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Magalie Roman Salas  
Secretary, Federal Communications Commission  
445 12th Street, S.W.  
TWB204  
Washington, D.C. 20554

Dear Ms. Salas:

I am submitting for your consideration a research study I have written entitled "Investment in Cable Broadband Infrastructure: Open Access is not an Obstacle", for your consideration in the proceeding concerning the transfer of MediaOne's cable licenses to AT&T, CS Docket No. 99-251.

I am a full Professor of Information, Economics and Public Policy at the University of Michigan. My curriculum vitae is available at <http://www-personal.umich.edu/~jmm/resume.html>. I am well-known as one of the founders of the field of Internet economics, a topic on which I have been publishing since before the Internet was commercialized, and before the Web was invented. I was the Program Chair of the 25th Annual Telecom Policy Research Conference, and current serve on its Board of Directors. I am currently co-chair of the ACM's Electronic Commerce 2000 research conference, and chaired and served on the program committee of several other relevant international research conferences. I am a co-editor of four scholarly journals, the Director of the Program for Research on the Information Economy at Michigan, and the faculty coordinator of our new graduate program in Information Economics, Management and Policy, as well as the Director of Doctoral Studies at our School of Information.

I strongly support a requirement that AT&T and other cable companies provide nondiscriminatory open access to Internet service providers that wish to reach customers via cable broadband lines. I do not support free-riding: cable providers should be allowed to price the access transport service at whatever level the market will bear (competition from DSL, for example, will provide a market constraint on monopolistic pricing), as long as those prices are non-discriminatory and in fact do not favor the cable companies' vertically-affiliated Internet service providers (such as RoadRunner and Excite@Home).

My research study provides detailed quantitative analysis to show that open access will not slow down investment in broadband. Even under the conservative, worst-case (for cable operators) assumptions I use the returns on broadband investment will be 60% higher than normal rates of return. I believe that this is the first careful, detailed research on investment returns to be presented to the public for scrutiny. Although AT&T has repeatedly claimed that its investment will not be lucrative under open access, I have been unable to discover a single shred of evidence publicly presented by AT&T on this question.

I support non-discriminatory open access with no price regulation for other reasons. It is technically feasible, as AT&T has been increasingly admitting through its publicly announced plans to move to open access in the future, and now its announced agreement with MindSpring. Competition in Internet service provision will, of course, lead to lower consumer prices for service provision, higher customer service quality, and a much greater variety of service offerings for consumers.

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December 7, 1999

I would be happy to discuss the research in my study, or the other related issues, with FCC staff.

Sincerely,

A handwritten signature in black ink, appearing to read 'Jeffrey K. MacKie-Mason', with a long horizontal flourish extending to the right.

Jeffrey K. MacKie-Mason  
Professor of Information, Economics and Public  
Policy

Cc:

International Transcription Service, Inc.  
To-Quyen Truong, Associate Chief, Cable Services Bureau  
Royce Dickens, Deputy Chief, Policy and Rules Division, Cable Services Bureau  
Frances Eisenstein, International Bureau  
Walter Strack, Wireless Telecommunications Bureau  
Sunil Daluvoy, Cable Services Bureau

**Investment in Cable Broadband Infrastructure:  
Open Access is Not an Obstacle**

**Professor Jeffrey K. MacKie-Mason**

**School of Information,  
the Department of Economics,  
and the School of Public Policy  
at the University of Michigan**

**November 5, 1999**

**Professor Jeffrey K. MacKie-Mason**

**301C West Hall  
University of Michigan  
Ann Arbor, MI 48109-1092  
[jmm@umich.edu](mailto:jmm@umich.edu)**

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## EXECUTIVE SUMMARY

“The Canadian Cable Television Association is committed to the implementation of third party access, in large part because it is in the cable companies’ financial interests.”  
Reply comments of the Canadian Cable Television Association in PN 98-14, 10/30/98,  
p. 2 (<http://www.crtc.gc.ca/internet/1998/8697/c12/02/ccta/981030fc.doc>).

