



Broadband Policy: Does the U.S. Have It Right After All?

by Jeffrey A. Eisenach, Ph.D.*

I. Introduction

The American approach to broadband policy has been much maligned, both at home and abroad.¹ Critics base their case on the United States' low rankings in the Organization for Economic Cooperation and Development (OECD) statistics on broadband penetration, on the relative paucity of resale-based competition, and on comparisons to countries like Japan and South Korea, which moved more quickly than the U.S. to deploy fiber infrastructures. Broadband in the U.S., they argue, is less advanced, less competitive, and less widely utilized than in other advanced countries, a clear indication that its relatively deregulatory policy approach has failed.

The case against American broadband policy is widely accepted. In some circles, it may even represent a consensus. But there is a problem: The brief against U.S. broadband policy is, at its core, fundamentally incorrect. Since 2003, when the U.S. Federal Communications Commission (FCC) began jettisoning mandated unbundling and chose instead to rely on infrastructure competition, the results have been extraordinary. U.S. broadband providers are investing tens of billions annually to build out what is rapidly becoming – and in many respects already is – the most capable and competitive broadband infrastructure in the world.

In this paper, I compare U.S. and (briefly) Canadian broadband policies and outcomes with the policies and outcomes in other advanced nations. The results show that the relatively deregulatory American approach to broadband policy has produced highly desirable results, including high levels of investment and innovation, nearly

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¹ Unless otherwise noted, I use the words "broadband policy" to refer to economic regulation of broadband services, i.e., to regulations requiring mandatory unbundling and resale of broadband services by incumbents to competitors. I so doing, I do not intend to diminish the significance of other aspects of broadband policy, such "network neutrality" regulation and subsidies for deployment in hard-to-serve areas. For a review of such policies, see Atkinson *et al*, May 2008.

ubiquitous broadband availability, high and increasing levels of penetration, falling prices, and high levels of consumer satisfaction. Indeed, the U.S. model is producing better overall results than in countries which continue to pursue mandatory unbundling and other highly regulatory approaches. Moreover, the advantages of the American model are likely to grow more pronounced over time. To avoid being left behind, other nations should abandon policies based on mandatory resale of incumbent networks and adopt the American approach.

The remainder of the paper is organized as follows. Section II briefly summarizes the recent history of U.S. and Canadian broadband policies. Section III summarizes the critics' case for why those policies should be regarded as a failure. Section IV analyzes the performance of American broadband markets in comparison with other advanced nations. Section V addresses whether the American model can work in other nations and whether other nations would benefit from adopting the American approach. Section VI contains a brief summary.

II. Broadband Policy the American Way

The debate over broadband policy is at once dizzyingly complex and utterly simple. At its simplest, it boils down to this question: Will consumers best be served by forcing incumbent owners of communications networks to resell access to their networks to competitors ("unbundle") at mandated prices; or, alternatively, should competitors be required to build their own networks, thereby encouraging investment in competing infrastructures? At least part of the answer lies in incentives: If forced to resell their networks to competitors, incumbents will be less inclined to invest; and, competitors, given risk-free access to the networks of incumbents, will have weaker incentives to build new networks as well. On the other hand, if entry barriers are so high, or economies of scale so significant, that competitors *cannot* viably build their own networks, infrastructure competition will never develop, so resale competition is the only viable option. One widely adopted thesis is that regulators can give competitors a boost up the so-called "ladder of investment" by mandating access to incumbents' networks until they reach critical mass, and then gradually weaning them off the regulatory teat. (Cave, 2006; Eisenach and Singer, 2007).

In the U.S., regulators have by and large answered these questions in favor of infrastructure competition. Cable modem service was never subjected to mandatory unbundling, and the broadband services provided by telephone companies using DSL and fiber were effectively exempted in 2003-2005. Canada has followed a somewhat different path, but ultimately reached a very similar result.

A. Broadband Policy in the United States

U.S. communications policy is governed by the Telecommunications Act of 1996 ("Telecom Act," or "Act"). At the time the Act was passed, however, the Internet had only just taken off (the first graphical user interface, the Netscape browser, was released in early 1994), and as a result the legislation was almost entirely silent on the

topic.² As a result, broadband policy was left largely to the Federal Communications Commission (FCC) and the courts.

The FCC's initial implementation of the Telecom Act focused on mandating forced sharing of the traditional telecommunications network, including digital subscriber line (DSL) services as well as voice services. However, the Commission's approach was quickly found wanting by the courts, which ruled in several important cases that the Commission had gone beyond its statutory authority, most notably in failing to limit mandated unbundling only to those facilities which were "necessary" for competition and without which competition would be "impaired." As a result, the Commission was forced to reconsider its initial course, and, beginning in 2003, ultimately scaled back unbundling significantly for all traditional telephone services. Most importantly for our purposes, the Commission determined in 2003 that fiber-based services would not be subject to unbundling, and that telephone companies would no longer be required to provide line-splitting (i.e., allowing competitors to lease only the frequencies used for broadband services) (FCC, 2003); and, in 2005, it ruled that DSL facilities would no longer be subject to unbundling (FCC, 2005). Thus, by late 2005, broadband services provided by traditional telephone services, regardless of the technology used, were for all practical purposes exempt from mandatory unbundling requirements.

