of these three distinct components of internet service. Equal access can mean that customer have freedom to choose among suppliers of the hardware and software that are use to connect to access supplier. Examples of items that end-users can select are television sets, audio players, recording devices, personal computers, computer operating systems, and other software on customer equipment that manages connections to the internet. The second meaning of equal access is that customers can select any existing supplier of gateway service, called internet service providers, or ISPs. The core function of an ISP is to enable customers to navigate the internet to obtain other services. The third meaning of equal access is that customers can with equal ease access all other internet services in e-commerce and data bases.

The other extreme access policy is to have no rules at all. In particular, connection providers can bundle high-speed access with any or all of the other hardware, software and information services that are involved in using the internet. In principle, one can imagine a fully integrated company that offers customers an all-or-nothing choice between no service at all or a bundle that includes everything: video and audio systems, a storage system, a personal computer, a computer operating system, the computer software that manages the customer’s internet use, the high-speed connection to the network, the ISP service, and all other information services,
such as e-mail, chat rooms, information services, and e-commerce sites, while denying customers the opportunity to use hardware or software or to connect to web sites that are not affiliated with the access provider.

The intermediate policies are myriad and multidimensional. As a practical matter, no company ever has sought to become the monolith described in the previous paragraph, so that access policy is not likely to be necessary to prevent this outcome. In addition, Congress has attempted to prevent some types of internet services, specifically pornographic sites, sites that provide unauthorized access to copyrighted material, sites that provide access to classified material, and software that assists customers in breaking encryption codes that protect access to some internet sites and the information that they contain. Whereas all of these policies are controversial and some raise constitutional issues, nevertheless neither extreme – completely free access or completely monopolized access – is likely to be a practical alternative.

Nevertheless, companies have sought to bundle a large chunk of the uses of computers and the internet. One highly visible example is the attempt of Microsoft to bundle operating systems, computer applications software, and numerous internet information services (although not denying customers the right also to use other software and services in addition to Microsoft products). Another highly visible example was the policy of AT&T/TCI, the nation’s largest cable television company, to offer high-speed cable modem access only when bundled with its now bankrupt affiliate, Excite@Home, which was a bundle of an ISP and other internet services (again, without preventing customers from accessing other ISPs and internet service providers through Excite@Home). Still another example, less familiar to Americans, is the internet access offering of Telmex in Mexico. Telmex bundles rental of a personal computer, its operating
system, some PC software, and subscription to the Mexican version of Prodigy, which is a joint venture of the American Prodigy and Telmex that is a combined ISP and internet services company. Of course, Mexican subscribers can buy a PC and connect to another ISP; however, competitive ISPs complain that they are not provided with adequate access and are charged exorbitant prices, and so cannot compete effectively with the Telmex bundle, which has captured over half the market.

**Access Policy Makers**

One factor that has caused chaotic access policy is the many government entities that believe they have the authority to set access rules. Four different types of government entities at three levels of government have attempted to determine at least some facet of access policy.

The front-line policy-makers are agencies that regulate some part of the communications sector. At the federal level is the Federal Communications Commission, which has authority to regulate certain aspects of cable television, telephone service, wireless communications, and satellite services. Similar authority in telephone service resides in state public utilities commissions. And, local governments can regulate some aspects of cable systems through their authority to grant cable television franchises.

Each of these entities owes its authority to legislative bodies at each level of government. The U.S. Congress is the dominant legislative body in that the interconnectedness of the national telecommunications infrastructure allows it to assert regulatory authority over the entire sector under the interstate commerce clause of the Constitution. At the heart of the chaos in high-speed access policy is a structural failure of the flagship federal law that governs the communications
sector, the Telecommunications Act of 1996. This Act has two major weaknesses: it
differentiates among the technologies in how it assigns regulatory responsibility and in
legislating the scope of regulation that applies to each.

Congress has created a jurisdictional problem by delegating different regulatory authority
to the FCC and the states for each technology. The states, in turn, have placed telephone
regulation in the hands of state utility commissions, but in most cases have delegated franchising
authority to local governments. Although this legislation assigns considerable power to the FCC
to oversee and even to pre-empt state and local regulations, the language is sufficiently vague
that, the Federal Communications Commission has opened an inquiry in which it has asked
commentators to provide legal interpretations of the agency’s statutory authority in regulating
high-speed access.

Congress also has established different roles for regulators in different technologies. As a
result, a crucial issue in resolving whether an access method can be regulated is the meaning
Congress intended to attach to the terms “telecommunications services,” “cable services,” and
“other services.” The Telecommunications Act of 1996 gives the FCC the authority to regulate
both prices and access rules for telecommunications services, including local access; however,
for local telecommunications services, states retain the authority to regulate as long as their
regulations are not anticompetitive. The FCC’s role is to set guidelines that interpret and
implement the Act, to act as court of appeals to review state regulations for compliance with the
principles of the act and the FCC’s guidelines, and to pre-empt state regulators if they fail to
regulate or issue non-complying regulations. Among the items covered by these provisions is
access requirements.
The Telecommunications Act of 1996 imposes equal access requirements on large local telephone access incumbents. Among these is the requirement to provide equal access to all information service providers, including those that compete with information service affiliates of the incumbent carrier. Another requirement is that incumbent local access carriers open their local networks to resale competition by providing competitively neutral interconnection to facilities-based competitors and by unbundling and offering for sale at competitively neutral prices the separate elements of the local network. The latter condition enables high-speed access competitors to enter by leasing the wires to the customer’s premises from the incumbent local telephone company, then bundling the use of these wires with their own switches and other network equipment and software. The combined effect of these equal access provisions is that local telephone companies can not offer high-speed access that is only available as a bundle with any other services or equipment, but competitors that resell the local carrier’s facilities can offer only bundled services. Congress currently is considering legislation submitted by Billy Tauzin and John Dingell to eliminate these restrictions, although passage is not regarded as likely.

Federal law does not give any authority to state and local governments to regulate wireless and satellite services. The FCC’s primary role is to define, auction and enforce spectrum rights in a manner that makes these industries structurally competitive so that the FCC need not regulate them. Hence, no regulator can prevent wireless and satellite providers of high-speed access from bundling access with both end-user equipment and internet services.

Finally, federal legislation largely deregulated cable television, but it preserved some role for states and, if states so delegate, local governments to franchise cable operators. As with local telephone service, franchising authorities can not prevent entry by competitive cable television
systems, but within limits they can establish minimum requirements for cable services. Some local franchising authorities have defined cable modem access as a cable service that can be controlled by franchise agreements, and have gone on to adopt equal access provisions for high-speed cable modem access that parallel those for local telephone companies. Meanwhile, the FCC, in reviewing the acquisition of TCI and Media One by AT&T, asserted jurisdiction over high-speed cable access as a telecommunications service and concluded that imposing any equal access requirements was premature. This decision put the FCC in direct conflict with several cable franchising authorities.

