One of the great economic success stories of the late 20th century was the federal government’s deregulation of several important American industries. By the late 1960s, major sectors of the U.S. economy had become bogged down in decades’ worth of red tape; high barriers to entry stifled competition and, with it, efficiency and innovation. A few large firms enjoyed so much influence over the regulatory process that entry by new firms had become almost impossible.

In an effort to reverse this trend, between 1968 and 1984, policymakers broke up cartels and monopolies in a number of industries, perhaps most notably in interstate trucking and telecommunications. In the case of trucking, deregulation proved to be relatively straightforward: Congress formally liberalized regulations governing trucking in 1980, and in 1995, the agency that had been responsible for regulating the industry—the Interstate Commerce Commission—was abolished. Today, trucking is a highly competitive and highly efficient industry with minimal government encumbrance.

But while policymakers had roughly the same goal for telecommunications as they had for trucking—to create a competitive market minimally tied down by regulation—the very different circumstances of the telecommunications industry have made success there far more elusive. For the past half-century, federal regulators have repeatedly changed the rules governing telecommunications, generating a seemingly endless stream of lawsuits and polarized debate—and still they have not found the right approach to fostering lasting competition and efficiency. Each time the FCC has tried to draw a clear distinction between the competitive and monopolistic sectors of the market, its efforts have been thwarted by rapid technological changes and the determined

Timothy B. Lee covers technology policy for Ars Technica.
resistance of incumbents. The litigation and uncertainty created by the constantly changing legal environment have exacted a high toll, both in direct financial costs and in the implicit disincentives to risk-taking and market entry.

Why did trucking deregulation prove so much easier and more successful than telecommunications deregulation? One of the most important factors was that the underlying infrastructure of the trucking industry—that is, America’s system of roads—was owned by the government and therefore open to the public. As a result, creating a competitive industry required only the repeal of the formal legal barriers to entry. In the case of the telecommunications industry, however, the basic infrastructure—the system of cables that carry voice and data—was owned by a private monopoly, AT&T. This meant that, to create a competitive telecommunications market, regulators had to do more than repeal regulations that excluded new competitors. They also needed to ensure that the incumbent (AT&T) did not use its control of that infrastructure to perpetuate its monopoly in adjacent markets—such as telephone handsets, computer networking, and long-distance calling.

The emergence of the internet offered a new way forward. The internet’s protocols establish a fundamental, and important, division of labor: On one end are providers of access to the internet, mostly phone and cable companies like Verizon and Comcast. On the other are providers of content through the internet—the vast array of web sites from which people around the world derive entertainment, get their news, conduct online commerce, and so forth. Between them are yet more companies maintaining the basic infrastructure of the internet’s “backbone”—the massive networks of cables and switches necessary to route data around the globe.

This division of labor was established by technical standards and has been preserved by market forces, and as a result the internet has experienced very little active government oversight. This has also kept the barriers to entry low for providers of internet content and applications, thereby promoting rapid innovation. And as legacy communications services, such as telephony and video, are increasingly delivered through the competitive internet, the need for regulators to actively supervise those markets may naturally decline as well.

But while the internet’s division of labor has proved extremely durable so far, there is strong reason to believe that, in the coming years, a
serious threat will be posed to its continued effectiveness. A steady consolidation of the market in broadband access to the internet—which is increasingly dominated by a few massive national telephone and cable-television providers—threatens to undermine the internet’s decentralized structure, and to upend the economics of internet access and content provision. Should that disruption occur, the FCC would be forced to intervene to prevent broadband incumbents from undermining competition on the open internet. The government would be pulled into precisely the sort of complex and error-prone regulatory process that bogged down telecommunications in the 20th century.

The best way to avoid the need for more intrusive (and likely harmful) regulation in the future is to resist concentration in the broadband market today. If policymakers grasp the nature of the coming danger, they can take some simple steps to avert it, thereby keeping the internet competitive and preserving its role as an engine of innovation and prosperity.

To fully understand this threat, however, it is first necessary to examine the unique character of the telecommunications market—as well as the perennial costs and benefits of market regulation.

EXTRAORDINARY PRIVILEGES

A telecommunications network, by its very nature, presents regulators and champions of free markets with some unique difficulties.