It is worth noting that the FCC's decisions were not based on the *existence* of competition, but rather on the Commission's *expectation* that competition would develop:

We find that an emerging market, like the one for broadband Internet access, is more appropriately analyzed in view of larger trends in the marketplace, rather than exclusively through the snapshot data that may quickly and predictably be rendered obsolete as this market continues to evolve....While we recognize that broadband Internet access service is *not ubiquitously available* today, this market is rapidly changing and growing. (FCC 2005, *emphasis added*)

For cable companies, policy developed along a somewhat different path. While the unbundling provisions of the 1996 Act did not apply explicitly to cable, a case could be (and was) made that the Commission nevertheless had the *authority* to mandate unbundling of cable modem services. Indeed, during the late 1990s, America Online, then the world's largest ISP, engaged in a major lobbying campaign designed to force cable companies to provide "open access" to their lines. The issue came to a head in 1999, when AT&T purchased the largest U.S. cable company at that time, TCI, a transaction which required FCC approval. The ISPs, joined by so called "public interest" groups, urged the FCC to impose mandated unbundling or bitstream access as a condition of the merger. The FCC, under the leadership of then Chairman William

² The two exceptions were Title V, the Communications Decency Act, the main portions of which were subsequently overturned by the Supreme Court, and Sec. 706, which permitted the Federal Communications Commission to forebear from regulating advanced services, but has not played a significant role in the Commission's decisions.

Kennard, refused to do so, arguing that the broadband marketplace was “still in its infancy” and that regulation would thus be premature. (TechLawJournal, 1999) Furthermore, Kennard explained in a 1999 speech, any effort to impose such requirements on cable firms would be fraught with difficulties.

It is easy to say that government should write a regulation, to say that as a broad statement of principle that a cable operator shall not discriminate against unaffiliated Internet service providers on the cable platform. It is quite another thing to write that rule, to make it real and then to enforce it.... So, if we have the hope of facilitating a market-based solution here, we should do it, because the alternative is to go to the telephone world, a world that we are trying to deregulate and just pick up this whole morass of regulation and dump it wholesale on the cable pipe.... when I look at the cost of regulation versus the benefits, when I look at the prospect that we can have a robust, competitive broadband marketplace, I conclude that we have to resist the urge to regulate and let it play out for just a while longer. (Kennard 1999)

While the issue of cable unbundling was not formally and finally resolved until 2002 (FCC 2002), as a practical matter, the idea died with Kennard’s 1999 speech.

The third primary leg of the broadband stool, wireless, has taken an even more convoluted course, and it well beyond the scope of this article to recount the entire history. Briefly, however, the U.S. has pursued a relatively market-oriented approach in the wireless arena as well, most notably by refusing to impose a single technology standard for digital mobile wireless services, by auctioning permissive spectrum licenses that allowed carriers to deploy the services of their choice, and by allowing carriers to lease and trade spectrum licenses among themselves (Hazlett 2001).

In sum, U.S. broadband policy followed a long and winding path to today’s relatively market-oriented posture. While it was apparent from at least 1999 on that cable modem service would not be subjected to mandated unbundling, relief for the incumbent telephone companies did not arrive until six years later, in September 2005. With respect to wireless, the U.S. market, while far from perfect, has been competitive, and largely unregulated, throughout the broadband era.

B. Broadband Policy in Canada

While Canada followed the U.S. down the path of unbundling last-mile infrastructure, it did not mandate line-sharing (Crandall 2007a), and its unbundling regime has – for a variety of reasons perhaps unique to Canada – not led to high levels of resale-based competition. Moreover, in 2006, a government-appointed advisory board recommended substantial deregulation of broadband (and other telecommunications services) (Telecommunications Policy Review Panel 2006), which is now being implemented (Canadian Radio-Television Commission 2006). Under the new policy, the regulator is required to forbear from retail rate regulation in any area where competing services are available to 75 percent of customers from two competing

infrastructures, of which one may be wireless (Canadian Governor in Council, 2007). Thus, while Canada has not completely forsworn mandated unbundling of broadband, the net result of its policies has been a high degree of infrastructure competition and relatively little resale based competition (Atkinson *et al* 2008).

III. The Brief Against the American Model

The brief against the American model takes two basic forms, the first theoretical and the second empirical. On the theoretical side, critics allege that broadband infrastructure is either a natural monopoly (at least in the “last mile”), or that whatever competition (e.g., between cable companies and telephone companies) that does emerge will be insufficient to generate economically efficient outcomes. On the empirical side, critics point to results in other nations, such as Japan, and to the U.S.’ relatively low ranking in the OECD’s broadband penetration rankings, as evidence that the U.S. model has failed. These two sets of arguments are summarized below.