The cable television industry in the United States has stated that its overarching goal is to transform from traditional multichannel video program providers to full service telecommunications providers, able to offer to consumers a full range of services, including video, local and long distance telephony, and high-speed Internet access services. AT&T is the exemplar: it has embarked on a massive program to deliver a bundle of telecommunications and advanced information services to U.S. residences. In the past year, AT&T has catapulted to become the nation’s largest cable operator through its acquisition of TCI and its proposed acquisition of Media One. Moreover, through a series of joint ventures with most of the other large cable providers, AT&T is positioned to deliver local phone service over cable to a substantial portion of the homes passed by cable in the U.S.

The cable industry generally, and AT&T specifically, has asserted that if cable operators are not allowed to maintain exclusive control over which Internet Service Providers (ISPs) their customers can use over the broadband cable infrastructure, they will not make the infrastructure investments necessary to make cable broadband Internet services widely available. Simply put, AT&T claims that unless its own vertically-affiliated ISP is the exclusive choice for Internet access, its cable upgrades will not be profitable, and will be too risky to justify the large investments needed.

It is important to understand that there are two separate services at issue, sold in two separate markets. One service is broadband last-mile transport, or the carriage of digital data between end users and ISPs. The second service is Internet service provision, which includes not only access to the Internet, but a value-added set of services such as content, chat, e-commerce and other features and functionality.

*Open access will not reduce the value of broadband last-mile transport infrastructure.*  
Incumbent cable operators will have substantial market power over broadband last-mile transport, and thus last-mile transport *investments will be profitable* even with open access. Cable operators will retain their market power because most will face at most one competitor, the incumbent local phone company selling DSL broadband service. Open, non-discriminatory access would not create any alternative suppliers of broadband last-mile transport, so cable operators’ market power would be undiminished. While some cable operators’ vertically-affiliated ISPs may lose market share under open access, cable operators could charge the same price for transport to competitive ISPs as they charge to their affiliated ISP. Control over the price of transport provided to ISPs by the cable operator ensures profitability.

*Open access will reduce the risk that cable broadband transport will be unprofitable.*  
Open access would increase the variety and quality of ISP services, making cable

delivered Internet service appeal to *more* customers, increasing cable operator revenue and thereby reducing risk.

Investments in broadband facilities will be so profitable that even under extremely conservative assumptions ("worst case" for cable operators such as AT&T), ample incentive exists for cable system upgrades. Specifically, this paper demonstrates that, even with zero revenue from a vertically-affiliated ISP (an extreme and unrealistic assumption):

- Investing in the infrastructure to provide local phone service and cable broadband Internet access yields more than a 60% higher return than does merely operating the cable companies as video distribution services; and
- If cable companies such as AT&T were to make the necessary investment to support local telephony – which is its often-stated plan – then making the incremental investment necessary for broadband Internet services would yield more than a 250% higher return than would cable TV alone.

*That is, AT&T and others will earn nearly three times as much profit per dollar of additional investment from adding open access broadband transport to the planned cable TV / local telephony network bundle, as they will earn on the cable TV investments already made. This is a rare, extraordinarily valuable opportunity.*

It may be that, as AT&T claims, it will earn even higher profits if permitted to monopolize Internet service over its broadband cable. However, more profit than the already extraordinary profit available from open-access broadband may make AT&T shareholders happy, but is clearly not a justification for reducing competition or for reducing broadband investments.

The evidence already shows that investment in broadband facilities is strong when open access is required. In the U.S., telephone companies are investing in DSL facilities, despite the requirement that they provide open access. And in Canada, where the requirement to provide open, non-discriminatory access was announced in January 1996, the major cable operators are investing in broadband facilities faster than the major U.S. cable operators.

Cable company statements that they will not invest in broadband last-mile facilities are not credible. The cable companies may *claim* they won't invest, but carrying out this threat would be irrational and contrary to their shareholders' interests.

Indeed, careful economic analysis shows that open access may increase last-mile broadband transport profits for cable operators such as AT&T. Cable companies would be able to charge the same price to competitive ISPs for broadband last-mile transport as they could have charged their vertically-affiliated ISP, and in addition, *the number of residential subscribers would likely be greater.*

Open access would foster increased residential subscriptions to cable modem service in three ways: (i) competition among ISPs would encourage them to offer *higher quality, lower-priced service* than an exclusive vertically-affiliated ISP would provide, and

consumer demand for cable modem service would be stimulated by the low prices and high quality; (ii) *existing ISPs would help migrate their current dial-up customers* to faster cable modem service; and (iii) there would be *much more variety* in ISP services available with cable modem service under open access, which would attract a broader segment of the market for broadband services.