This complex set of legislative policies and regulatory delegations is fundamentally flawed because it is based on an outdated view of the functions of each telecommunications technology. Underlying the Telecommunications Act is the notion that each technology will supply a particular niche in the communications sector. Wire-line telephone companies will supply telephone services, cable companies will provide video services, while wireless and satellite companies will supply mobile services. But technology has upset this tidy allocation of functions. The Act did not contemplate that each technology would soon evolve to the point at which it could supply all types of services in the same geographic area in competition with the others. Hence, policy has quickly entered the tortured legalism of defining what the Act implies in a technical regime its authors did not contemplate.

The third actors are competition policy agencies: the Antitrust Division of the U.S. Department of Justice, the Federal Trade Commission, and the offices of state Attorneys General. The Antitrust Division and some state attorneys general became involved in access policy in the 1970s through antitrust litigation against two companies that were then vertically integrated
suppliers of telecommunications services and equipment, AT&T and GTE. The most important and enduring legacy of this litigation was the requirement that the Bell System’s local telephone companies provide “equal access” to all long-distance carriers and providers of information services. From this legacy has emerged the policies governing internet services over local telephone wires that is embodied in the 1996 Telecommunications Act.

The second area in which antitrust agencies have promulgated access policies is through their primary jurisdiction in reviewing mergers. Late in 2000, the Federal Trade Commission approved the merger of Time-Warner (a major cable television company) and America-On-Line (the largest ISP) on the condition that Time-Warner grant equal access to at least three ISPs in any area in which it offers high-speed access that is bundled with AOL, and that it offer high-speed access to the company that led the fight against the merger, Earthlink, before it provides the bundled AOL service. This decision is in direct conflict with the FCC’s decision in approving the mergers of AT&T with TCI and Media One, although legally the decisions are not necessarily inconsistent because the Time-Warner/AOL deal did not involve a telecommunications services carrier. The FTC’s decision is not binding on any other cable carrier, so it creates another inconsistency – cable carriers that bundle access with internet services without merging with an ISP are not subject to the equal access requirement that the FTC has imposed on Time-Warner.

The last players in the access policy drama are the federal courts, which have ultimate authority in interpreting federal statutes. Several lawsuits have addressed the jurisdictional issue, leading to three mutually inconsistent decisions. First, in *AT&T Corporation vs. City of Portland*, a broad equal access requirement for cable modem access was overturned by the 9th
Circuit Court of Appeals on the grounds that bundled cable modem access is both a telecommunications service and an information service, and therefore under the exclusive jurisdiction of the FCC. Second, in *Gulf Power vs. FCC*, the 11th Circuit held that internet services are other services, and so not within anyone’s jurisdiction. Finally, in *Media One vs. County of Henrico*, the District Court for the Eastern District of Virginia ruled that cable modem service is a cable service that is within the domain of local government franchising requirements. Ultimately, these conflicts can and most likely will be resolved by the Supreme Court, but that could take years. Meanwhile, cable access policy will differ among regions and localities because of differences in governing court decisions.

Policy concerning high-speed access is chaotic because several different levels of government and entities within each level of government have asserted the right to regulate at least some aspect of internet access service, and because the same core facts and issues have caused different public officials to reach different conclusions about the requirements that ought to be placed on the providers of these services. In the sense used here, the presence of chaos does not necessarily mean that any decisions are irrational. Decision makers who face the same problem rationally can make different decisions for four fundamental reasons.

First, policy decisions by regulators can not be grossly in conflict with the re-election interests of elected officials, and the underlying interest-group politics of access policy differs depending upon which entity is making the policy. In general, large, national companies (like access providers) are, on average, more influential at higher levels of government, whereas local companies are likely to relatively more influential in the community in which they are located. A very large number of internet companies, either ISPs or information service providers, are local
enterprises, whereas almost all access providers are national concerns with a small proportion of their business and employees in any given local area. Hence, internet service providers are more likely to be influential in local decisions, while access providers are more influential in state and national decisions. Note that federal equal access policy for telephone companies is derived from conflicts among large national carriers (primarily, AT&T and GTE versus MCI). Small local ISPs and e-commerce companies, all of which have come into existence long after the equal access policies that were included in the settlement of the antitrust case against AT&T and in subsequent implementing decisions by the FCC, are incidental \textit{ex post} beneficiaries of these policies.

Second, the underlying political ideology of government affects the relative weight that decision makers place on different aspects of access policy. The two underlying ideological dimensions that dominate American politics are \textit{authoritarianism}, which refers to attitudes about government limitations on the freedom of choice of each person (including a business executive), and \textit{distribution}, or attitudes about the appropriate distribution of wealth and power between business and either labor or consumers. One can interpret an anti-authoritarian orientation as an ideology that assigns a high cost to any coercive act by government (a cost assigned to the existence of a rule that goes beyond the rule’s consequences), and a position on distribution as one that assigns different weights to the incomes or surplus captured by different individuals, depending on the level of their income and the manner in which they earn income or capture surplus. With this framework in mind, the presence of different entities with overlapping policy authority combined with differences among decision makers in terms of their ideologies (and hence the weights that they assign to the benefits and costs of the same policy) leads to
inconsistent and conflicting policies.

Third, although the technologies for high-speed access are the same everywhere, local market conditions can differ. The conditions that can differ by locality are demand intensity, comparative costs, and the organizational characteristics of incumbents can alter the underlying risks and benefits of access policies, and so the decision that local regulators will make, given the same information. For example, in areas with low costs and high demand, multiple access suppliers are more likely to emerge in an unregulated environment, so that any single access provider is less likely to be able to impose onerous burdens on either customers or hardware, software and service suppliers. Thus, decision makers that focus only on the efficiency aspects of regulatory policy can reach different conclusions about service in different areas.

Fourth, the underlying facts about costs, demand and likely business strategies under alternative access regimes remain uncertain because the technologies are evolving rapidly and unpredictably. In each policy forum, a different cast of players provides different information. In addition, the main players have large financial stakes in the decision and so present and emphasize facts and technological forecasts selectively in a manner that is most consistent with the policy that best serves their interests. Finally, the decision makers differ in their professional expertise and experiential background. At one extreme, the FCC and state regulatory commissions in a few large states possess a great deal of technical sophistication about the communications sector. Competition policy agencies possess a great deal of legal and economic expertise as it applies to antitrust, but less technical expertise about the industry. At the other extreme, city and county councils that oversee cable franchising may have no relevant expertise. As a result, the fundamental information base of policy decisions differs among decision-making
entities, leading to differences among them in the policy inferences that they draw from this information.