Most consumer products, such as shoes or hamburgers, are produced in factories, restaurants, or other self-contained facilities. Production can occur anywhere, and the finished products do not necessarily have to be consumed where they are produced. The raw materials needed to create and operate a restaurant or a shoe factory—land, lumber, nails, beef, leather, and so forth—are all available for purchase in competitive markets. While these industries are of course subject to some operating regulations, entry is governed by the same rules of property and contract that govern free markets more generally. The result is that market forces, not regulators’ decrees, determine how many firms the sector can accommodate.

By contrast, the most important input to a metropolitan-scale fiber-optic telecommunications network is, in practical terms, available only from the government. Telecommunications cables typically run beneath or above government-owned streets, or along railroad
rights-of-way acquired with government help. Governments must decide who has access to these scarce and valuable resources. And when these rights-of-way are insufficient, telecommunications companies in many states can, with the blessing of government, invoke the power of eminent domain to acquire easements on privately owned land.

The installation of communications infrastructure also imposes costs on vastly more third parties than does the manufacture of shoes or hamburgers. Consider, for instance, the case of the installation of fiber-optic cables for Verizon’s FiOS network. In 2006, the Associated Press reported: “In Pat Wilcox’s yard, Verizon workers laying the groundwork for a revolution in communications quickly turned their efforts to a more pressing project: putting out a fire they sparked by crossing two electric wires. By the time firefighters arrived, the wind-whipped flames had engulfed overhead utility lines and melted a chain-link fence.”

While this roaring fire in Richmond, Virginia, was an unusually severe problem, the FiOS cable installation created headaches for residents all over Verizon’s U.S. service territory. In 2004, a series of water-line breaks in Hillsborough County, Florida, prompted city officials there to order a temporary stoppage to Verizon’s installation work. In Anne Arundel County, Maryland, Verizon was “hitting 10 or 11 lines per 10,000 feet” of cable laid, forcing the county to step up its oversight efforts.

And the problem is by no means unique to Verizon. Such nuisances—torn-up streets and lawns, obstructed traffic, accidental damage to cables and pipes, ugly utility boxes and telephone poles on other people’s property—are par for the course when building communications infrastructure. Government officials may therefore be justifiably reluctant to allow new telecommunications firms into the market. In San Francisco, for instance, a company called Sonic.net is seeking to build a high-speed fiber-optic network—a project that would make the firm one of the few non-incumbents anywhere in the U.S. to enter the residential broadband market in recent years. But Sonic.net’s ability to gain the necessary permits is in doubt because, as the technology site GigaOM.com reported last December, “cabinets holding the electronics raise the ire of residents” who, understandably enough, “would rather not have refrigerator-sized boxes on their lawns.”

In short, government officials inevitably become involved in the minutiae of physical communications infrastructure to an extent that is simply not necessary in the cases of restaurants and shoe factories. These
officials make decisions about who will have permission to dig up public roads, who can obtain easements through eminent domain, how much firms must pay for the privilege, who must receive compensation, what measures firms must take to minimize inconveniences to others, and what kind of supervision the government will provide to ensure that the rules are followed. The installation of the new cables also creates ongoing management and monitoring costs for governments: They must keep track of the locations of existing cables to prevent other utility companies from accidentally cutting them, adjudicate disputes over the trimming of foliage, and work around facilities that are permanently installed on government-owned property. As a Maryland public-works official complained to the AP about the FiOS installation: “It’s a huge burden. In addition to my normal work, I’ve had to become a project manager for Verizon’s fiber-optic expansion.”

In this respect, telecommunications infrastructure is much like transportation infrastructure — roads, railroads, and airports. It would be prohibitively expensive, and in some cases impossible, to build any of these works without government assistance. As a practical matter, governments thus exercise direct control over how, and by whom, these services are provided.

Governments have two basic options when they want to sponsor the creation of transportation or communications infrastructure. One option, commonly employed for roads and airports, is direct government construction and operation of the infrastructure in question. The other option — traditionally followed in the telephone, cable-television, and railroad industries — is for the state to choose a private firm to build and operate the necessary facilities. The chosen firm is given preferential access to government land; it is also accorded special legal privileges — such as the power of eminent domain — that enable it to build the desired infrastructure in a cost-effective fashion.

There are advantages and disadvantages to each model. Private ownership leverages the technical and managerial expertise of commercial firms and avoids devoting taxpayer dollars to risky projects. Private companies also tend to be less constrained by red tape, meaning they can often complete the job more quickly and at lower cost.