A. The Theoretical Case: Infrastructure Competition is Either Not Viable or Not Sufficient

The theoretical case against the American model rests on one of two assumptions. Some, such as former FCC Chairman Reed Hundt and Google Chief Technology officer Vint Cerf, have suggested that the last mile infrastructure is a natural monopoly, i.e., that duplication of last mile facilities is economically inefficient. For example, in a February 2008 interview, Hundt opined as follows:

[W]e need to get over the idea that having cable and telephone companies each do an okay job is somehow better than one firm doing a great job.... If the network is truly open and if the goal is to maximize the bandwidth and that’s what you have as your business and regulatory paradigm, then it’s not very important that you always pit cable against telephone. It’s more important that you have at least one universal provider. (Gubbins 2008)

Hundt’s comment, of course, is a popularized version of what is ultimately a highly technical economic argument relating to the importance of economies of scale and scope in NGN networks. Skeptics of the viability of last mile competition argue, as the European Regulators Group concluded in 2007, that the characteristics of next generation networks “are likely to reinforce the importance of scale and scope economies, thereby reducing the degree of replicability, potentially leading to an enduring economic bottleneck,” and thus “may lead to a natural monopoly in certain areas of the electronic communications value chain.” (ERG 2007)

Even where infrastructure-based competition does occur, some critics argue it is insufficient. For example, in June 2008, Google chief scientist Vint Cerf attracted attention when he suggested that the Internet infrastructure should be nationalized (Shonfeld 2008). He subsequently explained his comments, arguing that

...the Internet is in some ways more like the road system than telephone or cable. These are essentially single purpose networks, each built for a particular application. ... I think the incentives now in place for broadband service provision *have not produced significant facilities-based competition.* (Cerf 2008, emphasis added)

Underlying Cerf's argument that facilities-based competition is not "significant" is the notion that the wireline infrastructures deployed by cable and telephone companies constitute a "duopoly" which does not produce economically efficient results. As one prominent U.S. Congressman put it "broadband service to residential consumers in the United States is dominated by a 'digital duopoly' of two technologies – cable modem and telephone company DSL services." (Markey 2006) Similar arguments have been advanced in more formal terms in various regulatory forums, with economists and others urging regulators to conclude that the competition between cable and telephone companies "does not provide effective competition" and "fails to protect consumers," (Baldwin 2007) and ultimately that "the United States' dismal position in the world is a result of the FCC's failure.... to foster competition in broadband markets now dominated by a telephone-cable duopoly." (Schwartzman *et al* 2007)

B. The Empirical Case: "15th in the World and Falling"

This brings us to the second primary argument against the American model: That the U.S. is "losing the race" to deploy next generation broadband networks. As one analyst put it recently, "It is hard to follow broadband telecommunications policy without hearing almost weekly that the United States ranks 15th out of 30 [OECD] nations in broadband deployment." (Atkinson *et al* 2008). The critique goes beyond penetration, arguing that U.S. pricing and quality are also below par. As one liberal U.S. group explained it in a 2008 policy briefing:

[W]e are falling behind the rest of the world. In 2001, America stood near the top of global rankings of broadband adoption; a few short years later, we have been leapfrogged by our European and Asian competitors.

Broadband adoption isn't the only statistic that matters. Maybe more important is whether high-speed Internet services are of high quality and value. Unfortunately, we are doing even worse when it comes to price and speed. The average broadband offering in Japan is 10 times faster than the average service available to U.S. consumers—at half of the cost. (One Nation Online, 2008)

Such arguments have been advanced in support of various alternative policies, from net neutrality regulation (Lessig 2006) to increased subsidies for rural broadband deployment (Hundt 2008). However, as explained immediately below, the empirical case against the U.S. broadband model is unsupportable.

IV. Comparing Results: Are the Critics Right or Wrong?

The case for or against the American model ultimately boils down to results. Are the critics right in arguing economies of scale and scope make last-mile infrastructure competition uneconomical? Does the data support the claim that U.S. consumers are receiving sub-standard services at high prices and that U.S. competitiveness is suffering as a result? As demonstrated below, the answer to both questions is, in a word, no. Last-mile infrastructure competition is flourishing, and consumers and the economy are benefiting as a result.

A. *Viability of Last-Mile Infrastructure Competition*

The economic viability of last-mile infrastructure competition is demonstrated by the simple facts that it exists and is growing. In both Canada and the U.S., telephone companies and cable companies have deployed nearly ubiquitous competing wireline infrastructures, and significant last-mile competition exists in many other nations as well. Moreover, in many areas of the U.S., cable overbuilders have deployed a third wireline infrastructure (Eisenach 2008). In significant portions of the U.S., and in many other nations, advanced wireless broadband infrastructures have also been deployed, and such deployments are expanding rapidly.

Virtually 100 percent of U.S. households have access to wireline telephone service from an incumbent telephone company; of these, approximately 82 percent (FCC 2008) have access to DSL services. At least 85 percent of households are passed by wireline cable providers (FCC 2006); of these, 96 percent have access to cable modem service, and nearly all of these have access to cable telephony services (Wlodarczak 2008). Further, 82 percent of U.S. households have access to mobile wireless broadband services from one or more provider (FCC 2008). Thus, the vast majority of U.S. consumers can choose from *at least* three infrastructure-based broadband providers – and, as discussed below, more are on the way.