II. COMPETITION POLICY ISSUES

Because the issues involved in deciding whether and how to regulate overlap with the rationale for antitrust policy, the language and economics of antitrust have spilled over into regulatory policy. Indeed, antitrust and regulation often are alternative means of achieving the same end, which is providing to consumers the optimal quality of service at prices at or near cost. Hence, in making an informed decision about the regulations to impose on AT&T regarding high-speed internet access, regulators and legislative overseers are forced to come to grips with some relatively arcane concepts from antitrust economics. This section reviews the main economic issues of antitrust, and applies them to the high-speed access service.

The first issue is “market definition,” which means identifying the “relevant market” in which the defendant operates. The standard reference on market definition is the Merger Guidelines, a joint publication of the Antitrust Division of the Department of Justice and the Federal Trade Commission. A “relevant market” refers to a reference product (the product market) and a geographic area (the geographic market). The inquiry begins by identifying the product to be analyzed, and asks whether other products at the same location or products in a different location are a reasonable substitute from the perspective of the product’s customers. A relevant market, then, is a product or group of products available in a particular geographic area that can “profitably” be monopolized in that if a single firm or group of colluding firms control the supply of these products in that area, it can profitably raise prices “significantly” above the
prices that would emerge in a competitive market for a “substantial period.” The terms profitably, significantly, and substantial period are in quotations because their meanings are not transparent.

“Profitably” means that the total profits of the firm (not profits per unit of sale) increase as a result of the price increase, even though the total quantity sold declines due to the suppression of sales volume from a price increase. “Significantly” basically means any deviation from competitive prices that can be proved according to the standard of civil litigation. This standard is below the scientific standards that apply to empirical research. Typically, the scientific standard is that the conclusion to be drawn from the empirical study is highly unlikely – less than five or ten percent – to be true. In civil litigation, including antitrust, the standard is “proponderance of evidence,” which generally means that the conclusion is more likely to be true than false – that is, the probability of a mistaken inference from the research is less than fifty percent.

As a practical matter, the antitrust standard for a significant price increase usually means a price increase of five percent or more. Note that in the case of cable access service, the monthly charge is around $50, which implies that if the competitive price were $47.50 (or less) – a quite small difference – providers would possess market power in high-speed access service.

In litigation about the appropriateness of regulatory proceedings, the evidentiary standard is even lower, requiring that the decision has reasonable basis in the evidence. The basis for this standard is appropriate – courts correctly view regulators as possessing superior technical expertise and information, and so are reluctant to over-ride their conclusions if they appear to have rational basis. But a consequence of the difference between the standards that are used in
civil litigation and court reviews of regulatory agencies is that on competition policy issues, regulatory agencies like the FCC, the FTC, and state regulatory commissions can enact competition policies that courts would not adopt through antitrust litigation.

“Substantial period” means somewhere between six months and two years depending on exactly how competition emerges, but in this case the relevant time period most likely would be found to be one year. That is, the issue is whether high-speed internet access from wire-line telephone companies, wireless services and cable systems is likely to be provided on comparable terms and with comparable quality within a year after the first service is launched, which is usually cable modem access but sometimes is either DSL over telephone lines or wireless access. If the answer to this question is in the affirmative, then the access alternatives that could enter within year are in the same relevant market as the initial entrant.

The geographic boundary of a market is determined by identifying the firms that supply the area or could do so quickly and easily. Market definition begins by asking what firms compete with a particular firm and product at a particular location. Because high-speed access services require capital investments that are fixed at a particular location, geographic markets frequently are small. For example, consider a single ranch that is miles from its nearest neighbor and has a telephone line that is equipt to provide high-speed access, but no cable or terrestrial wireless service. The next ranch a few miles down the road may enjoy telephone services plus cable; however, it probably is not realistic to expect the cable company to extend its service several miles to obtain one more customer, in which case the two ranches are in distinct geographic markets. At best, the market containing the first ranch contains only telephone and satellite services. The implication is that neither states, counties nor metropolitan areas probably
re not relevant markets for internet access, but more likely contain many geographic markets, differentiated according to the plausibility that specific access technologies will be offered there.

Whether prices above the competitive level are profitable depends upon the availability of substitutes. Any firm can raise its prices, but price increases above the competitive level are profitable only if consumers do not have access to adequate substitutes. Thus, a relevant market contains all products that are sufficiently close substitutes so that if one or some firms attempt to raise their prices above the competitive level, they will lose sufficient business to the other products in the market that the price increase would not be profitable. These alternatives may be products that are already available in the same geographic area, or may be products that are currently sold elsewhere but, at a small cost, could be offered in the same geographic area.

In the case of the product market in which high-speed access is offered, the core issue is which forms of internet access are sufficiently close substitutes that they force each access provider to charge competitive prices. As in all adversarial processes that begin with market definition, the parties participating in the debate over access policy seek to define the relevant market in a way that is most favorable to their interests, a practice that is known in antitrust economics as “market gerrymandering.” For example, companies that want to bundle cable modem access with internet services propose a market definition that includes all forms of telecommunications access, while their opponents seek to define the market as high-speed cable access so that, by definition, cable modem access is a monopoly. Both sides back up their proposed market definition with valid technical arguments about access technologies. Bundled suppliers emphasize the fact that physically one can access internet service providers (ISPs) in many ways, including through an ordinary telephone line, and its opponents emphasize the
advantages of cable modem access over the other technologies.

The problem with these arguments is that a difference in technical attributes (or product differentiation) is a crude indicator of substitutability and hence the scope of the relevant market. The principle of substitutability refers to valuations of products by their users (the intensity of their demand for one service in comparison to another, measured in dollars) and the capability of suppliers of related products to supply a particular product in a specific place. Both of these concepts are only loosely related to the technical characteristics of existing products.

With respect to demand substitution, the economically meaningful question is not whether each form of access has unique attributes, but how much users are willing to pay for one form of access rather than another, and whether this difference is large or small in comparison with cost differences. In a competitive market, prices converge to long-run average cost of service. If a high-quality product is more costly, but users are not willing to pay more than its additional cost to gain access to its unique features, then the product possessing unique technical attributes is still part of a larger competitive market that includes products of differing qualities.

With respect to supply substitution, the issue is not whether other firms today offer the same product, but whether within a year they could roughly match the technical qualities of the product in question.

Because high-speed internet service using any technology is available only in a few areas around the nation and actually compete in even fewer areas, we do not know whether consumers are willing to pay substantially more for high-speed access than its additional costs and whether consumers regard the alternative means of obtaining high-speed access as reasonable substitutes at relative prices that are roughly equal to relative costs. Consequently, we do not know whether
users are willing to pay a lot or a little more for one form of high-speed access in comparison to another, and whether other access suppliers, upon observing that the first entrant in a geographic area was extremely successful, could speed up their deployment plans and provide an effective substitute within a few months.