But private ownership can also have serious drawbacks. Transportation and communications services are essential inputs to a wide variety of industries. When the government helps a firm enter a transportation
or communications market, it gives that firm a lasting advantage over potential competitors. If given free rein, a shrewd firm can leverage its government-supported dominance of a communications or transportation market to undermine competition and extract rents in adjacent markets that would otherwise be competitive. In the long run, this kind of rent-seeking behavior may prove dramatically more costly to consumers than would direct taxpayer support for the infrastructure.

A concrete example can help to illustrate this point. Imagine that Congress privatized the interstate highway system by selling shares in a private company—Interstate, Inc.—that owned the nation’s freeways. A naïve observer might regard this as a step toward reducing government interference with the free market. The reality, however, would be far more complicated. Interstate, Inc. would quickly realize that vertical integration had the potential to dramatically increase its profits. It could, for instance, acquire a shipping subsidiary such as UPS and then jack up highway tolls for other shipping companies. Forced to raise prices or use much slower side streets, independent shipping firms would be put at a serious, and likely fatal, disadvantage. And with other firms out of business, Interstate, Inc.’s shipping subsidiary could restrict output and raise prices, establishing a lucrative shipping cartel.

Interstate, Inc. wouldn’t have to stop there. Just as it used its dominance in the freeway market to take over the shipping business, it could use its dominance in shipping to muscle out businesses that depend on moving goods around the country. For example, it might acquire an e-commerce subsidiary that could then offer its customers much lower shipping rates than other e-commerce sites. It would wind up being the dominant e-commerce firm not because it offered better products or customer service, but because it controlled one of its competitors’ essential inputs. In this and myriad other ways, a freeway monopolist could become extremely wealthy extracting rents and undermining competition in a host of industries that rely on access to the freeways. Significant harm would be done not only to those industries but also to consumers, who would be penalized with higher prices and fewer choices.

None of this is to say that freeways shouldn’t be privatized. The point, rather, is to highlight the often overlooked dangers inherent in privatization of government-sponsored infrastructure. If government does allow for the privatization of crucial infrastructure, it must then prevent this kind of rent-seeking by the assets’ new owners. This, in turn, requires
recognizing the risk of rent-seeking early and intervening while there is still time. Once monopolistic firms are allowed to vertically integrate into competitive industries (as when Interstate, Inc. enters the shipping and e-commerce markets), it becomes very difficult for policymakers to prevent such anti-competitive conduct down the road.

**Promoting Competition in Telecom**

Interstate, Inc. may seem like a far-fetched hypothetical; it is hard to imagine such an entity in the transportation sector. In the telecommunications industry, however, it represents precisely the problem that regulators have had to contend with for decades.

The AT&T of the early 1960s bore a striking resemblance to our fictional freeway monopolist: The physical infrastructure Ma Bell used to provide local phone service could almost certainly not have been built without government assistance. And AT&T used its local phone monopoly to dominate related markets—such as long-distance calling and telephone handsets—that might otherwise have been robustly competitive. This vertically integrated structure made it unusually challenging to foster competition in telecommunications markets. For example, AT&T provided every subscriber to its phone service with a telephone from its Western Electric subsidiary. Connecting devices not furnished by the phone company to the network was not just a violation of phone-company policy: It was actually illegal under FCC rules.

In the mid-1960s, though, an entrepreneur named Thomas Carter challenged this rule in court, seeking permission to sell an early cordless telephone. In 1968, the FCC reversed its previous ban on third-party technology and began requiring AT&T to allow devices such as the Carterfone on its network. In time, this move not only created a thriving market in third-party telephones: It also allowed customers to attach a range of exotic new devices—including answering machines and eventually fax machines and modems—without the phone company’s approval.

Meanwhile, a start-up company named MCI had petitioned the FCC for permission to begin offering long-distance telephone service using the new technology of microwave radio towers. Long-distance calling was another market in which AT&T had traditionally enjoyed a legal monopoly, but in 1969, the FCC approved MCI’s application to enter the market.
A third important policy change came in 1970, when the FCC issued the first of its Computer Inquiry rulings. Some people (especially at academic institutions) were beginning to use lines leased from AT&T to dial into remote computing facilities, and the FCC had to decide whether these computing services would be subject to regulation. The commission ultimately ruled that the computer industry had plenty of competition and would therefore remain exempt from the rules the agency normally applied to the telephone network. But the FCC worried that AT&T would enjoy an unfair advantage if it entered the market for computing services itself. So in its Computer I ruling, the commission decided that if AT&T wanted to offer computing services, it had to do so using a separate subsidiary.