Other independent analysts, such as Merrill Lynch, agree that open access would be successful for cable operators. Indeed, even the organization that represents Canadian cable operators agrees that open access is in their financial interest.

In summary, under open access:

1. Broadband service profits will be *more than sufficient* to induce rapid investment.
2. Cable broadband transport *profits will be higher*.
3. *Consumers will benefit tremendously* from the greater quality and variety of ISP service. This will increase penetration rates, and we will reach the Nation's goal of widespread broadband information infrastructure more quickly.

## 1. Introduction

This paper examines the effect of an open access requirement on the incentives of cable operators to invest in the facilities necessary to offer advanced communications services over their cable systems. I present two separate, in-depth analyses. The first analysis, in Section 2, shows that under open access the expected return on investment will be more than sufficient to support aggressive broadband upgrades, and that the investment risk will decrease. The second analysis, in Section 3, shows that open access may actually increase cable companies' profits. Penetration rates for cable modem service would be higher under open access conditions because competition among ISPs would bring about more variety, higher quality, and lower-priced ISP services on the cable network. Higher penetration will lead to increased broadband transport revenue and a broader set of revenue sources for cable operators, reducing the risk of investing in network upgrades in order to offer cable modem service.

## 2. Non-Discriminatory Open Access Will Not Diminish Investment

### 2.1. Overview

Cable operators say they will not invest, or will invest more slowly in the facilities necessary to provide broadband last-mile transport services if they are required to provide non-discriminatory access to unaffiliated ISPs.<sup>1</sup> In the first half of this paper, I evaluate that claim by examining the incentives for cable companies generally, and for AT&T in particular, to invest in broadband last-mile transport facilities.

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<sup>1</sup> “[AT&T] has said that if federal regulators require the company to open up their cable networks, AT&T would pull back from the investments needed to modernize the cable infrastructure.” (“AT&T: The house that Armstrong rebuilt,” CNET News.com, 4/22/99, <http://www.news.com/News/Item/0,4,35561,00.html>). The FCC summarizes AT&T's arguments in the TCI merger proceeding: “According to AT&T-TCI, any equal access conditions such as those advocated by opponents to the requested transfers will impose substantial investment costs and expenses on @Home, which will only delay and diminish its deployment of broadband services to residential customers... Moreover, argue AT&T-TCI, the advertising revenues provided by @Home's content are needed to offset the transmission costs incurred by providing cable modem service. (“Memorandum Opinion and Order In the Matter of Applications for Consent to the Transfer of Control of Licenses and Section 214 Authorization from Tele-Communications, Inc., to AT&T Corp.,” FCC 99-24, Federal Communications Commission, February 17, 1999, ¶89, p. 41)

### 2.1.1. The Payoffs

There are two distinct payoffs from investing in broadband last-mile transport facilities. It is important to distinguish between them. The first payoff, which I call “broadband last-mile transport revenue,” is payment from ISPs to the cable operators for the use of the last-mile facilities. The payment will generally be a fee for each broadband subscriber an ISP serves over the cable companies’ facilities.<sup>2</sup> The second payoff, “ISP income,” is revenue earned by cable operators through their ownership of vertically-affiliated ISPs.<sup>3</sup> For example, AT&T receives income and capital appreciation from its ownership share in the vertically-affiliated ISP, Excite@Home.<sup>4</sup>

Open access would increase cable companies’ broadband last-mile transport revenue, but may reduce their ISP income because of increased ISP competition.<sup>5</sup> Open access affects the payoffs differently because they are earned in different markets.<sup>6</sup> The first payoff is earned by cable companies in the broadband last-mile transport market. In this market, the cable companies sell ISPs broadband access to consumers. That is, the cable operator is selling digital communications links. In most areas, there are two or fewer firms sharing the broadband last-mile transport market: the incumbent cable operator and the incumbent local phone company.<sup>7</sup> In general, ubiquitous and affordable alternative broadband last-mile networks for residential consumers are not available.<sup>8</sup>

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<sup>2</sup> In practice, cable companies will either bill subscribers and forward a portion of each subscription fee to the ISP or ISPs will bill subscribers and remit a portion of that revenue to cable companies. In either case, ISPs are paying cable companies for last-mile transport. It may simplify things to think of cable companies as “upstream” firms, supplying an input, broadband last-mile transport, to ISPs, the “downstream” firms. ISPs use the input to supply broadband Internet access services to consumers. (See Appendix A).