Hence, one does not have enough evidence at this time to define the relevant market because there is as yet no real evidence about either demand substitution or supply substitution. In reality, any outcome is possible, from either cable modem or DSL access being so special that it has no substitutes in the eyes (and pocketbooks) of users, to all technologies, when priced at cost, being indistinguishable in their relationship between price and value in the eyes of users, including internet access over ordinary telephone lines at what amounts to a zero incremental price if the line also is used for telephone service.

At present, all technologies for providing high-speed access are in the process of being rolled out, and far fewer customers have access to any of them than is almost certainly going to be the case in a few years. At this point, most households have no high-speed access alternatives, and most of the rest have either DSL or cable, but not both. Technically, DSL and cable high-speed access are broadly similar. For example, a recent study by Keynote Systems, found that, on average, during peak-use evening hours, a web page could be downloaded in 3.55 seconds over DSL and 3.97 seconds over high-speed cable. The slightly faster performance of DSL is due solely to the fact that the initial cable offerings operate more slowly when more customers try to use them simultaneously, and so are slower during peak hours. In off peak hours, cable operates closer to its maximum efficiency, and is faster than DSL.

These findings tend to support the idea that both are in the same product market;
however, this conclusion is not true in the vast majority of locations, since few customers actually can buy both services now. Moreover, by the time most customers can choose between the two, technology may have opened a performance gap between them. DSL now is offered only to customers within three miles of a local telephone switch, but several companies claim to have solved this problem. For example, GoDigital claims to be able to offer DSL over resale telephone lines for distances up to forty miles.

Likewise, the cause of cable’s slowdown during peak use is transmission capacity in existing cable networks. As cable networks are upgraded, on-peak speeds should approach off-peak speeds. Moreover, DSL and cable suppliers claim to be developing further improvements that will substantially increase access speeds over current use. Finally, a consortium of wireless companies and their equipment suppliers, led by Cisco Systems and Motorola, has announced plans to provide high-speed wireless access.

Of course, one can not base a market definition on statements by interested parties about what technological capabilities they expect to have in the future. All that we know is that along all fronts, technology is developing extremely rapidly, and whatever the product market really is today, it might be very much different, either more or less inherently competitive at build-out, than it would be using today’s technology. Even if we could forecast the future of a rapidly developing technology, we still would not know how different access paths have to be for consumers to regard them as poor substitutes.

Because of the paucity of information about both future technological capabilities and the intensity of demand for high-speed access, policy makers probably should avoid adopting any of the proposed market definitions on the grounds that they are unsubstantiated claims without
sufficient basis in actual experience. At this point, the best use of market definitions is for constructing hypothetical cases: if the relevant markets turn out to be \( X \), then the implications are \( Y \). In this case, three outcomes are possible: (1) high-speed cable access is or becomes so attractive to consumers that they are willing to pay substantially more than the cost of providing it even if other high-speed access technologies are widely available at competitive prices; (2) other high-speed access technologies (like DSL) are or become regarded by users as reasonable substitutes for or even superior to cable, but not low-speed options (like ordinary telephone lines); and (3) all access technologies, high-speed and low-speed, are and remain regarded by consumers as sufficiently close substitutes at prices equal to their average costs that all are in the same market, despite differences in their qualitative attributes.

The second competition policy issue that has been raised in this case is whether any access provider has "market power" in high-speed access. Market power refers to the ability of a single firm to charge anticompetitive prices or to exclude competitors. A firm possesses market power if it is a monopoly, or if it is one of a few firms – an oligopoly – that are not likely to compete vigorously with each other. If a market contains only a handful of firms (the precise number depends on the nature of the product and conditions in the market), each firm is likely to realize that attempts to compete vigorously will be met with equally vigorous responses, and will take this into account in making decisions about prices, investment, and service quality.

If the relevant market contains only cable modem access (as opponents of bundled access argue), then because the vast majority of localities have only one cable company, by definition that company has “monopoly power” – it has no substitutes, and so faces no significant competitive discipline with respect to prices and service attributes. If the relevant market is all
forms of access to the telecommunications network, as vertically integrated cable modem access suppliers argue, one must include wire-line telephone companies, competitive access providers, wireless telephony, and satellites in the market, in which case cable modem access faces too many competitors for even oligopoly behavior to be plausible.

The most interesting case is if the relevant market contains all high-speed access providers, but not low-speed access. One possible outcome is that high-speed wireless access is sufficiently far in the future that only DSL, a service like DSL from wire or fiber optic competitive access suppliers (CAPs), and cable modem access will be in the relevant market. In this case the relevant market is likely to be an oligopoly, and outside of the most populous cities, where CAPs generally do not operate, a duopoly (two firms). If this occurs, provision of service is likely to reflect oligopolistic tacit collusion.

The third competition policy issue is identifying the “anticompetitive acts” (if any) of the firm with market power. Recall that a firm has market power if it can charge prices above the competitive level (recovering revenues that exceed its long-run costs, including the profits that would be earned by firms in a competitive industry of similar risk) **OR** can exclude competition. The “or” is emphasized here because it is crucial to the issue of determining which acts by a high-speed access supplier might be anticompetitive. The important point here is that a firm is not in violation of the antitrust laws if it sets a high price for a service for which it enjoys market power. Indeed, profiting from a monopoly is perfectly legal if the monopoly is acquired by legitimate means – through “superior foresight and efficiency.” For example, intellectual property law – pertaining to such things as patents and copyrights – creates temporary monopolies to reward innovation, based on the premise that society is better off creating sharper
incentives to innovate than preventing all monopoly profits.

If market power is created or maintained by means other than superior foresight and efficiency, the act of creating or preserving it is anticompetitive. In this case, if a high-speed access supplier enjoys substantial market power in high-speed access, it will have acquired this power because of its superior efficiency. For example, if cable modem access proves to be invulnerable to competition (including entry by additional cable television suppliers) because other technologies can not offer the same service at the same cost or any other service at a price equal to is cost that is a close substitute for cable access, cable companies legally can charge any price they want without violating antitrust laws, and the only means available to prevent this outcome would be to impose economic regulation.

The emphasis on the “or” in defining market power arises because the potentially anticompetitive act of cable companies is to tie high-speed access to other products, the interact services provided by its ISP affiliate. To explore this issue requires extending the competition policy analysis. Defining the relevant markets and assessing the extent of market power in these markets are very easy in the current environment. One begins by identifying the types of services that are distinct and that, therefore, do not compete to serve the same consumer purpose. Examples are basic interface services (ISPs) that enable unsophisticated consumers to use the internet, specific types of internet activities such as e-mail, chat rooms, electronic publications, games, and e-commerce sites in each major type of consumer product. Perhaps some of these are distinct markets, but perhaps they are not because once a firm is providing one service it can relatively easily provide other services if they appear to be more profitable. In the extreme, the possibility of supply substitution – a firm in one business entering another – is so strong that a
large number of functionally distinct services actually may be in the same relevant market.