B. *Effects on Investment and Innovation*

There is little dispute that infrastructure competition results in increased investment and drives more rapid innovation. A recent OECD report, for example, finds as follows:

In the United States, where cable modem use is more prevalent than DSL lines, competition is leading to network upgrades. Nationwide fixed-line telecommunication operators such as AT&T and Verizon are actively deploying optical fibre networks to compete with cable TV operators' multiple play services. (OECD 2008) (emphasis added)

As telephone companies improve their networks, cable companies are forced to respond with better technology and still faster networks. As a recent analyst report concluded:

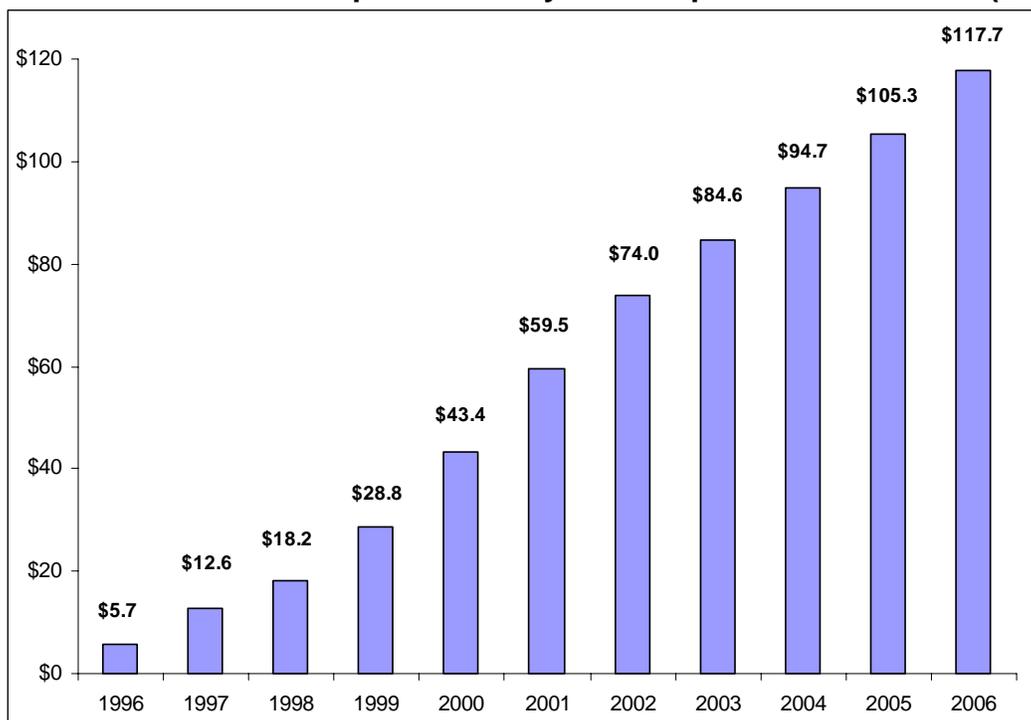
The chief reason why some cable operators are embracing DOCSIS 3.0 so tightly and others are not is the state of telco competition. Comcast is facing strong challenges from Verizon Communications Inc.'s growing fiber-to-the-home (FTTH) network, FiOS. Verizon, which tangles with Comcast up and down the East Coast, has now signed up more than 1 million FiOS TV customers and more than 1.5 million FiOS Internet users. (Breznick 2008)

In other words, more intensive infrastructure competition leads directly to more rapid innovation. In the U.S. today, Verizon's FiOS fiber-to-the-home infrastructure is offering 50 Mbps broadband service to over 12 million U.S. homes, while Comcast is beginning to deploy DOCSIS 3.0, capable of speeds 160 Mbps. Verizon's response: It recently announced trial deployments of new passive optical networking equipment capable of peak speeds of up to *400 Mbps* (Rearden 2008).

Innovation is also accelerating in the wireless sector, where European leaders now readily concede the U.S. mobile data market has taken the lead (Reding May 2008; see also Nielsen Mobile 2008, Kraemer 2008). The next phase: deployment of 4G networks, including Wi-Max. For example, Craig McCaw's Clearwire already offers high-speed wireless broadband (along with VoIP service) in 39 U.S. cities. Now that the company has merged with Sprint-Nextel's "Xohm" project, and collected more than \$3 billion in backing from Google, Intel and the major cable companies, it is building out its 4G network to cover 120-140 million people by 2010 (Sharma and Kumar 2008).

To make these improvements, the cable, telephone and wireless companies are investing literally hundreds of billions of dollars. As shown in Figure One, for example, U.S. cable operators – which, as noted above, were never saddled with unbundling restrictions – invested more than \$115 billion to upgrade their networks between 1996 and 2006. It is noteworthy that investment accelerated significantly in 2000, immediately after Chairman Kennard made clear unbundling would not apply.