Each of these policies could be viewed as FCC interference with the free market, since each restricted AT&T’s freedom to enter new markets or to control access to its network. But it makes more sense to regard the Carterfone, MCI, and Computer I decisions as efforts to minimize the distorting effects of the legal privileges the government had previously granted to AT&T.

For its part, AT&T had a strong incentive to evade the new regulatory strictures imposed by the FCC, and the commission struggled to keep up with a rapidly changing market. The FCC was forced to repeatedly revisit its Computer I decision as technological changes made the distinctions drawn in that first ruling increasingly obsolete. In the 1980s, these reviews resulted in the Computer II and Computer III decisions that sought to tweak the rules to keep up. In a 2007 article for Regulation magazine, Stanford’s Bruce Owen argued that AT&T enjoyed several important advantages over the FCC in this struggle, including “control of the information… required by regulators to monitor and control the company’s behavior, AT&T’s control of the definitions of its services and the default pricing of those services, and the inherent constraints of administrative law on agency behavior.”

The FCC’s case-by-case regulatory strategy during this period also created dangerous uncertainty for AT&T’s would-be competitors. Firms in the long-distance, device, and computer-networking markets were largely dependent on FCC protection for their existence. They knew that if a future FCC reversed the commission’s pro-competitive policies, AT&T could put its competitors out of business by denying them access to its network. In short, Ma Bell’s vertically integrated
structure gave it both the ability and the incentive to engage in anti-competitive conduct, while at the same time making it difficult for the FCC to detect and prevent such conduct.

So in 1974, the Ford administration’s Justice Department filed an anti-trust lawsuit against AT&T. According to Owen, FCC staff officials testified during the anti-trust trial that, despite strenuous efforts, they had failed to “prevent AT&T from finding ways to keep competitors out of potentially competitive markets into which it had integrated vertically.” Once Interstate, Inc. is allowed to acquire a shipping subsidiary, it’s hard to prevent it from giving the subsidiary an unfair advantage over other shipping firms.

In 1984, after a decade of litigation, AT&T was forced to spin off its local telephone business into seven new companies that were dubbed the “Baby Bells” (Ameritech, Bell Atlantic, BellSouth, NYNEX, Pacific Telesis, Southwestern Bell, and US West). Breaking up AT&T didn’t entirely eliminate the need for regulatory oversight: The Baby Bells still enjoyed local phone monopolies in their respective territories, and they still had every incentive to find new ways to extend their monopolies into adjacent markets. But divestiture did make regulators’ jobs less difficult: After all, it is easier to prevent a monopolistic firm from entering competitive markets than it is to force a monopolist to behave itself in a competitive market it has already entered. And it is much harder for seven small monopolists to collude against firms in the competitive parts of the market than it is for one large firm to crowd out its rivals.

This evolution of telecommunications regulation had a great deal to do with the extraordinary rise of the internet in the years that followed. The success of the internet is often attributed to a lack of government regulation, and this description is correct as far as it goes. But it leaves out an important detail: While the internet itself was unregulated, it benefited from regulations that discouraged anti-competitive behavior by AT&T and its progeny. For example, by requiring AT&T to allow third-party devices on its telephone network, the Carterfone decision created the market for modems, through which most households gained access to the internet during the 1990s. And had the old vertically integrated AT&T existed in the 1990s, it would likely have regarded the internet as a major competitive threat and made a greater effort to hamper the network’s growth.

Thanks to the divestiture of Ma Bell, however, the parts of the old AT&T with the most to fear from the internet — its long-distance and
computing divisions—were lodged in a company completely distinct from the firms that controlled the local telephone lines that people were using to reach their internet service providers. The result was that no incumbent had both the motive and the opportunity to harm the internet—meaning that the FCC could afford to take a relatively hands-off approach to a vital and rapidly growing market.

