

The Ineluctable Modality of Broadband†

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To encourage growth in the flagging information, communications, and technology sector, the FCC recently laid out a new broadband policy. This Essay argues that the current FCC plan is unlikely to create adequate scale and scope for broadband to offer stability to the industry. Instead of duplicating infrastructure by encouraging both telephony and cable firms to build broadband networks in the same communities, the FCC should favor shared use of access networks by competing service providers. Competition based on customer service and innovation will allow the industry to grow rapidly again; but the large capital investments required for redundant access networks might destroy value for many firms. A new national universal service plan for broadband that linked all homes to a big broadband network would ensure that customer demand grows. With such a network, all Americans could join the online community, and the increased number of users and consequent growth in potential demand for services would further encourage technological innovation.

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Introduction

For the last three years, the information, communications, and technology (“ICT”) sector of the economy—comprising everything from computer chips to telephone service—has suffered slow growth, evaporating equity values, and widespread insolvency.¹ The future of the ICT sector appears, in the phrase of the poet Robert Lowell, “frizzled, stale and small.”² In fact, a recent article in the *Harvard Business Review* pronounced that ICT is merely a commodity of no strategic value and advised firms against focusing on investment in new technologies.³

ICT growth could not have continued at the torrid pace of the bubble years from 1997 to 2000. Few expected, however, that unprecedented growth would be followed by mounting job losses, flat revenues, and falling stock prices. The American economy depends on technological growth, so a weakened ICT sector threatens both the quality of American life and our national competitiveness. In this anxious time, the country reasonably turns to the government, and even to the often-obscure Federal Communications Commission, for policy prescriptions that will bring growth back to ICT.

In February 2003, the FCC laid out its broadband policy.⁴ It encourages cable and telephony companies to invest in the hardware and software necessary to alter their existing fiber-coaxial cable and copper networks to provide broadband. These two technologies will be encouraged to compete as the firms racing to build the transcontinental railroad once did. In addition, the FCC welcomes the possibility of wireless broadband access technologies, including the format called wi-fi or 802.11.

Even as growth flags across much of the ICT sector, broadband Internet access is the fastest growing communications service ever. Currently, over twenty million households subscribe either to a cable company’s or to a telephone company’s offer of fast data transmission. At speeds usually around one megabit per second, broadband is ten to twenty

1 See *After the Telecommunications Bubble*, in OECD ECONOMIC OUTLOOK, June 1, 2003, at 119 (noting decline in growth and high-profile bankruptcies of Worldcom and Global Crossing); Simon Romero, *Telecommunications Outlook: First the Bad News, then the Bad News*, N.Y. TIMES, June 18, 2002, at C6 (explaining that the telecommunications sector has lost \$1.4 billion in market capitalization).

2 Robert Lowell, *Home After Three Months Away*, in SELECTED POEMS 89-90 (1977), available at http://www.poetryconnection.net/poets/Robert_Lowell/7986 (last accessed Dec. 6, 2003).

3 Nicholas G. Carr, *IT Doesn’t Matter*, HARV. BUS. REV., May 2003, at 41.

4 See *In the Matter of Review of the Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers*, No. 01-338; *Implementation of the Local Competition Provisions of the Telecommunications Act of 1996*, No. 96-98; *Deployment of Wireline Services Offering Advanced Telecommunications Capability*, No. 98-147, FCC Release 03-36 (Aug. 22, 2003) (adopted Feb. 20, 2003), 2003 FCC LEXIS 4697.

times faster than narrowband access over a telephone line.⁵ Prices were originally more than forty dollars a month, but telephone companies have now led retail levels toward thirty dollars, and even lower in some markets, as they try to overtake cable's early lead in residential customer acquisition.⁶

Yet just as the great railroad boom ended in bankruptcy for many firms, the FCC's current policy creates too much risk of serious economic harm to both telephony and cable. Both types of firms will be mindful of that risk, lessening their incentive to invest in infrastructure. The FCC's policy will retard the deployment of truly big broadband (speeds up to ten megabits per second or even higher) and will delay broadband from being offered to the full range of households to whom cable and telephony are currently available. In both these respects, today's policy fails to maximize economies of scale and scope. The current policy also fails to provide the requisite stimulus to economic growth. To address these problems, this Essay proposes a national universal service program to promote a physical link to every home, probably through fiber, enabling data rates ranging from ten to one hundred megabits per second with capacity for numerous service providers.⁷ This new policy should help preserve the economic viability of both telephony and cable firms for years to come. In this way the FCC can stimulate economic growth, ensure reliable communications services, and encourage investment.

I. The FCC's Broadband Policy

In response to the collapse of ICT firms' equity values since 2000, the FCC has encouraged consolidation in a number of markets, including broadcast television and radio, cable, and mobile communications. The FCC's current broadband policy is explicitly pro-concentration in its reversal of rules permitting rival broadband firms to lease and to share some of the facilities of existing telephony firms. In the current broadband market, the policy appears to be creating a race for market share, as

5 See INDUS. ANALYSIS & TECH. DIV. OF THE WIRELINE COMPETITION BUREAU, FCC, HIGH-SPEED SERVICE FOR INTERNET ACCESS: STATUS AS OF DECEMBER 31, 2002 (June 2003), available at http://www.fcc.gov/Bureaus/Common_Carrier/Reports/FCC-State_Link/IAD/hspd0603.pdf.

6 See JP MORGAN, BROADBAND: MYTHS AND REALITY 23 (2003); *Study: Decline in Broadband Prices in 2002*, SILICON VALLEY/SAN JOSE BUS. J., Mar. 31, 2003, available at <http://sanjose.bizjournals.com/sanjose/stories/2003/03/31/daily12.html>; Press Release, Verizon Communications, Verizon Supercharges DSL with New Wi-Fi Access, Higher Speed, Lower Prices and "Verizon Online DSL with MSN 8" Service (May 13, 2003), available at http://newscenter.verizon.com/proactive/newsroom/release.vtml?id=80217&PROACTIVE_ID=cecec8c7caacd9cdc7c5cecfefcfc5cececdc8cfc7ccc9edcec5cf.