<sup>3</sup> A “vertically-affiliated ISP” is an ISP which, like Excite@Home, provides Internet service on a cable company’s facilities, and is owned in part by the cable company. Due to its ownership interest, part of the vertically-affiliated ISP’s net income flows to the cable company.

<sup>4</sup> If the merger between AT&T and MediaOne goes through, AT&T will also get a payoff from its ownership share in the RoadRunner ISP.

<sup>5</sup> See Section 3.2.4 for an explanation of how open access increases broadband last-mile transport revenue.

<sup>6</sup> See Appendix A for formal market definitions and a chart that illustrates the markets and flow of funds.

<sup>7</sup> The broadband technology being deployed by phone companies is known as Digital Subscriber Line, or DSL.

<sup>8</sup> I discuss market power in Appendix A. I show that alternatives to the incumbent cable company and incumbent local phone company for broadband last-mile transport will not be generally available within the next few years.

Cable companies have a head start over local phone companies, and thus the cable companies have substantial market power. In an open access environment, the cable companies will provide last-mile transport to some combination of independent and vertically-affiliated ISPs and will collect revenue from them both. Even if open access shifts some ISP market share to independent ISPs, the cable company will still collect the broadband transport revenue. Indeed, as I show in Section 3, *broadband transport revenues are likely to increase.*

The second payoff, ISP income, is earned in the retail market for broadband Internet services. In this market, ISPs such as Excite@Home, Mindspring, AOL and countless others compete to sell broadband Internet access service to consumers. With exclusive access, there is only one ISP on each local cable broadband network: the incumbent local cable company's vertically-affiliated ISP. The cable operator may also profit through its ownership interest in the affiliated ISP. With open access, the vertically-affiliated ISP might lose market share, and earn less profit to share with its affiliated cable company. Cable companies say this decrease in vertically-affiliated ISP income will deter investment in broadband last-mile facilities.

Investment in broadband last-mile facilities would increase revenues and profits from both markets (last-mile transport and ISP service). Cable operators claim that even higher ISP income from exclusive access (which is to say, an affiliated ISP monopoly on broadband last mile cable links) is necessary to support broadband investment. As I show below, the revenues from broadband transport alone are more than sufficient to support aggressive investment, even if ISP income is zero. Indeed, open access may increase customer penetration so much that overall cable operator profits will be *higher*, not lower.

### 2.1.2. Framework for Analysis

Cable companies will invest in additional broadband last-mile transport facilities if the risk-adjusted expected return from the investment is positive and significant. I begin, in Section 2.3, by showing that open access will not increase the risk of investment in broadband last-mile transport facilities. The analysis then focuses on expected return.

I take a conservative approach to the analysis, giving the benefit of the doubt to the pessimistic cable operator views. I test whether investment in broadband last-mile facilities would be justified by broadband last-mile transport revenue alone. In effect, I assume that cable companies would earn *no* income from vertically-affiliated ISPs. I call assumptions such as this one “conservative” because they make broadband last-mile facilities appear in the analysis to be a worse investment than they actually are.<sup>9</sup> This gives confidence in the results of the analysis, because we know they do not depend on overly optimistic assumptions. It is, of course, overly pessimistic to assume that vertically-affiliated ISPs’ income will drop to zero.<sup>10</sup>

Assuming that ISP income is zero creates a powerful test of whether open access would prevent cable companies from investing in broadband last-mile facilities. If investment is warranted even under the worst-case assumption that ISP income is zero, then contrary to the claims of cable companies, *no* decreases in ISP income resulting from an open access requirement could be great enough to deter investment in broadband last-mile cable facilities. I perform the quantitative test in Section 2.4, and conclude that broadband last-mile transport revenue alone provides more than sufficient incentive for cable companies to invest in broadband last-mile facilities.