A NEW APPROACH TO REGULATION

The period from the late 1960s until the breakup of AT&T was dominated by the struggle to keep the telecommunications market competitive by restraining a vertically integrated monopolist. Policymakers took it for granted that some parts of the telecommunications market (such as local telephone service) would be monopolistic, and focused on shielding the competitive segments of the market from anti-competitive behavior. With the Telecommunications Act of 1996, they abandoned this strategy in favor of a new approach—one influenced heavily by the emergence of cable-television companies, which were creating their own infrastructure and building a telecommunications system separate from the nation’s phone network.

The new approach had two prongs. First, policymakers relaxed restrictions on vertical integration to encourage the various phone and cable incumbents to enter each other’s markets and thereby to make both sets of markets more competitive. Second, policymakers tried to promote the entry of new firms into telecommunications markets with an “unbundling” regime under which incumbents would be forced to lease parts of their networks to competitors at regulated rates.

The first prong of this strategy was somewhat successful. Cable companies began offering phone service, phone incumbents entered the video business, and Verizon and AT&T now compete with each other in the wireless market. Consumers have benefited from this increase in competition.

But the second prong proved a complete failure. Consider, for instance, the case of broadband internet. The Baby Bells were required to unbundle the “local loop”—the copper cable that physically connects a subscriber’s home to the incumbent’s telephone network—and lease it to third parties at regulated rates. Congress hoped this would allow many new firms to offer high-speed internet access without building expensive and redundant infrastructure; in the 1990s, several firms did
just that. But the law also allowed the Baby Bells themselves to offer residential internet access, which created a conflict of interest. Just as it had in the 1970s, the effort to regulate the conduct of incumbents sparked a decade of acrimony and litigation. Independent ISPs accused the incumbent phone companies of sabotaging them with foot-dragging and frivolous litigation. The incumbents countered that they were being forced to lease their networks at prices below their costs. The Baby Bells eventually won the battle and drove most of the independent ISPs out of the residential market.

The result has been a telecommunications duopoly. Most households today have two options for wired voice, video, and data services: their local telephone incumbent and their local cable incumbent. To be sure, wireless options provide additional alternatives in some areas, satellites provide many households with a third option for premium television service, and there are several companies providing mobile-phone service. The result is that, in most respects, telecommunications markets are more competitive than they have ever been. Nevertheless, today’s telecommunications market falls far short of the vision of Clinton-era policymakers, who hoped that consumers would be able to choose from dozens of telecommunications options, not just between one phone option and one cable option (with a few more exotic choices at the margins).

But while efforts to separate ownership of the local loop from the retail broadband market have failed, there has been a clear separation between the provision of internet connectivity and the provision of online content and applications. This division of labor was not established by government regulators but is nonetheless a basic principle of the internet’s very architecture. And it has been essential to keeping the internet intensely competitive, innovative, and productive.

There are three types of network providers on the internet. The first type includes broadband providers that supply ordinary homes and businesses with network connectivity. The second includes data centers that contain the racks of servers used to provide online applications and content (hosting data for Google, Facebook, Twitter, and the countless other producers of internet applications and information). And in the middle are the companies that operate the so-called internet backbone, which moves data between the two end points. Backbone providers play the same role on the internet that long-distance providers play in the
traditional phone network, keeping information flowing and charging for their ownership and management of the infrastructure.

But unlike on the traditional phone network, end users on the internet do not pay separately for these “long distance” services. Instead, payments flow from the edges of the network to the middle. A household pays an ISP for a broadband connection, and that ISP in turn pays an “upstream” service provider for a connection to the internet’s backbone. On the other side of the network, a web site is hosted by a server in a data center, and the firm running the data center buys connectivity from a different “upstream” provider connected to the internet backbone. The backbone itself is a highly competitive industry, with dozens of firms competing to provide “long distance” network services.

The fact that broadband ISPs and data centers both pay backbone providers for connectivity helps to maintain a healthy distance between them. For example, Twitter (a popular online service) is neither a customer nor a supplier of Mediacom (a cable company with 850,000 broadband customers). Twitter pays the cost of getting its content to the internet backbone, and Mediacom covers the cost of getting it from the backbone to its own customers. If Mediacom’s costs go up because of an increase in Twitter traffic, it has no way of passing those costs on to Twitter; it must charge its own customers enough to cover its expenses. Theoretically, Mediacom could try to blackmail sites like Twitter by threatening to cut off access to its users, but this threat would not be very credible. Mediacom is a small fish in a very big pond, and a site like Twitter would rather risk losing access to a few thousand users for a few days than set a precedent that would have it paying money to every ISP on the planet.