7 See generally Lisa Guernsey, *A Dissent on the Digital Divide*, N.Y. TIMES, Sept. 18, 2003, at G4; Steven P. Martin, *Is the Digital Divide Really Closing*, INFO. TECH. & SOCIETY, Spring 2003, at 1.

telephony and cable compete to bring broadband to the sixty million houses that have already subscribed to narrowband Internet access. This broadband market will substitute for narrowband access and ultimately create a platform for voice at lower prices than currently offered.

As this Essay argues, the FCC's broadband policy would be more successful if, rather than promoting consolidation and perhaps diminishing revenue for communications services, instead it encouraged consumer spending in the ICT sector. Many economists, often identified as new Keynesians, believe that the correct governmental response to an economic downturn is the promotion of spending to soak up unused capacity.⁸ When excess capacity is used rather than merely being reduced, firms can escape downward economic spirals and create growth. The current Bush administration's policy of incurring a record federal deficit while passing substantial tax cuts is the kind of "priming the pump" that Keynesians might suggest. It is notable, and perhaps a mistake, that the FCC's recent actions are an exception to this trend.

A. *Consolidation and Surplus Capacity*

The fundamental problem in the ICT sector is a surplus of capacity. The telephone companies' capacity to carry voice goes under-used because cellular networks carry the traffic instead. Many households that convert to broadband will cancel a phone line dedicated to dial-up or narrowband access, thereby creating more unused telephone network capacity. Cable companies' lines now pass almost one hundred percent of homes, but increasing competition from satellite services has limited their subscribership to around sixty-five percent.⁹ At least five or six cellular carriers offer service in all major markets, but only a few use efficient percentages of their networks (although all have pockets of over-use in some geographic markets).¹⁰ More than a dozen long-haul data networks link cities, yet two or three such networks could meet not only existing but

8 For a popular summary from a prominent new Keynesian, see PAUL KRUGMAN, *PEDDLING PROSPERITY: ECONOMIC SENSE AND NONSENSE IN THE AGE OF DIMINISHED EXPECTATIONS* (1994). The term "new Keynesian" is also used in more technical circles to refer to a set of beliefs about microeconomics, namely, that markets take time to clear and wages and prices are "sticky." See Gregory N. Mankiw, *New Keynesian Economics*, in *THE CONCISE ENCYCLOPEDIA OF ECONOMICS* (2002), available at <http://www.econlib.org/library/Enc/NewKeynesianEconomics.html> (last accessed Dec. 19, 2003).

9 See MOTION PICTURE ASS'N OF AM., *U.S. ENTERTAINMENT INDUSTRY: 2002 MPA MARKET STATISTICS* 41, 45 (2003), available at http://www.mpa.org/useconomicreview/2002/2002_Economic_Review.pdf (last visited Dec. 6, 2003); NAT'L CABLE & TELECOMMUNICATIONS ASS'N, *INDUSTRY STATISTICS* (2003), available at http://www.ncta.com/industry_overview/indStat.cfm?indOverviewID=2 (last visited Dec. 6, 2003).

10 In the Matter of Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, No. 02-379, FCC Release 03-150 (2003), 2003 FCC LEXIS 3916, app. D-9.

also projected future traffic for the next decade.¹¹ Manufacturing plants that make the components and systems of networks are under-utilized; software firms are reducing the number of engineers and programmers on their payrolls.¹²

This over-capacity has contributed to service provider bankruptcies, reduced stock market values leading to a negative wealth effect, and reductions in work forces—all bad news for this sector. Overarching this unhappy picture is a continuing trend to invent ways to make more capacity for less cost. This technological deflation tends to make it harder and harder for firms to generate profits unless they have substantial market power.¹³

This situation presents significant challenges for a regulating agency. Current congressional policy aspires to stimulate business demand and investment with tax breaks. At the same time, the FCC's supply-side policy for broadband threatens to create redundant access networks that may reproduce the story of excess capacity that has saddened many in the ICT sector for the last three years. By contrast, a new, common, and universal broadband access network would increase revenue for broadband service providers and generate new revenue for services delivered to consumers over that access network.

B. *Problems with the FCC's Broadband Policy*

The FCC's broadband policy sets a new and high-stakes contest in motion, summoning two large, well-trained gladiators into the ring of converging broadband solutions. A battle over broadband between telephony and cable is underway, but its benefits to ICT as a whole are uncertain. The goals to keep in mind when evaluating policy are economic stimulus, an expandable physical platform that will sustain technological evolution, and viable economic futures for firms on which we depend for further investment and innovation.

At least three problems afflict the FCC's current broadband policy. First, telephony and cable are expanding the scope of their existing networks in order to offer broadband, but not all existing plant is suitable

11 GOLDMAN, SACHS & CO. & MCKINSEY & CO., U.S. COMMUNICATIONS INFRASTRUCTURE: BEYOND THE CROSSROADS 45-47 (2002); JP MORGAN SECURITIES INC. & MCKINSEY & CO., BACKBONE! HOW CHANGES IN TECHNOLOGY AND THE RISE OF IP THREATEN TO DISRUPT THE LONG-HAUL TELECOM SECURITIES INDUSTRY 10, 69-70 (2000).

12 See, e.g., *Computer Associates International: Software Maker's 450 Job Cuts Are Tied to New Services Unit*, WALL ST. J., Apr. 2, 2003, at B10; John Hechinger, *Layoffs at IBM Trim About 5% of Global Staff*, WALL ST. J., Aug. 14, 2002, at B2; Almar Latour et al., *A Wrong Number for Telecom*, WALL ST. J., Apr. 28, 2003, at C1.