Whichever view one has about relevant internet services markets, the answer is the same: internet markets are highly competitive. The most amazing feature of the internet is its openness and competitiveness, and preservation of this state of affairs motivates the opposition to plans for bundling cable modem access with internet services. Setting up a website to sell a product or simply to distribute one’s opinions and creative output for free to whomever might want them is inexpensive. To have a personal website, all one needs is a computer, some telephone access lines, and some widely available software, and one is in the e-commerce business. As a result, there are now over a million websites around the world. Setting up an Internet Service Provider (ISP) is more expensive, but is still relatively cheap – one needs a better computer, more and better connections to the network, and more elaborate software, but the task is more like than unlike setting up a personal or e-commerce website. Even small towns typically have several competing ISPs. In the present environment, ISPs are unlikely to enjoy any market power other than that which might arise because they are especially creative in the service that they offer.

An important subset of internet services are businesses that provide ordinary users with internet access and navigation. These businesses allow consumers to access the internet without knowing anything at all about its technology or the software that enables communication among computers. Some companies provide only very limited service – a means of access, or, separately, search service to enable a user to find the right website. Other companies, like America On-Line (AOL), bundle many services together. For example, a single service allows a user to send and receive e-mail, provides “chat rooms” where people with a particular interest can exchange messages, offers electronic consumer products such as computer games and
information data-bases, includes affiliated e-commerce sites that advertise on free service sites that are provided by the ISP, and provides a “search engine,” wherein users enter key words and obtains web addresses that correspond to those key words. As an example of the last, one can enter “fishing equipment” and find websites that sell tackle, or “books” and find on-line book sellers.

Today consumers have an amazing amount of choice about how they access and use the web. They can “pick and choose” elements of internet service, or buy bundled services, or even do both, since the bundled services usually permit access to competing services and websites. In a highly competitive regime, bundling of services – combining products that might be provided in separate relevant markets – survives only because consumers value bundled services over creating their own bundles by selecting each service component separately. Hence, bundling by itself is not an anticompetitive act.

The important issue pertaining to combining high-speed access and a full-service ISP is whether the latter will acquire market power by being combined with the former. The ability to exclude competitors can apply to either the market in which a firm has market power, or to another market that is linked to the product for which the firm enjoys market power. In this instance, internet access is a necessary input to acquiring the service of an ISP and using the internet to obtain other services, including e-commerce. Thus, a firm that possesses market power in access can exclude competitors in internet markets by requiring that its access customers also buy internet services from its affiliates. This act is called “tying” and is anticompetitive. A related anticompetitive act is “discriminatory access,” in which the access provider allows customers to use competing suppliers of internet services, but either charges
extra for the privilege (a “price squeeze”) or permits access to competitors only through technically inferior means, purposely degrading the technical quality of competing services.

These acts are anticompetitive only if they harm consumers (harming other competitors is not sufficient), and harm to consumers can arise only if the firm taking the action has market power. If the firm lacks market power, consumers in sufficient numbers will respond to attempted anticompetitive acts by switching to other access providers so that the firm that imposes these restrictions will not find them profitable. Hence, in order for the policies of an access provider to be anticompetitive, the relevant market in which it provides access service must be either a monopoly or an oligopoly. In the latter case, if the access market has a very small number of firms and all access firms adopt exclusive arrangements with affiliated suppliers of internet services, the oligopoly in access would lead to a similar oligopoly in internet services, thereby destroying the open, highly competitive feature of the internet.

Present policy prevents an oligopoly in internet services because most internet access is over telephone lines and telephone companies must grant access to their networks to competing ISPs, so that they can not leverage market power in traditional wire-line access (even with DSL capability) into market power in internet services. The present set of policies can lead to substantial reductions in competition in internet services only if high-speed access becomes essential to the survival of internet competitors and if cable access companies continue to offer access only when it is bundled with internet services.

The incentives of cable access providers with respect to exclusive bundling is not entirely clear. Vigorous competition in internet services increases the value of internet access to customers. This effect is known as the network externality: if a greater number of customers
make use of the internet, more companies will be attracted to enter internet services, and an increase in the number of internet services will cause both an increase in customers of internet access and the amount they are willing to pay for access. Hence, if cable access providers monopolize internet service, their gains from the latter could be offset by attracting fewer access subscribers. Most likely, monopolizing just ISP services is not likely to enhance the profits of cable access suppliers for reasons of market power alone. Customers need one access supplier and one ISP to access other internet services. Higher prices for one can not be offset in part by buying relatively less of it and more of the other. As a result, a monopoly in one with competition in the other can not be less profitable than a vertically integrated monopoly in both, and could very well be less profitable if the quality of ISP service is greater under ISP competition.

A cable access supplier (or ISP) with substantial market power may be able to increase profits by monopolizing some other internet services. The reason is that the cable access supplier may be able to engage in price discrimination among types of internet service, thereby charging more for the combination of access and services for customers who place the highest value on high-speed internet access. In this case, the profit-maximizing strategy for cable companies is not to integrate into internet services, but to charge a fairly low price for the bundle of access and ISP service, then to add different surcharges for using various other internet services, including e-commerce. But this strategy runs into two problems: it requires monitoring the specific uses that customers make of the internet (and thereby invading their privacy), and it requires engaging in price discrimination that has no basis in cost, which is an antitrust violation. Hence, vertical integration into internet services is second-best alternative to price discrimination combined with
competition in internet services. Whether this strategy makes sense depends on whether the additional revenues from more effective price discrimination offset the reduced demand that may result from the effect of monopolization on the quality of internet services.

Even if cable access suppliers possess substantial market power in high-speed access and succeed in leveraging that market power into internet services, they are likely to be sued for violating the antitrust laws. Tying, price squeezes, and technically inferior interconnection are all anticompetitive acts, and indeed were parts of the many complaints that were filed against AT&T in the 1970s and that led to the divestiture of the Bell System.

The possibility of antitrust action does not necessarily mean that one does not want to impose regulatory rules on a monopolistic provider of access; however, it is quite likely that regardless of what decision regulators make, now or in the future, pertaining to bundling of cable access and internet services, if cable modem access suppliers turns out (a) to have significant market power in high-speed access and (b) successfully leverage this market power by causing ISP affiliates also to enjoy market power in internet services, numerous antitrust actions will be filed against cable companies on behalf of both consumers and other providers of internet services. If the arguments of those who disagree with cable access suppliers about market definition, market power, and anticompetitive leveraging are correct, cable companies probably will lose these cases, will be subjected to significant financial penalties through triple damages judgments, and will have requirements placed upon them by the courts that protect against such leveraging in the future.