The fact that the backbone stands as a kind of buffer between the creators of content and the providers of consumer access means that access providers do not have the ability to push content providers around, protecting the freedom and competitiveness of the market. This division of labor also keeps barriers to entry in the market for online applications and content extremely low: Anyone can create a new web site without the assistance or approval of the large firms that manage the internet’s physical infrastructure. And the fact that anyone can enter the market is one reason technological progress online has been so rapid.

There is nothing inevitable, however, about the fact that payments flow from broadband companies to backbone companies instead of the other way around. The direction of payments results from unregulated
negotiations among the companies involved; they are a function of relationships developed in an open market. Traditionally, broadband ISPs have been small compared to backbone providers, so the former paid the latter for connectivity. But a firm that controlled a sufficiently large share of the internet’s end points—the points at which users access the network—would be able to make itself a gatekeeper to the market for online applications and content. And as the broadband market has been consolidating in recent years, this has become more than a theoretical possibility.

The rise of online video has given large providers of internet access even greater incentive to pursue a more active gatekeeper role. Growing numbers of consumers are “cutting the cord,” using online video services such as Netflix as substitutes for traditional cable-television subscriptions. And since some of the largest incumbent providers of internet access are cable-television companies, this trend poses a serious competitive threat to their core business. It is logical that these firms would want to neutralize, or at least reduce, this threat by restricting the flow of rival internet content through their networks. Up to now, the internet’s decentralized architecture has made such anti-competitive behavior difficult; with the continued consolidation of broadband, however, this obstacle could be swept away.

Imagine, for instance, that a single broadband provider—call it Broadband, Inc.—had gained enough leverage to reverse the flow of payments, forcing backbone companies to pay Broadband, Inc. to deliver traffic to the ISP’s users. This would dramatically alter the internet’s structure, effectively transforming the internet’s largest backbone providers into mere re-sellers of access to Broadband, Inc.’s network. Broadband, Inc. would then have both the ability and incentive to vertically integrate into the backbone market and gradually displace independent backbone firms.

That, in turn, would transform web-content companies such as Yahoo!, Twitter, and Hulu into customers of Broadband, Inc.; essentially, these companies would have to purchase access to potential users of their services. And Broadband, Inc. would have enormous power over these content producers. For example, if Broadband, Inc. believed the video site Hulu was a threat to its own pay-television business, it could charge Hulu more for bandwidth: It would charge backbone providers more for delivering Hulu traffic to Broadband, Inc. users, and those backbone providers would pass the added cost on to Hulu. Broadband, Inc. could then
also give discounts to online video services with which it had commercial
ties, further advantaging them and strengthening the company’s own po-

tion. The economics of the internet would never be the same, and the

competitiveness so critical to its great success would suffer most of all.

**The Trouble with Comcast**

Broadband, Inc. is not wholly hypothetical: The past 15 years have been a
period of rapid consolidation among incumbent phone and cable com-
panies. Between 1996 and 2006, six of the seven original “Baby Bells”
merged to produce two telecommunications giants, AT&T (which got
the name after acquiring its former parent company) and Verizon. Rapid
consolidation also occurred in the cable-television industry during the
same period, with several small cable firms merging to form two giants:
Comcast and Time Warner.

Comcast is now the nation’s leading internet service provider, with
more than 20% of all residential broadband subscriptions. And its domi-
nance is likely to grow in the coming years. In 2011, Comcast completed
an upgrade of its network that will allow it to offer 100 Mbps broadband
service, which is an order of magnitude faster than the typical DSL
connection provided by phone companies today. For technical reasons,
Comcast can squeeze much more bandwidth out of the coaxial cables
that make up its existing cable network than can be squeezed from the
twisted-pair cables of traditional telephone networks.