13 See *Singing the Deflationary Blues*, ECONOMIST, Oct. 10, 1998, at 77 ("[Technological deflation] arises from the productivity gains delivered by technological advances, or from increased competition thanks to economic liberalization.").

as a platform for truly big broadband networks—say at speeds of 10 to 100 megabits per second. Additionally, by encouraging a two-firm access market structure, the FCC may be discouraging future growth and innovation in the market. Finally, because the current policy is directed at only half the country, the FCC is ignoring the potential demand from at least fifty million homes and the social benefits that would come from linking all to a new medium of communications.

Under the current policy, telephony is supposed to alter the circuit-switched, copper-based access network to offer broadband, even as cable allocates to broadband some of the capacity of its fiber-coaxial cable network. Originally built to carry analog voice and video, respectively, neither a telephony nor a cable network is optimally designed for broadband. Cable companies have a sufficiently robust network, however, to offer higher connection speeds than telephone companies.¹⁴ The Bells appear to have the greater challenge: They need to install glass fiber and optoelectronics in their network in order to make broadband offers to more customers and to reduce the expense of maintaining current networks. Indeed, telephone companies have begun to procure parts of the passive optical networks that will be designed to target likely subscribers. Cable networks' greater robustness may mean that cable would ultimately succeed in a "winner take all" situation. But is that what the FCC wants? Moreover, the two networks are currently positioned to make different offers to customers. Telephony's broadband network permits high-speed Internet access and voice services. Cable's broadband network creates high-speed access and video, but not voice. As a result, telephony firms can be expected to enter video very warily. The investment would be quite large, and the competitive battle probably value-destroying. For similar reasons, cable should be cautious about entering voice.

The possibility of a single, fiber-based network for delivering voice, video, and data is referred to as the "triple play," and, as in baseball, it signifies that one side is out.¹⁵ If either cable or telephony pulls off such a triple play at a profit, it could reasonably expect to become the primary communications network for the nation.¹⁶ Yet both cable and telephony

14 For example, Comcast recently announced that it had doubled the bandwidth of its high-speed Internet service. See Jim Hu, *Comcast Raises Broadband Speed Bar*, CNET NEWS.COM (Oct. 2, 2003), at http://news.com.com/2100-1034-5085725.html?tag=sas_email (last viewed Dec. 19, 2003).

15 See Loring Wirbel, *Can Cable Score Voice, Video, Data Triple Play?*, COMM. SYS. DESIGN, Jan. 3, 2003, available at <http://www.commsdesign.com/csdmag/sections/pipeline/OEG20030103S0046>; Press Release, Cisco Corp., Cisco "Triple Play" Communications Portfolio Helps Transform Cable Industry Infrastructure (May 12, 2003), at http://newsroom.cisco.com/dlls/prod_051203.html.

16 Currently, access networks are responsible for about forty percent of the value obtained from all video, voice, and data markets. That forty percent translates into approximately \$150 billion in revenue per year. A triple-play provider has the potential to capture that entire market. McKinsey & Co., *Broadband Industry Sizing Model*, 2003 (on file with author).

may reap higher profits by approaching the triple play with restraint. After all, a number of start-ups did invest in this possibility during the boom years, including WIN, WOW, Knology, and RCN. Each pulled back from wide deployment of such an access network. Given the tremendous capital required and the ability of existing network to price their services to low incremental costs, the risk for the “overbuilders” outweighed the reward. For this reason, the broadband access network is likely to remain a two-firm market (barring a wireless innovation) over a significant period of time. Moreover, equilibrium behavior in the two-technology broadband market probably will not generate a big broadband offer from cable or telephony. As long as no third firm tries to build a new network, the two firms may decline to bear the risk and expense of doing so. Instead, cable and telephone companies may choose for eminently sound reasons to focus on economies of scale and scope within existing markets, rather than on the future, more speculative services that big broadband might permit.

Second, even if the FCC’s broadband policy does help stimulate a growing broadband market (albeit at speeds around one megabit per second), the emergence of that market may not lead to material revenue or profit growth for the communications sector as a whole. It is true that the two-firm race for broadband market share should stimulate the telephone networks to invest in passive optical networking. This new technology permits “lights out” networking—meaning that by design they are operated by machines rather than by people. The Bells will need fewer employees and may generate greater returns on equity.¹⁷ These efficiency gains should increase firms’ returns and generate the potential for productivity gains in sectors that use communications services as an input. However, such efficiencies may not translate into material economic stimulus for the ICT sector.

A problem in restarting economic growth in ICT is that the sector is characterized by technological change that may create consumer benefit but not economic growth for firms. Examples include competition among web browsers that bid prices down to zero and successive generations of microprocessor enhancement with continual declines in price per unit of performance. In particular, today’s broadband roll-out directly cannibalizes the narrowband Internet market; so virtually every new broadband customer at thirty dollars per month (and falling) is also someone who drops a narrowband subscription at perhaps twenty dollars per month, or jumps directly into broadband without ever having had a narrowband subscription.¹⁸ The same customer tends to drop a second

17 See APA Optics, PON Q&A: What Is a Passive Optical Network? (2003), available at http://www.apaoptics.com/fiberoptics/APA_Optics_PON.pdf (last visited Dec. 6, 2003).

18 See McKinsey & Co., Broadband Dashboard, Sept. 2003 (on file with author). Of broadband users surveyed, seventy-one percent either dropped a narrowband subscription or planned to

telephone line, at approximately fifteen dollars a month, that had been dedicated to narrowband access.¹⁹ Finally, bundling long distance into cellular and local voice has dropped long distance total revenue by a very large percentage.²⁰

No one should want the FCC to block the creation of efficiencies that promote consumer welfare. However, deflation and consolidation do not make for a constructive new Keynesian approach to the ICT economy. Some individual firms may be winners in a declining sector; and value may even be transferred over time from one segment of ICT to another, just as software and services have in the aggregate tended to capture increasing percentages of value in ICT. Notwithstanding the profitability of a few winners and the sectoral trends, in the short-term everyone would benefit if something new primed the sector's pump. That is what a very high-speed universal broadband policy could do.