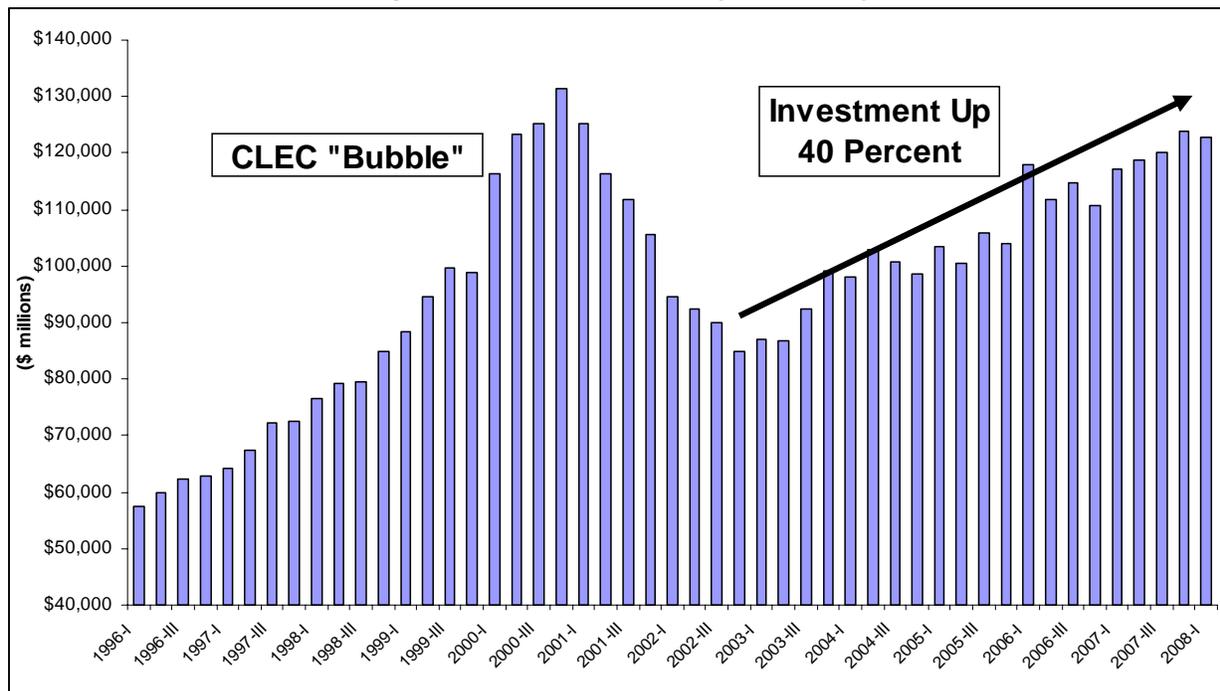
Figure 1:
Cumulative Infrastructure Expenditures by Cable Operators 1996-2006 (\$billions)



Source: National Cable Television Association.

U.S. infrastructure investment has not been limited to cable companies. Since the FCC began exempting broadband infrastructures from unbundling requirements, overall investment in communications equipment in the U.S. has risen by more than 40 percent, as shown in Figure 2. And, unlike the prior investment bubble, much of which consisted of literally hundreds of billions “invested” by now bankrupt CLECs in advertising and overhead (Darby *et al* 2002), the bulk of the investment in the last five years has gone into network upgrades that have yielded a faster, more robust broadband infrastructure.

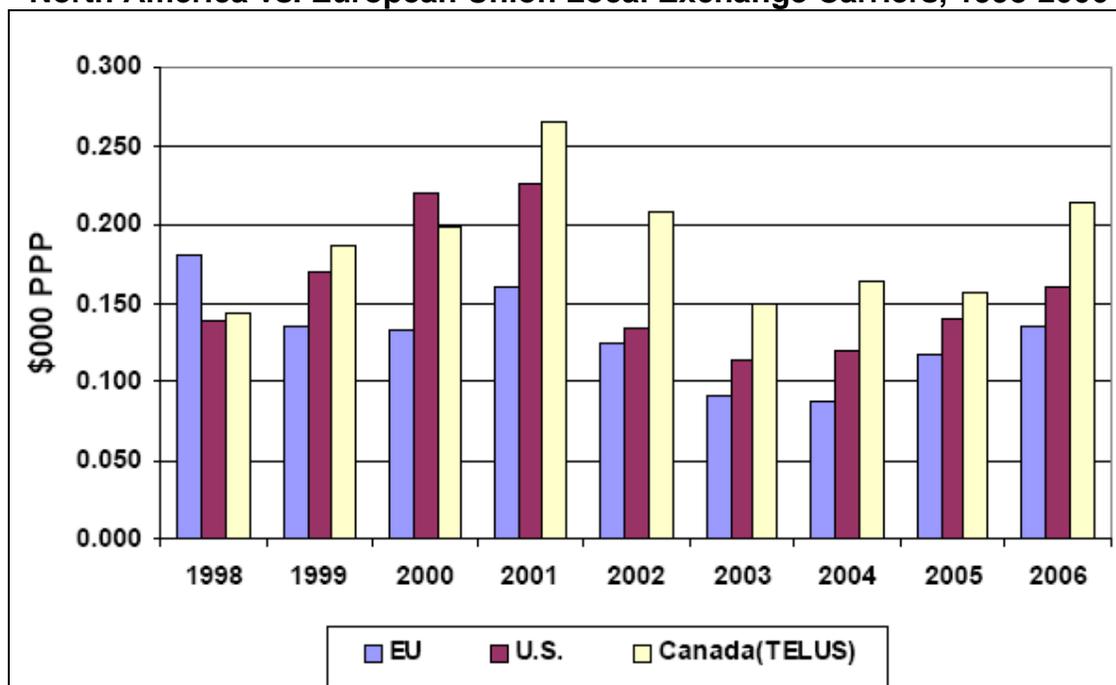
**Figure 2:
Real Investment in Communications Equipment,
By Quarter, 1996-2008 (\$millions)**



Source: United States Department of Commerce Bureau of Economic Analysis

Perhaps most importantly, investment under the American model has outpaced investment in nations which have aggressively pursued mandatory unbundling. For example, as shown in Figure 3, investment per line by incumbent telcos in the U.S. and Canada has exceeded investment in the European Union.