FiOS is Verizon’s attempt to solve this problem by replacing its slow
television cables with fiber-optic connections capable of offering speed
that can compete with Comcast’s. But in 2010, Verizon announced that
it was winding down its FiOS installation efforts. Verizon plans for the
network to reach around 18 million households, but not in some ma-
jor metropolitan areas, including a few (like Boston) at the heart of its
service area. News reports cited the high costs of the project as a rea-
son why it was not being extended to all homes in Verizon’s territory.
Meanwhile, AT&T’s project to partially replace its copper network with
fiber, “U-Verse,” is also being hampered by high costs. U-Verse service
is faster than a traditional DSL line, but it is significantly slower than
Verizon’s and Comcast’s high-speed networks, and it will not reach all
households in AT&T’s service territory. This might explain why, in the
third quarter of 2011, Comcast added more than twice as many subscrib-
ers as did the seven largest telephone incumbents combined.
Comcast’s large share of the broadband market, along with the fact that most of its customers have few if any comparable alternatives, gives Comcast significant leverage in negotiating with backbone ISPs. Comcast has traditionally been a customer of Level 3, one of the largest internet backbone providers. When a Comcast user exchanged data with a network that was not directly connected to Comcast’s own network, Comcast paid Level 3 to carry that traffic.

But in November 2010, the two firms became locked in a bitter dispute. Level 3 had just won a contract to deliver content for Netflix, one of the internet’s largest video services. Anticipating that Netflix would generate more traffic than the existing links between the Comcast and Level 3 networks could accommodate, Level 3 proposed installing additional links between the networks. Ordinarily, Comcast, as a Level 3 customer, would gladly accept what was essentially a free upgrade. Instead, Comcast refused to accept the new connections unless Level 3 agreed to pay Comcast for the additional traffic. And Level 3, after voicing strong objections, paid up.

Was this the first step toward a regime in which Comcast requires backbone providers to pay it for access, instead of having payment flow in the other direction? It may well have been, although the details of this incident were a little more complicated. Before it signed its contract with Level 3, Netflix had used a service called a content-delivery network to deliver video content to Comcast broadband users. CDNs are networks run by third parties, such as Akamai, which place servers within the networks of large ISPs like Comcast, enabling faster downloads while reducing Comcast’s bandwidth costs. Level 3, by contrast, planned to host Netflix content on servers outside of Comcast’s network, access to which would likely have consumed significantly more resources on Comcast’s network. Comcast argued that Level 3 was abusing its relationship with Comcast to gain an unfair advantage in the CDN market, and in a way that would cost Comcast money.

Yet one reason why Level 3 was able to underbid Netflix’s previous CDN providers was that Comcast charges CDNs to host their servers. Remember, CDNs typically save broadband ISPs money by reducing the amount of expensive long-distance traffic they must pay for. Comcast could — and a smaller ISP probably would — allow CDNs to install their servers inside its network for free, which would reduce Level 3’s cost advantage in the CDN market. The fact that Comcast
feels comfortable charging CDNs for the privilege of installing servers that reduce Comcast’s own bandwidth expenses is itself evidence of Comcast’s growing market power.

Comcast’s dispute with Level 3 suggests that, if the company does not yet have the ability to charge backbone networks to deliver traffic to its customers, it is getting close. Comcast’s leverage over backbone providers has grown with its share of the broadband market, and, as we have seen, that market share is likely to continue growing over the next decade. It seems increasingly clear that the economic model of the internet is changing in ways that will soon present regulators with very troubling challenges.

**Preventive Medicine**

Regulating telecommunications networks is difficult because it is hard to draw clear lines between the monopolistic parts of the industry and the competitive ones. On a highway, this line is defined by the point at which the rubber meets the road: Competitive industries drive above this point, while the monopolistic road system lies below it. Because building roads and operating vehicles are such different activities, it is not difficult to keep them separated.

Regulators have repeatedly tried to draw similar lines in the telecommunications industry, but to no avail. In the 1970s, the FCC tried to divide computing and communications. In the 1990s, it tried to separate the “local loop” from retail internet access. Such distinctions have quickly been rendered obsolete by technological progress and incumbent resistance. And the failure to define clear lines has produced costly litigation and uncertainty.

The one line that *has* stood the test of time was not drawn by federal regulators at all. As we have seen, the buffer between ISPs and content providers is defined by the internet’s protocols and enforced by the internet’s decentralized architecture. And the durability of this line has given regulators the luxury of taking a hands-off approach to the internet: The FCC hasn’t needed to closely scrutinize the actions of broadband incumbents, because incumbents have no real leverage over content-providing firms like Google, Facebook, and Netflix.