Even if economic stimulus were not a sensible goal, a final problem with the FCC's broadband policy is that it seeks growth from half the country at most. At its peak, about sixty percent of households subscribed to narrowband Internet access.²¹ To date, virtually all broadband subscribers have come from this group. At prices above twenty dollars, about thirty to thirty-five million of the existing fifty million narrowband households have indicated a willingness to pay for broadband.²² It would be unreasonable to assume that cable and telephony companies would lower broadband prices much below twenty dollars.²³ As a result, the broadband policy effectively applies to only about half the country's one hundred million households. By contrast, economic growth from the wireless policies of the 1990s has come from virtually all segments of the economy. Penetration of wireless may well exceed one hundred percent, as many consumers will acquire more than one wireless communication device.

do so, while for fifteen percent broadband was their first Internet access subscription. Only fifteen percent maintained both narrowband and broadband accounts.

19 See JP MORGAN SECURITIES INC. & MCKINSEY & CO., *supra* note 11, at 26.

20 See McKinsey & Co., Telecommunications Mass Market, Summer 2003 (on file with author).

21 Michael Pastore, *Number of U.S. Internet Subscribers Drops Again*, CYBERATLAS, Nov. 3, 2003, at http://cyberatlas.Internet.com/big_picture/geographics/article/0,,5911_924691,00.html.

22 McKinsey & Co., *supra* note 18.

23 Existing estimates that take cost savings into account suggest that high-speed cable operators will incur costs of thirty dollars per subscriber per month by 2005, while DSL operators will incur costs of thirty-eight dollars per subscriber per month. See JP MORGAN SECURITIES INC. & MCKINSEY & CO., *supra* note 11, at 72.

II. A Better Broadband Policy

A. *The 1990s vs. the 2000s in Policy Terms*

Ever since the federal government sued to break up AT&T in 1974, Democratic and Republican Administrations, Congresses, and regulatory agencies have pursued competitive communications markets. They have pursued this goal through every means at their disposal, including laws, orders, rulemakings, lawsuits, international negotiations, and bully-pulpit proselytizing. Policymakers have consistently embraced competition in communications products and services as the means to obtain more economic growth, efficiency, productivity gains, and social benefits.

In the 1990s, FCC policy helped to open monopolized communications markets to competition. The Commission, pursuant to Congressional action, encouraged satellite services to compete with local television, new entrants to lease local phone networks so as to compete against the Bells, and the Bells to challenge AT&T and MCI in the long distance market. In wireless networks, the FCC initiated auctions, bringing at least four new players into competition with the duopoly of the 1980s. And the Commission permitted new entrants to the narrowband Internet access market to use the Bell network at very low cost, producing thousands of entrants to that market.

Some congressional actions overrode the FCC's bias toward encouraging competition. Principally, these actions included laws opening the door to consolidation of broadcast radio, a multibillion dollar gift of spectrum to broadcast TV stations ostensibly for their exclusive development of digital, over-the-air TV, and a prohibition on the creation of new low-power FM radio stations. Nevertheless, for the most part, the pro-competition policy prevailed.

Competition and technological innovation produced both radical reductions in retail service prices and new service level innovation. Elasticity effects and the appeal of new services together produced record-breaking economic growth. The entire economy grew substantially though the 1990's, but growth in ICT, and the productivity growth associated with information technology, led the way.²⁴ Over the last ten years, the United States went from about sixty percent of homes connected to about twenty-

24 The communications sector grew at an annual rate of 5.3% from 1990-95 and 6.8% from 1995-99. Comparable figures for U.S. GDP are 2.4% from 1990-1995 and 4.2% from 1995-99. U.S. CENSUS BUREAU, STATISTICAL ABSTRACT OF THE UNITED STATES 2002, at 418 (2003). That growth spurred direct and indirect productivity growth. See D.W. Jorgenson & K.J. Stiroh, *Raising the Speed Limit: U.S. Economic Growth in the Information Age*, in 1 BROOKINGS PAPERS ON ECONOMIC ACTIVITY 125 (2000); see also OXFORD ANALYTICA, UNITED STATES—ECONOMIC PROSPECTS (2000) (attributing two-thirds of productivity growth in the 1990's boom to ICT), available at <http://www.ciaonet.org/pbei/oxan/oxa00020615.html> (last accessed Dec. 19, 2003).

five cable channels to eighty-five percent receiving an average of eighty-five channels from cable and satellite providers;²⁵ eleven million cell phone subscribers became more than 140 million;²⁶ and the Internet evolved from an academic hobby into one to which more than sixty percent of homes are connected.²⁷ Additionally, the Web consists of more than thirty million registered domains,²⁸ and more than eighty-five percent of all classrooms—from elementary school to graduate school—have Internet access.²⁹

In many service categories, prices dropped radically. Newly competitive markets have passed cost reductions on to consumers: From 2000 to 2002, frame relay, voice, private line, and ATM service prices declined by ten to fifteen percent.³⁰ End users responded to lowered prices by buying greater volumes of services. Telecommunications services revenue went from \$164 billion to \$260 billion from 1996 to 2001.³¹ Overall, telecommunications services revenue (adding in wire, wireless, and Internet) has more than doubled in ten years and has been the one of the key drivers of growth in GDP.

The key focus of ICT competition policy has always been encouraging growth in retail services while acknowledging the significance in the value chain of the critical bottleneck: the access network.³² The core problem of access networks from the perspective of the government is threefold: how to ensure innovation toward the most efficient network solution (defining efficiency as throughput per dollar), how to assure enough return on investment for access network providers to continue to innovate, and how to obtain efficient pricing both as to end users and service providers dependent on the access network. The desired result has often been described as “facilities-based” competition, where multiple networks would behave efficiently, enhance innovation, and

25 MOTION PICTURE ASS'N OF AMERICA, *supra* note 9.

26 CELLULAR TELECOMMUNICATIONS & INTERNET ASS'N, SEMI-ANNUAL WIRELESS INDUSTRY SURVEY 2-3 (2003), available at <http://www.wow-com.com/industry/stats/surveys/> (last visited Dec. 6, 2003).