The last economic issue pertaining to liability in rule-of-reason cases is whether the anticompetitive acts have a “reasonable business justification,” which means whether they
produce efficiency benefits to consumers (not to the firm) that more than offset their anticompetitive effects. In this instance, companies that bundle high-speed cable access with internet services offer as a business justification the risks involved in their investments in high-speed internet access. The essence of the argument is that a prudent firm would not make the investments necessary to provide high-speed internet access unless it could combine that service with other internet services. This argument is not a business justification if it is simply a story about leveraging – that AT&T will be more profitable if it combines two services. Indeed, the argument about a disinvestment effect from risk is correct only under some forms of risk – specifically, if the risk is about whether cost and demand conditions allow any service to survive in the market. If the risk is simply that competition will reduce profits or even that competitors might provide a better product, then allowing the monopoly supplier of access to tie access to internet services will reduce investment, not increase it.

A business justification for an anticompetitive act must be an argument about efficiency arising from “economies of scope.” Specifically, it must be the case that designing the access system and internet services together as an integrated system is significantly less costly or of higher quality than if they are undertaken by separate companies. Only if joint creation of the services is more efficient will a firm be more profitable if both services are provided as a package and the firm lacks market power in the access component of service.

Economies of scope in access and internet services have two theoretical sources. One is that the business risks of internet access and internet services are negatively correlated, so that the expected profitability that is necessary to induce both investments is lower if they are undertaken together. This argument almost certainly does not apply in this case, for the most
important source of business risk for investments in services that take advantage of high-speed access is whether consumers value high-speed access sufficiently greatly to be willing to pay for its higher costs. The other is more straightforward economies from integrating the design of the access network with the design of the software.

If cable access suppliers have market power in access, they may be able to justify bundling services if the cost savings and/or service quality improvements offset the harm to competition. To avoid antitrust liability a cable modem access supplier must satisfy another economic condition: that it could not accomplish the same efficiency objectives through substantially less anticompetitive means. Although ultimately this issue will be decided by the court, if a cable company is shown to have market power in high-speed access (a big if), most likely it can not defend an exclusivity agreement with an ISP as a practice that is not dominated by a non-exclusive arrangement accompanied by charging more for internet access that is used to access another ISP. That is, if a cable company faces additional costs for providing internet access separately from integrated internet services, and can sustain this argument with evidence, it has a reasonable basis for setting a higher price for access to competitive ISPs than the implicit price it sets for its own affiliate; however, cable suppliers probably can not succeed in using higher costs as a justification for denying access altogether. Note that if bundling access and services produces a superior product, cable companies do not need to engage in an anticompetitive act to obtain and maintain market power. If cable companies were to offer access to other ISPs, which could then bundle access with their own services, and the latter then offered an inferior product because it could not capture the benefits of technically integrating access and service, these ISPs would lose the battle for customers to bundled services. Obtaining
a monopoly by producing a superior product is not an antitrust violation, and even an equal
access requirement would not prevent a monopoly by a bundled offering of cable modem access
and internet services.

Despite the likelihood that if opponents of bundled service plans are right, they are likely
to win a subsequent antitrust suit, one might not want to rely on antitrust to solve the problem
after the fact. Antitrust cases often take many years. The litigation that led to the divestiture of
AT&T took eight years to complete, another year to implement the remedy, and several more
years before equal access to local networks for long-distance competitors could be implemented.
In the interim, some opponents of bundled cable modem service fear that internet services will be
forever harmed by a policy that permits bundling during even a brief period when cable
companies enjoy market power in high-speed access.

The basis for this fear is a “lock-in” effect on consumers. The argument is that once
consumers have signed up for the bundled service, they will face serious impediments to
switching to alternative suppliers later, after either an antitrust court or regulators have ordered
equal access after anticompetitive harm is observed, or alternative high-speed access suppliers
without similar ties to internet services have emerged. Note that lock-in occurs when consumers
refuse to switch to an alternative supplier in response to an offer of either lower prices, higher
quality service, or both. One source of lock-in is high “switching costs,” that is, users must
undertake costs to change suppliers that are large compared to the combination of price
differences and the value of better service. The other source of lock-in is a “network effect,”
which occurs when service suppliers choose not to provide service in connection with a
subsequent competitive entrant because, upon entry, the entrant has no customers.
Lock-in effects are easy to understand in the context of operating systems for computers. First, consumers undertake the costly effort of learning the system, in part by devoting time to the process and in part by paying for manuals and computer courses. If consumers later move to another operating system, they must experience these costs again, so that as long as the benefits of the new system are less than the costs of learning how to use it, consumers will not switch. As a result, the owner of the “first-in” operating system can set a price above the amount necessary to recover its cost without risking the loss of customers to a competitive product. Second, observing that one operating system has all or nearly all users, a firm in the applications software business knows that it will have greater prospective sales if it writes its applications using the dominant operating system. This effect will be especially pronounced if the value of the application to one user is greater when other users also adopt it, such as is the case for workers in the same office using the same word processors and spread-sheet programs so that they can share files and more easily produce joint work.

The issue presented by high-speed access is whether the lock-in argument pertains to internet services. Both types of arguments have been put forth to claim that lock-in is potentially important here.

With respect to consumer switching costs, the examples are the value of not having to learn how to navigate a new ISP, of retaining an e-mail address, and of continuing to participate in the same ISP-based chat room or interactive, multi-person on-line games. With respect to internet service, the argument is that services that make use of high-speed access will become dominant, will be controlled by proprietary technical characteristics of the integrated cable internet services company, and will not be available quickly, if at all, over alternative ISPs when
a competitive access supplier emerges. The second argument amounts to the claim that competing ISPs can not soon and may not ever catch up in quality and enhanced service offerings to ISPs that are affiliated with cable companies and have exclusive access to the proprietary protocols of cable internet access systems.

As a practical matter, there is no direct evidence pertaining to whether lock-in is likely to be a big, small, or nonexistent problem for internet services that depend on high-speed access. One can only draw inferences from indirect evidence, and this indirect evidence generally does not support the contention that lock-in effects are substantial.

First, lock-in does not appear to be an important aspect of internet services that make use of low-speed access. Customers switch ISPs and use multiple search engines. Moreover, the e-commerce business model that relied on locking in large customer base with low prices, then later emerging from the red by rising prices, seems to have failed in nearly all e-commerce lines (the exception may be auctions), indicating that the lock-in effect is not substantial.