The second payoff is income from vertically-affiliated ISPs. Affiliated ISPs might do better if they are protected from competition by having an exclusive access monopoly. Even so, under open access the cable operators will earn *more* from their ISPs by expanding the broadband network than by refusing to invest. By investing to reach more homes, the ISPs will get more subscribers and earn more revenue. Broadband investment under open access increases the cable operators’ returns on the value of their equity in

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<sup>9</sup> I make conservative assumptions for a number of reasons. The most important reason is that I can feel confident about the result because I know it doesn’t depend on overly optimistic assumptions. Other reasons are simplicity, and the difficulty of finding, evaluating, and incorporating projections of a large number of variables, and evaluating the effect of all of the projections on the results of the analysis. At virtually every turn in the analysis requiring an assumption, I made a conservative one. The conservative assumptions discussed here are only the beginning; a list of them may be found at the end of Appendix B.

<sup>10</sup> Evidence that vertically-affiliated ISPs would have a bright future even in an open access environment is given in Section 2.4.8.

affiliated ISPs. Since AT&T already owns a controlling share in Excite@Home (and soon is likely to in RoadRunner), it will be reluctant to let that investment lie fallow.

## **2.2. A Great Deal Of Broadband Investment Has Already Been Made**

A great deal of investment in cable broadband facilities has already been made, and this sunk investment would not be affected by an open access requirement. Cable operators have been upgrading to fiber for a number of years. In 1997, cable operators installed more fiber than the massive regional phone operators (the RBOCs) did.<sup>11</sup> The FCC reported the status of cable system upgrades in their fifth report on competition in video markets:

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<sup>11</sup> *1998 MultiMedia Telecommunications Market Review and Forecast*, Telecommunications Industry Association/MultiMedia Telecommunications Association, 1998, p. 46.

### Cable System Upgrades by 1998

	% of systems with transmission facilities at 750 MHz or higher	% of systems two-way activated
Comcast	60%	60%
Cox	56%	50%
Cablevision	43%	70%
MediaOne	45%	49%
Adelphia	30%	21%
TCI	20%	26%
Time Warner	n.a.	85% (in 1999)*

Source: *Annual Assessment of the Status of Competition in Markets for the Delivery of Video Programming*, CS Docket No. 98-102, Federal Communications Commission, 12/17/98, p. 25.

**Note:** The cable companies in the table serve over 61% of cable subscribers in the U.S. (*Ibid.*, Table C-3).

\*The source for this table does not give 1998 data for Time Warner. This figure is from "AT&T: Going Local via Cable," *Wired News*, 2/1/99, <http://www.wired.com/news/news/business/story/17644.html>

Moreover, investment is occurring so rapidly that these data are out of date. The number of cable homes passed by Excite@Home increased 50 percent, from 10 million to 15 million, in the six months between September 30, 1998 and March 31, 1999.<sup>12</sup> Recent reports indicate that half of the entire country's cable systems have been upgraded to a standard high enough to offer broadband Internet access.<sup>13</sup> The upgrade of AT&T's holdings in TCI is expected to be 60% complete by the end of 1999 and 90% complete by the end of 2000.<sup>14</sup> MediaOne expects its 70% of its systems to be upgraded to 750 MHz

<sup>12</sup> @Home reported 10.0 million homes passed on 9/30/98 ("@Home Network Reports Fourth Quarter and 1998 Results Subscriber Base Grows to 331,000 @Home Revenue Increased 546% During 1998," Excite@Home press release, 1/20/99, 1999, [http://www.home.net/news/pr\\_990120\\_01.html](http://www.home.net/news/pr_990120_01.html)) and 15.0 million 3/31/99 ("@Home Network Reports First Quarter Results," Excite@Home press release, April 13, 1999, [http://www.home.net/news/pr\\_990413\\_01.html](http://www.home.net/news/pr_990413_01.html)).

<sup>13</sup> See "The Battle for the Last-mile," *The Economist*, May 1, 1999.

<sup>14</sup> *Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996*, CC Docket No. 98-146, Federal Communications Commission, 1/28/99, p. 18.

with two-way activation by the end of 1999.<sup>15</sup> By the end of 1999, the five largest cable companies, which pass about three-quarters of the households in the U.S., will be able to offer broadband service to 65% of households in their service areas.<sup>16</sup> Road Runner says that by the year 2000, its service will be available to all of the 27 million homes passed by Time Warner and MediaOne, as well as homes passed by other affiliated companies.<sup>17</sup> These data indicate that cable companies' broadband facilities have already been deployed in many areas and are therefore not at risk to any effect of an open access requirement. Moreover, as I show next, an open access requirement would not deter continued investment in broadband last-mile facilities.