27 Pastore, *supra* note 21.

28 Whois.net, Homepage, at <http://www.whois.net> (last visited Dec. 6, 2003).

29 FCC, FACT SHEET: SCHOOLS AND LIBRARIES PROGRAM (2003), at http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-233530A2.pdf (last visited Dec. 6, 2003).

30 See Lisa Pierce, *Carrier Carnage Prompts Focus on Fundamentals*, NETWORK WORLD 36 (May 27, 2002).

31 JP MORGAN SECURITIES INC., TELECOMMUNICATIONS SERVICES 2001, at 1 (Nov. 2001).

32 Also called the last mile or local loop, the access network is that portion of a wire or wireless network that connects individual end users in buildings, homes, or mobile locations to the aggregation points where their traffic is combined with others' traffic and their requests for connection are routed or switched to the desired destinations. The access medium may be a wireless hop from a handheld device to a base station's antenna, the copper wire telephone line from my bedside table to the telephone pole on the curb and down the street to a central office, or the cable connection from the set top box on the TV in our living room to the same telephone pole and down the street to the cable company's hub where video pictures are received from a satellite feed.

guarantee productivity gains because if they did not do so, their competitors would defeat them. In the 1990s, however, government at the federal and state level generally assumed the way to stimulate facilities-based competition was to force sharing of the access bottleneck through regulation. That latter step is what the FCC has eschewed with respect to broadband.

Moreover, the policies of the 1990s successfully created multi-party offers in numerous service markets, such as wireless, small business telephony, long distance, and narrowband access. Similarly, in cable data access, the Federal Trade Commission tried to create a multi-firm market by obliging AOL Time Warner to carry at least three other Internet access providers on its network.³³ This policy has also been rejected by the FCC with respect to broadband. So the current FCC seeks not multi-firm facilities competition, nor bottleneck sharing, nor multi-firm service provider competition—at least when it comes to the emerging broadband market. In all these respects, current policy is inconsistent with the successful policies of the past.

The FCC has rarely sought to encourage firms to compete by means of building parallel, unconnected, proprietary physical infrastructures. Even with respect to such parallel infrastructures as satellite video, the FCC has moved to foster joint access to such common elements as broadcast content; similarly, the parallel wireless networks were given access to critical common elements such as telephone numbers and connections to wire-based telephones. Indeed, under both Republican and Democratic Administrations, the FCC respected the efficiency and possible inevitability of natural monopoly in the market of physical, fixed wire links to households. In so doing, the FCC effectively favored the shared use of bottlenecks. The FCC's goal has routinely been not to insist that competitors always bypass bottlenecks, such as by building redundant local access, but instead that bottlenecks be shared where that would be a means to the end of competition in services offered to end users.

B. *New Service-Level Competition from Wireless*

We are now in an era of cost-cutting and more risk-averse investment philosophies. That alone is not necessarily regrettable: Cyclical change should pressure firms to become more efficient. The problem with the new FCC broadband policy is that it does not appear likely to induce a new virtuous cycle of revenue growth, innovative investment, new services, and more revenue growth in a timely manner. Service-level competition

33 See *In re Am. Online, Inc. & Time Warner, Inc.*, No. C-3989, 2001 F.T.C. LEXIS 44 (Apr. 17, 2001), available at <http://www.ftc.gov/os/2001/04/aoltwdo.pdf>.

among many firms does not appear to be the FCC's chief goal. The result may be an ICT version of a liquidity trap, as capital expenditure declines as a percentage of industry revenue, leading to a decline in aggregate industry revenue.

Current policy views wireless as a third and potentially disruptive entrant into the broadband access market, just as wireless was in voice markets in the 1990s. Wireless broadband might be the mode of transmission that stimulates innovation in access as well as the creation of new retail services. It is possible that wireless will deprive the last mile or local loop of significant competitive advantage and, thus, reduce the capability of any last mile owner to extract rents from that asset.

The FCC could do more to encourage wireless innovation. It should sell at auction a large swath of spectrum to anyone who promises to make it available to those who manufacture wireless communication devices under any set of rules that mitigate interference and establish clear rules of device behavior. This spectrum would resemble a private park and could be used as experimental proving grounds for wireless broadband solutions. This might help to develop a wireless access link that provides an effective big bandwidth alternative to fiber at a much lower cost. In addition, the FCC should allow any secondary use of spectrum that does not impose material cost on any existing users of spectrum. Furthermore, the FCC should create major new allocations of unlicensed spectrum. Finally, any wireless service provider should receive guaranteed interconnection at fair, forward-looking prices to all other broadband providers. Each of these steps should provide better opportunities for wireless solutions to challenge existing access providers.

FCC policies promoting wireless should also encourage other forms of the triple play that include wireless. A mobile voice and data, fixed voice and data, and video bundle might serve cable very well. A mobile and fixed voice and data bundle might be more effective for telephony than investing in a network that could deliver video. One never-ending merit of a policy of promoting competition is that the future of creativity in technology or marketing is often more interesting and valuable than any forward-looking speculation anticipates. To the end of promoting many different variations of double, triple, or quadruple plays, the FCC should make sure that the wireless industry does not consolidate into structures that discourage either combinations with other industries or innovation in wireless technologies.

At the same time, breakthrough wireless access technologies could produce significant deflation in access revenues, just as wireless voice helped drive down long distance prices in the 1990s. The problem of demand stimulus emerges again: If wireless technologies would presumably stimulate demand for new software and hardware, would they

in general raise or lower ITC sector revenues? This may be unanswerable, but should the question go unasked? Should we try to mitigate the downside risks? In July 2003, a senior government official said, "I personally don't think anybody is safe. I don't believe any company currently in communications is so well-structured and tied down that they are guaranteed to be here 15 years from now."³⁴ Although we should welcome innovations that produce efficiency, the potential destruction of national firms vital to our economy and society deserves serious attention from government. Happily, we have at hand an ideal new Keynesian way to stimulate new revenue growth: a new universal service policy for big broadband.