Second, an interesting feature of the antitrust litigation against Microsoft is the argument that Microsoft greatly feared that ISPs and internet search engines together posed a significant threat to the supposedly “locked-in” customers of Microsoft operating systems (MS-DOS and Windows), and so not only entered these services but bundled them with Windows to protect its market position in operating systems. For this strategy to work, consumers must not be locked in to the internet services that compete with Microsoft, for if they were locked in to, say, AOL and Netscape, Micorsoft’s bundling strategy would not work – consumers would simply undertake the relatively easy task of loading AOL and Netscape software onto their new computer (overriding the bundled Microsoft products).
Third, if one performs the thought experiment of inquiring what someone would be willing to pay to retain the same ISP services and avoid learning the ropes of a new ISP, the financial significance of consumer lock-in does not loom very large. How much would a normal person pay to be able to keep access to an e-mail address and other internet services, and to avoid learning new protocols for using an ISP and other competitive websites? Suppose a consumer would pay $1000 never to have to switch throughout one’s life. This amount seems like a lot, especially considering that advances in technology cause one to learn new computer skills and software protocols relatively frequently even if one never switches service providers. But even this number amounts to a relatively small monthly equivalent charge for internet services – the standard rule of thumb is that a long-term investment (with about a 25 year expected life) translates into a monthly cost of about one percent of the face value of the investment (including depreciation and a competitive return on the investment). Thus, if a customer is willing to pay “only” $1000 to avoid switching ISPs, this translates to a $10 a month anticompetitive cushion on the price of the first-in firm that “locks-in” these customers, or a cushion of equivalent value on the quality of service (including restricting access to the vast majority of competitive internet sites). Of course, if consumers place a value of switching from established internet services that is substantially less than $1000, the financial magnitude of the lock-in advantage is even smaller.

The importance of the software network effect is more difficult to grapple with. Its significance depends on the technical differences and the cost of adapting internet services to multiple high-speed access options.

III. THE BENEFITS AND COSTS OF ACCESS REGULATION
This section examines the benefits and costs of imposing an equal access requirement on suppliers of cable modem service, assuming that telephone companies will continue to have such a requirement while wireless and satellite carriers will not. Decision analysis provides guidance about how to put together all of the likely effects of alternative actions (including inaction or delayed action) in a way that they can be compared in terms of their likely benefits and costs.

In approaching the problem of identifying and comparing the benefits and costs, the following discussion assumes that a regulator will decide whether to act, now or later, purely on the basis of the consequences of their actions for customers of communications services. This assumption is probably inaccurate, and certainly controversial. To some degree, regulatory decisions are likely to be affected by interest-group influences, distributional concerns and political ideology, as described in Section I. In addition, opinions differ about when imposing regulation is politically most feasible. Some believe that action is easier to take before cable modem service becomes firmly established, while others believe that action will be easier after anticompetitive harm becomes a reality rather than a forecast.

The problem facing a regulator is a sequential decision problem. In each period, the regulator collects information and decides whether to impose equal access or to wait until the next period to decide again. One important characteristic of this sequence of decisions is that the benefits and the costs of action are uncertain, but uncertainly diminishes with time. The other important characteristic of the problem is that the decision in each period may have an irreversible consequence: customers and/or internet service suppliers may become locked in to a monopoly provider if equal access is not imposed.

The dimensions of uncertainty are as follows. Cable access companies may or may not
have significant market power in providing high-speed internet service. If they do have significant market power, they may or may not voluntarily unbundle access or be forced to do so as a result of antitrust litigation after their market power becomes apparent. If equal access is imposed, cable companies may or may not delay introducing high-speed access and may or may not use litigation to fight such an equal access requirement. If cable access suppliers enjoy market power and are allowed to tie access and internet services, the customers they acquire during the exclusivity period may or may not become “locked in” to the bundled internet services after competitive ISPs are permitted to seek customers over the cable network. Finally, if equal access is not imposed and cable suppliers enjoy and exploit market power, internet service providers may become locked in to the proprietary protocols of the cable service, and so be disinclined to take advantage of subsequent entry of other suppliers of high-speed access. For simplicity, the following analysis lumps together both lock-in effects as a lock-in cost to some consumers.

The potential benefits of imposing an equal access requirement now rather than later can be separated into four components. The probability that cable systems will enjoy market power in high-speed access and will engage in anticompetitive actions to exercise market power in internet services is denoted as \( p_0 \). The three components of benefits of acting now rather than waiting, given that cable modem service has no reasonable substitutes, are as follows.

(1) Some customers may derive more benefit from internet services if they use an ISP other than the ISP that is bundled with cable access and prefer cable access to available alternatives. Denote the probability that this effect occurs as \( p_1 \), the number of such customers as \( N_1 \), and the benefit per customer during the next period as \( B_1 \).
(2) Some customers who will subscribe to the bundled cable product in any case may benefit from an equal access requirement because under competition they receive better service and/or a lower price. This outcome is assumed to occur with probability \( p_2 \) for \( N_2 \) customers and in this period generates benefits per customer of \( B_2 \).

(3) Some customers in the \( N_1 \) group may subscribe to and become locked in to bundled cable service who otherwise would pick another alternative if action took place sooner. This possibility occurs with probability \( p_3 \), applies to \( N_3 < N_1 \) customers, and generates a stream of benefits from immediate action for each of these customers of \( B_3 \).

The costs of acting include monitoring and enforcing the agreement (\( C_1 \)), litigating the challenges to the agreement (\( C_2 \) that occurs with probability \( q_2 \)), and the cost to customers of delaying the service (with probability \( q_3 \) delay will occur, with the cost being the lost net benefits, \( B_4 \), of service to each of \( N_1 + N_2 \) customers who would subscribe to the bundled service even if it were a monopoly).

The following decision problems assumes that the uncertainties about the wisdom of acting will be resolved in one period. This assumption makes the conclusions more transparent; in a more realistic model the conclusions are qualitatively similar but the formula for deciding whether to act now is much more complicated. Thus, if a regulator acts now, the net benefit is:

\[
p_0(1-q_3)(p_1N_1B_1 + p_2N_2B_2 + p_3N_3B_3) - (1-dp_0)(C_1 + q_2C_2) - q_3N_4B_4,
\]

where \( d \) is the discount rate and reflects the lower present value of costs if action is delayed. This expression highlights the factors that determine whether one should act or wait.
The first term represents the expected benefits from avoiding the anticompetitive harm to customers who either would be able later to switch to a competitor or who would always prefer the bundled internet services. This term is important if the probability is substantially greater than zero that cable modem service has no effective substitutes, the benefits of competition in internet services are large, and cable companies are not very likely to delay offering service.

The second term is the expected process costs from acting now, rather than later only if regulation is necessary. If the probability that cable modem services have market power and act anticompetitively is high, this term is less important because the chance of avoiding the process costs is low.