**Figure 3:
Capital Expenditures Per Line on Fixed-Line Networks:
North America vs. European Union Local Exchange Carriers, 1998-2006**



Source: Crandall 2007

For those such as former FCC Chairman Hundt and Google's Vint Cerf, who have suggested the U.S. government should fund and operate the next generation Internet, these figures should be cause for reflection. In 2007, the U.S. Federal government invested a total of about \$57 billion in *all* U.S. transportation infrastructure, including roads, bridges, ports, airline infrastructure and railroads; the *Wall Street Journal* reports U.S. telecom firms invested \$70 billion in the telecom infrastructure alone (White 2007).

C. Effects on Prices, Quality, and Penetration

Ultimately, the complaint against the American model rests on results, and – because Canada has consistently ranked highly in the most frequently cited OECD statistics – primarily on results in the U.S. As discussed above, critics argue that the U.S. has fallen in the OECD rankings of broadband penetration, and also argue that prices are higher, and service slower, than in other OECD nations.

As a preliminary matter, the OECD rankings, which are (in theory) based on the number of residential internet connections divided by a country's total population, have been demonstrated to produce biased results, for several reasons, including (a) the OECD statistics do not reliably distinguish business from residential connections (meaning that business connections are likely included in the totals for other nations, but excluded from the totals for the U.S.) and, (b) counting connections per capita, as opposed to per household, inherently understates the proportion of connected

households in countries, such as the U.S., with large household sizes (Adkinson *et al* 2008, FCC 2008, Wallsten 2008). Further, the OECD data fails to count most wireless Internet connections, an arena where the U.S. (as noted above) is among the leaders, and where more than a third of the population accesses the Internet using public wi-fi connections (Horrigan 2008).

Data on household internet penetration paints a very different picture from the OECD data. For example, a recent Ofcom report, based on 2006 data, ranked Canada first and the U.S. fourth in both household penetration and growth of household penetration, ahead of Germany, Italy and France (Ofcom 2007; see also Wallsten 2008, showing the U.S. ranked ninth among 31 advanced nations). The Pew Project on the Internet and American Life reports that household internet penetration in the U.S. increased from 47 percent in March 2007 to 55 percent in 2008, and that the annual growth rate increased from 12 percent to 17 percent over the prior year.

Furthermore, academic studies leave little doubt that infrastructure competition leads to higher penetration (e.g., Distaso *et al* 2005), a fact recognized even by pro-unbundling policymakers. For example, European Union Commissioner Vivian Reding, a staunch advocate of unbundling for next generation networks, recently conceded that

effective infrastructure competition has been one of the main factors contributing to broadband rollout. Countries such as the Netherlands and Denmark, that have the highest broadband penetration levels in the world ahead of Korea and Japan, are those that have a real choice of infrastructures. (Reding January 2008)

The data cited by critics relating to prices and quality are also highly misleading. Typically, critics point to a few countries, notably Japan and Korea, where high speed services are available for relatively low prices, but ignore the fact that such services are not available to most consumers, or are heavily subsidized; or, they cite advertised speeds, ignoring the fact that advertised speeds are rarely delivered (Internet for Everyone, 2008; Schwartzman *et al* 2008). Surveys of broadband prices that take these factors into account tend to find the U.S. has among the lowest prices and highest delivered (as opposed to advertised) speeds of major countries (Kende 2006, Ofcom 2008, Wallsten 2008).³

Indeed, infrastructure competition in the U.S. has led to lower prices across the board. For example, FCC Chairman Kevin Martin reported in a recent speech that prices for entry-level DSL service dropped from \$49.99 to \$14.99 between 2002 and 2006, i.e., during the period cable companies were aggressively rolling out their cable modem services (Martin 2006), and the Pew Project on the Internet and America Life

³ The data cited in the Ofcom report has to be carefully sifted, as price comparisons are reported for a number of different baskets of services of telecommunications services, many of which include prices for pre-paid mobile (higher in the U.S., but purchased by very few U.S. consumers relative to other nations), or exclude TV license fees (which do not exist in the U.S.). Looking solely at the broadband prices reported by Ofcom, U.S. prices generally rank lowest or second lowest.

recently reported that average broadband prices in the U.S. declined by four percent between December 2005 and April 2008 (even as speeds increased) (Horrigan 2008). A recent report by the U.S. Government Accountability Office concluded that markets in which cable overbuilders had deployed competing infrastructures enjoyed 23 percent lower pay TV prices as a result (FCC 2006), while a Bank of America survey found even deeper price cuts, ranging from 29 percent to 43 percent, in markets where Verizon had deployed FiOS pay TV services (Ford 2006). Overall, U.S. telecommunications prices have declined by six percent since 2000, while the consumer price index rose by 18 percent.

Perhaps the ultimate test is that U.S. consumers appear to be highly satisfied with their broadband services. For example, Ofcom reported that 85 percent of U.S. consumers reported being satisfied with their download speeds (the highest satisfaction level of the countries surveyed), compared with only 39 percent of Japanese consumers (Ofcom 2008).