III. Universal Service for Big Broadband

A. *Benefits of Universal Service and Big Broadband*

Under the current policy for broadband network development, government is ignoring millions of households for whom broadband access is too expensive. In any market, some are unwilling or unable to pay for goods and services. For some people in some markets, government provision intervenes: Bus service is offered for those who lack a willingness to pay for private cars, and public education compensates for the inability of some to purchase private education. These policies are guided by the government's assessment that the benefits of intervention outweigh the costs. That approach should be applied to the provision of broadband.

Even those who cannot or will not pay would derive benefits, both social and economic, from universal broadband service. Connectivity also exhibits positive network externalities, which means that society will benefit from a world in which everyone can reach, and is reachable through, the Internet. Creating social value and internalizing economic value to others are the twin bases of what is usually called universal service. Despite its name, universal service does not apply to all people or to all services. For many years, it has described a hodgepodge of federal and state policies that concern users in areas that are high cost, low density, and often rural.³⁵ For the most part, universal service has been considered

34 Chris Baker, *FCC Chief Says Tech Is Wild Card*, WASH. TIMES, July 8, 2003, at A1, available at <http://washingtontimes.com/business/20030707-101146-5642r.htm> (last visited Dec. 17, 2003).

35 See generally Angela J. Campbell, Comment, *Universal Service Provisions: The "Ugly Duckling" of the 1996 Act*, 29 CONN. L. REV. 187 (1996); Eli M. Noam, *Will Universal Service and Common Carriage Survive the Telecommunications Act of 1996?*, 97 COLUM. L. REV. 955 (1997); FCC, Universal Service Home Page, at http://www.fcc.gov/wcb/universal_service/welcome.html (last visited Dec. 17, 2003).

only in terms of voice service.

The FCC currently has no meaningful universal service policy for broadband. Moreover, its broadband policy is likely to precipitate serious change in the universal service policy for voice. As telephone companies lose voice revenue, there may not be enough profitable fixed line voice customers to subsidize unprofitable fixed line voice customers. When voice is a data application, under current FCC policy it may not be part of the pool of revenue that is tapped to subsidize local telephony service for rural and high cost areas. As some consumers switch to data bit streams in order to obtain voice as an application, those left behind in the circuit switched market will make higher and higher contributions to universal service. This implicit tax on circuit switched traffic unfairly penalizes the telephone companies that own the network and unfairly advantages any who offer data services, whether through wireless, coaxial cable, or other technical solutions. Urban residents and those who do not use computers will bear the increasing cost of supporting universal voice service. That burden allocation hardly advances social equity, given that those who do not own computers are typically lower on the socio-economic scale.

It would be a blessing for most people to say goodbye to the universal service system for voice. It taxes everyone in cities, including the poor, to pay for everyone in rural areas, including the well off. It charges too much to businesses and less than many residential customers are willing to pay. It is inefficiently collected and poorly disbursed. Lastly, it pays for a copper network and voice service when efficiency demands fiber and fast access to the Internet. Indeed, today's universal service system's only merit is that, although it is a sin against fairness and logic, its complexity prevents its victims from recognizing its failings. A serious mistake would be a governmental effort to prop up the existing system by taxing (through transfer payments of some kind) emerging broadband networks in order to support old voice networks.

On the other hand, a policy for bringing all Americans into the experience of using a computer on the Web can generate economic and social benefits, as well as provide a significant stimulus to the economy. As matters stand now, total Internet penetration rates have peaked at around sixty percent for the last year and a half.³⁶ It is possible that the difficulty of using computers and managing keyboards sets a ceiling on adoption. Perhaps voice-activated computers will lead to higher

36 AMANDA LENHART ET AL., PEW INTERNET & AMERICAN LIFE PROJECT, THE EVER-SHIFTING INTERNET POPULATION 3 (2003) (reporting penetration rates hovering between fifty-seven and sixty-one percent since October, 2001), available at http://www.pewinternet.org/reports/pdfs/PIP_Shifting_Net_Pop_Report.pdf (last visited Dec. 17, 2003). The PEW center found that new users continue to sign up for Internet services, but that users were also being lost. Twenty-four percent of the American population, however, has never been online. *Id.* at 2.

penetration rates. But we should be sanguine about the possibility that nearly one hundred percent of homes would be willing to subscribe at fairly reasonable prices to a universal triple play: (1) truly big broadband access—speeds of at least ten megabits per second per household, with reliable, secure, and always-on service; (2) cheaper and easier computers (particularly computers that respond to voice as opposed to keyboard instructions) coupled with cheaper and higher quality display screens; and (3) access to extensive free Internet video, music and text libraries (not to mention shared personal camera work!).

Even if only as many homes went online as now watch satellite and cable video—about eighty-five percent—many social benefits could be distributed and many social needs served.³⁷ Political associations could be created more readily, thus increasing participation in democracy; new social groups could promote a greater sense of participation in community. Health care and education could more efficiently be distributed to target populations that are otherwise costly to reach, such as workers or those geographically distant from medical centers and schools.

From an economic perspective, each potential subscriber obtains value from joining the network, and adding a new subscriber increases value for everyone else on the network. So when a new subscriber pays for the ability to call existing subscribers, all existing subscribers get the additional benefit of calling the new participant. That additional benefit is external to the new subscriber's transaction. A government, however, may reasonably try to realize for all citizens the external benefits of network size.

B. *Means of Implementing Universal Service*

Without elaborating on the justification, a lesson of politics in America is that if any part of the country obtains subsidies for communication networks, that part is most likely to be rural America. This has always been a fact of politics under our federal system, given the political power disproportionately allocated to states with relatively less population. The question is not whether urban America should want to spend money to connect rural America to a common network. It is instead how to use the certainty of such expenditures as a catalyst for designing a universal broadband system that benefits the whole country. Two ways of universalizing access to broadband are outlined below; more may well emerge from further consideration and public discussion of the objective.