The last term represents the lost benefits to consumers if cable companies delay service after equal access is imposed. This term is important if the chance of delay is substantially more than zero, and if even monopolized internet service is valuable.

Thus, to advocate acting now one has to hold three beliefs: cable is likely to have durable market power in high-speed access is high, cable is not likely to delay service if regulation is imposed, and significant anticompetitive harm, especially from lock-in, is large.

To illustrate these points, consider a purely fictional illustration. Suppose one believes the following:

* the chance is 50-50 that cable systems will have market power in high-speed access and will use this power to inhibit competition in internet services;

* cable systems will have 2 million high-speed access customers when the decision
is made and 5 million customers one year later if no action is taken;

* the chance is 20 percent that customers would prefer the cable system’s internet services regardless of whether equal access is provided, but that each customer who prefers the bundled service will experience a $500 annual benefit from competition if cable systems have market power without equal access;

* the probability is 50 percent that customers who do not prefer cable service will be locked in to bundled cable service if equal access is not imposed, and the cost of lock-in is $1,000;

* customers who prefer other services will benefit from competition by $750 if they switch;

* the chance that cable systems will delay expansion is 25 percent, keeping their existing 2 million customers but not adding the additional 3 million, and the net benefit of service to each customer is $2000 per year if they been given service;

* the process cost of imposing equal access requirements is $100 million, and the relevant rate of time preference is ten percent.

Under these assumptions, the expected net benefits of acting now are calculated as
follows. For existing customers, the gross benefits of equal access, conditional upon the presence of market power in cable access, an expected 400,000 would prefer cable and receive $500 each ($200 million), an expected 800,000 would prefer others but are locked in without equal access so can avoid the $1000 lock-in cost with equal access as well as the $750 benefit from switching ($1.4 billion), and an expected 800,000 can switch without cost and gain $750 from equal access ($600 million), for a total of $2.2 billion. Because this outcome will happen only when cable has market power, its expected value is $1.1 million. For new customers, assuming the presence of market power and the absence of delayed service, 600,000 would prefer the bundled service anyway ($300 million) and 2.4 million would prefer to switch ($1.8 billion), of whom 1.2 million would be locked in by bundled service ($1.2 billion), for a total of $3.3 billion. The likelihood of this eventuality is the chance of market power times the chance service will be offered, or .375, so the expected benefit of equal access is $1.237 billion. Thus, the total expected gross benefits are $2.348 billion.

The costs of imposing equal access are the denial of service (.25 x 3 million x 2000 = $1.5 billion) plus the expected increment to process costs (.5 x .9 x 100 million = $45 million), or $1.545 billion. Thus, the net benefits are $803 million. But lock-in alone accounts for $850 million, so that in this example if one thought lock-in was implausible, the net benefits of acting would be negative.

This calculation provides some insight about why different policy makers have not reached agreement on whether to act or to wait. None of the relevant numbers are known with reasonable precision. Different analysts, using their expertise and experience, have reached different conclusions about the probability that cable systems will have durable market power.
and the likelihood that the lock-in effect is significant. If one believes that both of these are low, “wait” is better than “act” because it has a good chance of saving the cost of action (action will prove to be unnecessary) and delay, and in any event the anticompetitive harm, if it becomes apparent, is likely to be reversible.

The principle implication for regulators is that deliberations should focus on the following issues: how likely is it that cable modem service will have no effective substitutes for a long while, giving cable systems substantial market power; how likely is it that cable systems, if they have market power, will practice exclusive bundling without being told to stop through antitrust actions by customers or internet services competitors; how many people are likely to want such service; how valuable is competition to the people who want high-speed access; how likely is it that subscribers to bundled service will be locked in if competition comes later; and how much will it cost to battle integrated cable and internet service companies over an equal access requirement.

CONCLUSIONS

The purpose of this essay is to describe the nature of the policy chaos that currently reigns in high-speed access policy, and to lay out framework for deciding whether to impose equal access on cable or, symmetrically, whether to relax these requirements for telephone companies. At this point, nearly all internet service is provided by low-speed access over telephone lines and acquires this service from the incumbent telephone company rather than a reseller. Moreover, the price of telephone lines is regulated, so that telephone companies are likely to have unexploited market power in access lines that could be leveraged into market power internet
services if telephone companies could insist that internet customers use an affiliated ISP. Thus, applying the framework provided in this paper, competition in telephone access is not sufficient as of yet to warrant removing the equal access requirements for telephone companies.

High-speed access is still not offered to most customers, and many of those who are offered such service can obtain only one form, DSL or cable access, but not both and not wireless or satellite service. Thus, the justification for delaying the imposition of equal access requirements on cable must lie in one of three areas.

First, high-speed access may be a service for which there is too little demand for it ever to be very profitable, in which case regulation can have no benefits, will impose costs, and may prevent the service from achieving the penetration that it might otherwise obtain. In this case, most internet service companies will not orient their service to high-speed access, and so a proprietary system is not a plausible threat.

Second, high-speed cable access may face stiff competition from other technologies in the near future, or may even compete now with low-speed access over telephone lines – that is, the low cost may offset the slow speed. If so, cable has no market power to exploit, and if consumers do not want bundled service, cable companies will be forced to unbundle or lose the competition for high-speed access customers.

Third, the future is uncertain with respect to whether high-speed access over cable will be a marginal service, one of several effective competitors, a durable monopoly, or something in between, but because lock-in effects are implausible or small, waiting to see how the industry develops will impose no significant costs and may provide the benefit of avoiding the costs of imposing regulation.
REFERENCES


1. Two major exceptions are the papers by Timothy Bresnahan (1999) on “vertical competition” and by Gerald R. Faulhaber and Christiaan Hogendom (2000) on the likely long-run market structure of high-speed internet access. Another partial exception is the work of Mark Lemly and Lawrence Lessig (2000), which is best characterized as an unusually comprehensive, independent adversarial document (no specific interest supported it or is happy with all of its analysis and conclusions). All three have significantly influenced the analysis in this essay.

2. The Merger Guidelines are not clear on the issue of whether potential competitors are in the market. At one point the current version states that potential competition is to be considered, but that potential competitors should not be included in the relevant market, but then two pages later the Guidelines state that the market contains all firms that customers believe to offer reasonable substitute. Most likely, if, say, cable modem access is available, DSL is available in an adjacent neighborhood but still under development in the customer’s locale, and customers otherwise
regard the two services as reasonable substitutes, then customers might postpone the acquisition of cable modem access if they thought that a few months later DSL would be available at a significantly lower price.

3. Deciding whether and when to deregulate local telephone service is the obverse parallel to the analysis here, and is left as an exercise for the interested student!