In sum, while it is indisputable that *some* consumers in *some* countries have access to higher broadband speeds at lower prices than consumers in the U.S., the selective use of this fact to suggest that U.S. broadband policies have failed, or that the U.S. broadband market is failing to deliver the services consumers want at attractive (and constantly falling) prices is simply not justified by the broader facts. To the contrary, the evidence suggests the American broadband market is meeting the needs of the vast majority of American consumers, and that performance will continue to advance as the pro-infrastructure competition policies that constitute the American model continue to result in higher levels of investment and innovation.

V. Can the American Model Work Elsewhere?

Given the facts above, most policymakers, including those who support access regulation of next generation networks, appear to recognize that infrastructure competition is the most desirable outcome in broadband markets. For example, the European Regulators Group recently concluded that

Competition over competing infrastructure has many advantages. The pressure to minimise costs is exerted over the whole value chain, inducing greater scope for innovation in products and processes which creates a downward dynamic for costs. Consumers also benefit from more diversified offerings, which correspond more closely to their individual needs. (ERG 2007)

Similarly, the Australian Consumer and Competition Commission, which has aggressively pursued mandatory unbundling on next generation networks, admits that “[F]acilities-based competition is more likely to promote the [long-term interests of end users]. This is because this form of competition allows rivals to differentiate their services and compete more vigorously across greater elements of the supply chain.” (ACCC 2007)

A. Fatal Flaws in the Case for Access Regulation of Next Generation Networks

Given the widespread agreement on the desirability of infrastructure competition, why do policymakers continue to advance policies aimed at increasing competition through resale? The most commonly cited reason is that most countries, unlike Canada and the U.S., do not presently have widely deployed competitive wireline infrastructures (i.e., cable). As Commissioner Reding explains,

Only about 20% of Europe's telecom markets have full infrastructure competition in the access networks. The rest have no choice but to connect using the incumbent's local loop, in practice this means that 90% of European subscribers are on the incumbent's local access network. That is why access regulation, in particular the process of unbundling access loops, has been so important. (Reding, January 2008)

Thus, while regulators generally agree in the *desirability* of infrastructure competition, they argue that it can only be achieved through access regulation, and in particular by applying the so-called "ladder of investment" model. As Commission Reding puts it,

The current EU rules are based on the view that, by also giving competitors access to the networks of dominant operators, new market entrants will start generating revenue, thereby climbing up the first step of a 'ladder of investment'. And this will allow them in due course to roll out their own infrastructure and to become less dependent on other player's facilities. This will lead to more infrastructure-based competition over time which is to be welcomed as a more resilient and independent way to compete. (Reding, June 2008)

Furthermore, the logic goes, broadband networks are no different from (or, as noted above, perhaps even more prone to natural monopoly than) the traditional telephone networks to which the "ladder of investment" model was initially applied.

The move to Next Generation Access Networks does certainly not change the logic when assessing the need for regulation in order to ensure effective competition.... In the Commission's view, it would be a fatal mistake to deviate from the pro-competitive approach of the current framework. (Reding June 2008)

Thus, "[u]nless there is a competitive access market, access regulation can be expected to continue irrespective of the underlying technology." (Reding June 2008)

The problems with this line of reasoning are both numerous and profound.

First, the economics of next generation networks are, contrary to some regulators' assumptions, profoundly different from the economics of single-purpose

telecom and cable networks. Whereas single purpose networks must recoup the entire cost of investment from a single service (telephone, pay TV), next generation networks permit providers to increase their Average Revenue Per User (“ARPU”), by selling multiple services over the same network. Thus, for example, many U.S. cable companies now have ARPUs at or above \$100 per month (Moffett, 2007). At the same time, falling input prices and economies of scope have reduced the costs of infrastructure. Regulators in the U.S. and elsewhere have recognized that digital convergence in “significantly reduces the amount of capital that is required to build and maintain facilities.” (Telecommunications Policy Review Panel, Canada, 2006; see also FCC 2005). As a result, service territories that might once have been unable to support multiple wireline providers can economically do so – as the experience in the U.S., Canada and elsewhere has shown.

Second, there is virtually no evidence that the “ladder of investment” approach to telecoms regulation has worked in practice, in the sense of having encouraged (or even permitted) competitive telecommunications carriers to move from reliance on incumbents’ networks to building their own (Eisenach and Singer, 2007, Hausman and Sidak, 2005). While theoretically appealing, the model’s success depends on the ability of regulators not only to predict the “correct” prices for unbundled network elements, but to adjust those prices constantly to reflect changing market conditions and, ultimately, to determine when the time has come to cut competitors off from mandated access altogether. These tasks are challenging as a matter of technical economics, but perhaps even more so when competitors argue in the public arena that any increase in access fees, let alone complete termination of mandated access, will “harm competition.” Even where competitors have deployed fully functional networks (as, for example, in Australia, where competitor Optus has built out a hybrid-fiber-coax network to approximately two million homes, but continues to use unbundled network elements from incumbent Telstra to serve those same homes), regulators are likely to be told that continued mandated access is essential to the competitor’s economic survival (Eisenach 2008).

U.S. regulators overcame these fears. Their decisions had profound impacts on competitive telecom providers, as well as on ISPs whose business models depended on reselling the broadband services of facilities-based providers. Undoubtedly, the objective of being “fair to competitors” delayed the move away from mandated access regulation. Yet, the FCC ultimately decided to place the long-run interests of consumers ahead of the short-run interests of competitors.