Each proposal would cost much less than many other discretionary

37 See MOTION PICTURE ASS'N OF AM., *supra* note 9, at 41, 45 (estimating number of households subscribing to cable and satellite).

expenditures of public funds. Moreover, each is less than or similar in magnitude to other spending ordered by the FCC. For instance, the FCC has ordered that every American must buy television sets with a digital over-the-air tuner, even though by the time the order goes into effect less than ten percent of Americans will be watching over-the-air TV.³⁸ Currently, each American household has about two televisions per home.³⁹ A tuner will cost about \$200 per TV.⁴⁰ With \$400 from each home, the FCC might have enough subsidies to ensure that virtually all households could pay for broadband. Alternatively, the FCC could repurpose extant subsidies for local voice—probably about \$30 billion a year in indirect and direct subsidies. Even federal universal service alone (an explicit fund) is more than \$5 billion a year. Or Congress could sell the digital TV channels it gave for free to broadcasters for digital over-the-air broadcast (a market that will never be large, given that eighty-five percent of homes already watch TV over cable or from a satellite). A handful of channels would fetch in the billions. The total amount of spectrum given to broadcasters for digital TV has been said to be worth as much as \$70 billion.⁴¹ In short, there is more than enough money under the command of the FCC and the state regulators to support a universal broadband policy, given the pre-existing willingness to pay that has already been demonstrated by many millions of end users. So let us turn to possible techniques for supporting big broadband to every household.

1. Assignable Tax Credit

A traditional policy approach to universalizing broadband would be to grant to every consumer an assignable tax credit. Consumers would grant that credit to any firm that provided the requisite minimum broadband access. Cable, telephony, and any other entrant, such as wireless, would compete for the credit. It would be annually assignable, so that competition would remain vibrant and innovators in broadband access could win the credit in the future.

In the case of broadband, as mentioned above, studies have shown that about thirty million households are willing to pay the current market price for at least little broadband (one megabit per second), which is in

38 See *In the Matter of Review of the Commission's Rules and Policies Affecting the Conversion to Digital Television*, 7 FCC Rcd 15,978, 15,979 (2002), 2002 FCC LEXIS 3997 at *1 [hereinafter *Conversion to Digital*].

39 UNITED NATIONS, ICT AT A GLANCE: UNITED STATES (2002), available at <http://unpan1.un.org/intradoc/groups/public/documents/apcity/unpan008352.pdf> (last visited Dec. 6, 2003).

40 *Conversion to Digital*, supra note 38, at 15,983.

41 Common Cause, *Channeling Influence: The Broadcast Lobby and the \$70 Billion Free Ride*, at http://www.commoncause.org/publications/040297_rpt2.htm (last accessed Jan. 13, 2004).

most places about forty to fifty dollars per month.⁴² In order to convert most of the remaining seventy million households to broadband, the credit might need to be as much as ten to twenty dollars per month. For the sake of encouraging widespread construction of big broadband networks, the credit could be assigned to every household regardless of income level. However, in rural areas, where distances create larger costs, the credit would have to be larger. In the aggregate, at fifteen dollars per month for one hundred million households, the total credit would be about eighteen billion dollars a year. When revenues returned the cost of capital, the credit could be reduced to a level that supports the expenses of maintenance and replacement.

The broadband provider could charge whatever the market would bear. It would not obtain the credit, though, unless it won the customer. Therefore, the provider would be encouraged to experiment with differentiated services in order to induce customers to subscribe. One household might subscribe if broadband were bundled with cable; another might prefer a combination of wireless and broadband; a third might select a long distance voice and broadband bundle. Marketers would invent many other techniques to win the customer and the accompanying credit. In some cases the provider might give away broadband to very low-income customers just to win the credit. Such market-based techniques should be encouraged: The goal would be to get everyone online.

By comparison, the e-rate alone distributes about four billion dollars a year to private sector firms that provide Internet access in two million classrooms. Obtaining big broadband access for one hundred million homes in return for tax credits at only about four times that level hardly seems disproportionate in terms of cost and benefit.

2. Consolidated Access Networks

Another proposal is for government to encourage cable and telephony to merge their local access networks or at least the broadband portion of their networks, thus saving each of them substantial costs. As a condition, they would each be free to offer services in competition with each other. Another condition could be the requirement that the merged entity expand the scope of the resulting access networks to ten megabits per second. This model resembles the exemption from the antitrust laws passed by Congress to permit local newspapers to share printing facilities in order to obtain economies of scale in distribution while continuing to compete in the content business.

42 McKinsey & Co., *supra* note 18.

C. *Economic Stimulus*

Either of these proposals, and the better ones that surely could be advanced, would provide economic stimulus to the networking industry. The proposals would also ensure adequate returns on previous last-mile spending by cable and telephony and generate both innovation and competition at the service layer of the big broadband networks of the future. These proposals are goal-oriented, seeking to tie the nation together in the new medium of broadband and to use that new medium as a platform for innovation in services. Such policies pose less risk and promise more predictability for the ICT industry as a whole than the current FCC plan. Moreover, as big broadband networks reach every household, we will be able to dispense with the current voice subsidies and, incidentally, the need for perhaps all regulation limiting ownership in media markets (given that the new broadband network would give distribution to any content).

IV. Broadband and Economic Growth

Few countries have the two parallel networks that tempt United States regulators to endorse the convergence of both into broadband competition. In most other countries with two networks, national regulators fear that in any geographic market ICT firms will divide territory either by colluding or competing until one broadband technology prevails.⁴³ They tend to believe that the access link is a natural monopoly. They are concerned that their economies are not sufficiently vibrant to attract capital even to a two-network competition in broadband, given the high fixed costs in that market. As a result, other nations are moving towards the creation of a single national provider of broadband physical links. The South Korean government, for example, built a nationwide fiber network, then opened up provision of retail services to competition. Vendors are compelled to carry communication to each other (called interconnection), which helps to prevent market domination by a single service provider. The result is widespread broadband access at a reasonable price to the consumer, and the envy of the world.⁴⁴

Very often in the history of communications policy, the United States has gone its own way to its benefit. When all Europe decided to mandate a

43 See Scott Beardsley & Luis Enriquez, *A Regulatory Remedy for European Broadband*, MCKINSEY Q., Jan. 1, 2002, at 156 (highlighting the need for European regulators to ensure local competition in broadband markets).