If a broadband provider gained enough market power to undermine the internet’s decentralized architecture, however, the FCC would no longer have this luxury. The commission would likely be sucked into adjudicating
an endless series of interconnection disputes, just as it has for decades in the traditional telephone industry. And just as in the telephone industry, this would be a process rife with rent-seeking, waste, and expensive litigation. But if the FCC chose not to get involved in such interconnection disputes, independent backbone providers would likely be driven out of business. The result would be a new, vertically integrated internet that would smother competition and innovation in Silicon Valley.

In other words, broadband consolidation presents a case where an ounce of regulatory prevention today would be worth more than a pound of regulatory cure in the future. By preventing broadband incumbents from becoming too concentrated, regulators can preserve the internet’s backbone as a buffer between the duopolistic broadband market and the competitive internet economy.

How can policymakers protect this division? The basic strategy should be to prevent any single firm from gaining too large a share of the national broadband market. There has never been a network like the internet before, so it is impossible to know exactly how much concentration is “too much.” But the dispute between Level 3 and Comcast suggests that Comcast is large enough that regulators should be nervous. And given the high stakes, it is better to be safe than sorry.

The first and least intrusive step regulators can take is to require greater transparency. The terms of interconnection on the internet are closely guarded secrets, a fact that makes it difficult for regulators and the general public to understand how the market is evolving. Requiring that agreements involving large broadband incumbents be publicly available would allow for a much better informed public debate.

Second, regulators should prevent mergers that would increase the market share of the largest broadband providers. There have been many mergers among phone and cable incumbents since 1996; had regulators blocked some of them, it is unlikely that any firm would have a large enough share of the broadband market to raise concerns today. Rather than reviewing mergers on a case-by-case basis—a process that invites arbitrariness and corruption—Congress should establish a formal rule governing mergers involving phone and cable incumbents. For example, it might prohibit mergers that would produce a firm with more than a specific share—perhaps 10% or 15%—of the high-speed internet market. Regulators should also be more skeptical of mergers—like Comcast’s acquisition of NBC/Universal last year—that combine broadband
providers with firms that produce applications and content. Such mergers increase the incentive and opportunity for broadband incumbents to engage in anti-competitive conduct.

A final step, and the most intrusive and problematic, would be to follow the example policymakers set a generation ago and seek divestiture of the largest broadband incumbents. As we have seen, the 1984 AT&T break-up was essential to effective regulatory oversight of the telecom behemoth. Today, there are four firms claiming more than 10% of the broadband market each: Comcast, AT&T, Time Warner, and Verizon. As the largest of these, Comcast merits the most attention. The company holds more than 20% of the broadband market, and many of its customers have no alternatives that offer more than a fraction of Comcast’s speed. Breaking the firm up into two or more pieces would greatly reduce the risk it poses to the open internet.

To be sure, breaking up Comcast would have significant downsides. The legal process would be long and acrimonious, and litigation would distract Comcast’s leadership from improving their company’s products and services. And to the extent that Comcast owes its growing market share to its aggressive investment in network upgrades, it would be unfair to use that smart investment as a basis for seeking the cable giant’s break-up.

Divestiture should therefore be considered only as a last resort. The other two reforms—requiring transparency and blocking further consolidation—may be sufficient to preserve the internet’s decentralized architecture, and policymakers should try these approaches first. Implementing them in the near future might well make further and more overbearing regulatory steps unnecessary. If policymakers and regulators wait too much longer, however, they may well find that they have to engage in more substantial regulatory interventions—and thus to choose among only unpleasant options for preserving internet competition.

**Saving the Internet**

It would be wonderful if the structure of the telecommunications industry, like the structures of the shoe and restaurant industries, were governed by ordinary market forces. Over time, this may happen: Future improvements in wireless technology, in particular, might make wireless internet access a real alternative to broadband access, and might lower the barriers to entry in the wireless market enough to render the
regulatory precautions proposed here unnecessary. And telecom regulators should certainly try to ensure that any efforts to keep broadband competitive do not create barriers to entry for new firms in the wireless market, or in telecommunications more generally.

In the meantime, however, entry into the broadband market is controlled by governments, and governments have a responsibility to prevent rent-seeking by firms granted privileged access to the market. The simplest and least intrusive way to do this is by preserving the internet’s division of labor between network providers and content providers. And the key to preserving that division is taking a few carefully considered steps now to prevent broadband consolidation — a trend that threatens the internet’s decentralized architecture, and so threatens the engine of innovation and productivity that has done so much to advance American prosperity.