Third, the existence of competing infrastructures (or the lack thereof) is, as economists would put it, an endogenous variable. For example, in Germany, where only about five percent of broadband services are provided over cable modems, the cable television infrastructure passes approximately 80 percent of homes. Why has more cable modem service not been deployed? The reasons are complex, and include the facts that the cable system was once owned by incumbent Deutsche Telecom (which had little incentive to upgrade the system to provide cable modem service when it was already providing broadband over DSL), and that the industry is highly fragmented (a

situation which is now beginning to change). Going forward, however, there can be little doubt that the incentives of cable operators to spend billions upgrading their systems to provide broadband are affected by their perceptions of the likelihood that Deutsche Telecom will be forced to offer next generation services to competitors at below cost rates, thus undercutting the cable companies' ability to earn an economic return on their investments (Atkinson *et al* 2008). Thus, the very decision to mandate access in the face of inadequate infrastructure competition is a recipe for *continued* inadequate infrastructure competition.

Would cable companies in the U.S. have deployed advanced broadband infrastructures, or deployed them as rapidly and wisely as they did, if the FCC had yielded to pressure to impose "open access" requirements in 1999? Would the telephone companies today be rapidly and widely deploying advanced FTTH and FTTN infrastructures if the FCC had imposed unbundling requirements on those investments? All of the evidence suggests not.

Ultimately, the case for mandated unbundling of next generation networks fails for the simple reason that today's broadband markets are intensely dynamic. Today's "next generation" network is – as the U.S. cable companies are finding out in the face of competition from 50 Mbps FiOS service – tomorrow's technological dinosaur. Multi-billion dollar investments must be made on the basis of business judgments about largely unquantifiable risks, in an environment in which analysts and economists are bound to disagree. (Many analysts, for example, continue to believe Verizon's FiOS investment will prove to be a loser; and, it is anyone's guess whether Clearwire's investors will ever see a penny of their money back.) Moreover, a delay of a year (a nanosecond in regulatory time, but eternity in the modern broadband marketplace) may be enough to ensure an investment is never made at all. As Chairman Kennard stated so clearly back in 1999, regulations have costs as well as benefits.

B. Principles for Advancing Competition for Next Generation Infrastructures

Given the demonstrated viability and acknowledged benefits of infrastructure competition in broadband markets, the only remaining question for policymakers should be how best to advance such competition. Designing such policies will be a complex undertaking, but regulators would do well to begin with four principles in mind.

First, the presumption in broadband markets should be that competition is viable. Thus, in the absence of a clear demonstration of specific market failures, broadband infrastructures should not be subjected to mandated access rules. That is, policymakers should take a cue from the FCC, whose decisions to forbear from access regulation were made largely on the basis of its *expectation* that infrastructure competition would develop in the future.

Second, to the extent regulators have residual doubts about the prospects for infrastructure competition to develop, they should weigh those doubts against the

likelihood that regulation is capable of achieving economically efficient outcomes.⁴ Simply put, they should weigh the likelihood (and magnitudes) of imperfect marketplace outcomes against the certainty of imperfect regulation.

Third, to the extent infrastructure-based competition is not already occurring, regulators should look to the particular causes, including specifically whether existing policies may be part of the problem. For example, as discussed above, the German cable industry has been extremely slow to deploy cable modem service. In such a circumstance, regulators should ask what policy obstacles may be delaying investment by cable operators, rather than jumping to the conclusion that the broadband market is a “natural monopoly.”

Fourth, to the extent countries elect to subsidize deployment of broadband networks, particularly in rural areas, they should design such policies to be both competitively and technologically neutral. In this regard, the U.S. is a poor model, as the design of its universal service program has provided billions of dollars in subsidies to one class of incumbent telephone company (the “rural local exchange carriers,” or RLECs), and billions more to subsidize duplicative wireless voice service, while virtually ignoring rural areas served by other wireline carriers (GAO 2008).

VI. Summary

The American model for broadband policy has been widely criticized. Upon inspection, however, the criticisms simply do not hold up. Next generation broadband networks are manifestly not natural monopolies in most places; and, with the exception of a single highly publicized but deeply flawed OECD penetration metric, the performance of American broadband markets compares well with the performance of markets in other nations. Indeed, by forbearing from application of access regulation to next generation networks, American policymakers have set the stage for continuing investment and innovation that promises to make North American broadband markets the envy of the world. Regulators elsewhere would do well to take notice, as their continued pursuit of mandated access regulation is likely to result in the perpetuation of infrastructure monopolies and their attendant economic disadvantages.

⁴ In this regard, consider Commissioner Reding's recent statement that “[T]he best way for encouraging long-term investment is to establish a priori a number of principles that national regulators should take into account when regulating access prices with regard to next generation access networks. In my personal view, these should include a risk premium of around 15%.” (Reding, June 2008) This proposal is simply ludicrous, for two reasons: First, as discussed above, the ability of analysts and economists to estimate the economically efficient risk premium for any given project is at best doubtful. Second, there is no reason whatsoever to believe the risk premium would be the same across projects. Ms. Reding's proposal, if implemented, would thus guarantee the misallocation of billions of dollars of scarce investment capital. Yet, despite opposition for the European Regulators Group, the European Commission appears ready to mandate it. (Jones 2008)

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