44 See Ken Belson & Matt Richtel, *America's Broadband Dream Is Alive in Korea*, N.Y. TIMES, May 5, 2002, at C1; see also *After the Telecommunications Bubble*, supra note 1 (noting that Japan has had success with regulations designed to encourage competition in provision of high-speed Internet access).

single cellular transmission standard, GSM, America opened the door to standards competition that in turn permitted the CDMA industry to develop here at home and win foreign markets, especially in Asia.⁴⁵ But in broadband, it is far from clear that the United States' unusual approach is the wisest. If the FCC were to adopt policies promoting big broadband to all households, we could better ensure our competitiveness with other national economies and bring our ICT policies into line with the new Keynesian approach taken by the Administration with respect to tax policy.

At the very end of the last century, narrowband Internet access became the fastest growing communications service in history. That narrowband access used the copper monopoly in access as its key link. The telephone companies were not permitted to seek advantages in service markets by selling the access discriminatorily.

Narrowband Internet created the platform—the widespread interconnected web experience—that in turn was the petri dish for the growth of dot coms. Entrepreneurs experimented with selling on and through the web everything from pet supplies to cars to airplane tickets. Many such efforts failed, principally because delivery of tangible objects takes place not in cyberspace but in the real, three-dimensional world where movement costs money. Notwithstanding deep skepticism expressed in the popular press, predictions of e-commerce growth have come true, more or less. Through June of 2003, the Dow Jones Internet Index was up fifty-two percent for the year.⁴⁶ EBay's third quarter 2003 revenue was half a billion dollars—up over ninety percent from last year.⁴⁷ And Yahoo!'s market value was more than twenty billion dollars by November 1, 2003—if not nearly what it was during the boom, still a prodigious number.⁴⁸ According to Professor Tom Eisenmann, the aggregate capital contributed to dot-com companies that relied on the access of narrowband Internet has earned at least an internal rate of return of about nine percent.⁴⁹ Many Internet companies failed, but their losses were more than offset by the valuation gains of successful dot coms like Yahoo! and eBay.

45 For a brief introduction to the different cellular transmission standards, see *Spread Betting: How Code-Division Multiple Access (CDMA) Technology Emerged as the World Standard for Mobile Phones*, *ECONOMIST*, June 19, 2003.

46 Dow Jones Indexes, at <http://www.djindexes.com/jsp/indexReportDirector.jsp?prodnum=5&pname=Internet%20Indexes> (last visited Dec. 6, 2003).

47 Quotes & Info: Ebay, Yahoo! Finance, at <http://finance.yahoo.com/q/is?s=EBAY> (last visited Dec. 6, 2003).

48 Quotes & Info: Yahoo!, Yahoo! Finance, at <http://finance.yahoo.com/q/ks?s=YHOO> (last visited Dec. 6, 2003).

49 See Thomas R. Eisenmann, *Valuation Bubbles and Broadband Deployment*, in *The Bandwidth Explosion: Living and Working in a Broadband World* (Stephen Bradley & Robert Austin eds.) (forthcoming 2003) (manuscript on file with Yale Journal on Regulation).

Big broadband is the new narrowband and will likely provide similar opportunities for growth, especially since it will spur demand for new technologies that current Internet access cannot support. More demand for existing services, new services, new connectivity, and new ideas is the right answer for communications markets. With more demand, new investment will naturally follow in due course. By contrast, promoting investment in the absence of perceived demand either will not work or will not work as well.

V. Conclusion

Broadband policy should stimulate demand. It should not pursue any action that is certain to cause economic harm to cable and telephony firms, given the decades-long government encouragement of capital investment by these firms. However, it should stimulate growth through an efficient universal service policy that will produce economic and social benefits. A decade ago, John Malone, one of the most important builders of the American cable networks, predicted that three inventions—the microprocessor, digitization, and fiber optics—would revolutionize the media and communications industries and drive their convergence into a single market.⁵⁰ He foresaw a 500-channel universe.⁵¹ In late 1993, to capture the value of this triple revolution of technology, he sought to merge his cable company, TCI, with the phone company, Bell Atlantic.⁵² The two together promised to build an “information highway” to at least forty percent of all homes in the United States. This highway would carry all voice and all video channels to each home. To support this big pipe, the two companies would raise the capital necessary to build fiber networks to homes. The merger plans collapsed in 1994.⁵³

Now Malone’s prescient vision of providing access plus all services deserves to be revived, although not in the form he proposed a decade ago. After all, since the Bell Atlantic-TCI merger was proposed, the Internet has arrived. Yet Malone was right to say that the access network is key to innovation and growth in ICT. Even with little broadband, the access bottleneck will be exasperating for years to come. Current microprocessors are able to display in fractions of seconds movies or videoconferences that fiber can carry at the speed of light from anywhere in the world. At the screens of these information-hungry computers sit a hundred million people who wait impatiently for still pictures and words to resolve

50 See John Greenwald, *Wired! Bell Atlantic’s Bid for Cable Giant TCI Is the Biggest Media Deal in History*, TIME, Oct. 25, 1993, at 50.

51 *Id.*

52 *Id.*

53 *Id.*

themselves into recognizable form. Rather than waiting hours to download a film, a consumer drives to Blockbuster for a rental. So we have a problem of complementary products: no shoestrings, plenty of shoes; no access network, plenty of services that would like to get across that network. We have skimpy connection and plenty of computing potential that yearns for the big broadband connection.

Many chapters of regulatory history counsel against government policies that promote specific technologies. However, a high capacity physical link is not so much a technology solution as a platform for innovation and a basis for service level competition. It should be not a barrier for innovation but a door to a future of technological discovery. And, because our ICT sector is ailing, it would provide a short-term remedy of demand stimulus.