### **2.3. Open Access Reduces Cable Companies' Risk**

Investments are evaluated by comparing the incremental revenue from the investment with the incremental cost of the investment, taking into consideration the risk of the investment.

Opponents of open access to cable networks argue that such a requirement will increase the risk of cable's investment in broadband facilities.<sup>18</sup> The rationale for this argument is that unless cable operators bundle the services of their vertically-affiliated ISPs with broadband last-mile transport, broadband services are less likely to catch on with the public because other ISPs have less interest in developing and marketing content "designed to take advantage of the high speeds that cable transmission can offer."<sup>19</sup> Absent this exclusive arrangement, they ask, how could cable operators "justify investing the millions of dollars required to upgrade its systems so as to offer broadband local

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<sup>15</sup> See "Media One Group," Merrill Lynch Capital Markets report, April 30, 1999. AT&T's acquisition of MediaOne has not yet been approved.

<sup>16</sup> "Broadband Today," Deborah A. Lathen, Bureau Chief, Cable Services Bureau, FCC, October, 1999, p. 26.

<sup>17</sup> *Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996*, CC Docket No. 98-146, Federal Communications Commission, 1/28/99, p. 31.

<sup>18</sup> "Without integration and accompanying *exclusivity*, risk may increase... leading to a reduction in the willingness to invest" (Ex Parte Written Submission of the National Cable Television Association, "Cable Modems, Access and Investment Incentives," by B. M. Owen and G. L. Rosston, CS Docket No. 98-178, filed Dec. 10, 1998, pp. 2-3) (emphasis supplied).

<sup>19</sup> *Ibid.*, p. 6.

transmission services with no assurance that the Internet access and content industries will offer the specific products and marketing services that might make such a venture profitable?”<sup>20</sup>

Backing a service provider that is committed to providing broadband specific content may reduce the risk of broadband investment. However, preventing customers from being able to reach *other* ISPs if they so choose does *not* reduce the investment risk. My analysis (see Section 3 below) shows that there would be *less* risk of consumer dissatisfaction and apathy if there is open access. If only one ISP is available and it is unsuccessful in marketing its services to the public, the cable operator will lose transport revenues. In contrast, if many ISPs are available and the public does not like the service offered by the vertically-affiliated ISP, consumers can use a different ISP on the same network. In that event, the cable operator will still be able to charge the competing ISP for network transport. As demonstrated below, broadband last-mile transport fees alone are enough to justify investment in broadband facilities.

There is another fallacy in the claim that a single, exclusive ISP will reduce risk because otherwise there may not be sufficient broadband content to attract broadband customers. Most content on the Internet is developed completely independently of the service provider. Moreover, a vast amount of content that is best suited to broadband is already widely available: music files, videos, Web-based TV programs, videoconferencing, and other high-bandwidth applications are well-developed and universally available, independent of the customer's ISP. The cable industry argument ignores the realities of Internet content development and availability.

#### **2.4. Quantitative Investment Analysis**

In this section, I show that there is more than sufficient incentive for cable companies to invest in broadband last-mile facilities, in the worst possible case: that open access causes income from vertically-affiliated ISPs to drop to zero.

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<sup>20</sup> *Ibid.*

#### 2.4.1. Services Produced Jointly By Upgraded Facilities

One of the reasons cable operators are upgrading their facilities so rapidly is the multiplicity of non-Internet services that can be offered over them. Upgraded cable plant can be used to supply digital TV, telephony, fax service and video-conferencing, as well as Internet access service.<sup>21</sup> Moreover, digital facilities allow cable companies to increase channel capacity for traditional video offerings and improve reception quality.<sup>22</sup> Many of these services, of course, are produced jointly; that is, the investment necessary to deliver several services is shared. This is great news for cable companies, but complicates the analysis of broadband Internet access, because joint investment will support multiple revenue-generating services other than Internet services. In my investment analysis, I conservatively account only for revenues from analog cable TV, telephony, and broadband Internet access. This is conservative because adding revenues from other services would make the investment appear even more attractive.

Indeed, there is substantial evidence that broadband last-mile facilities will produce revenue from fax, videoconferencing, and digital cable TV services, and will provide increased channel capacity and better reception. Comcast and TCI, in submissions to the FCC, specifically mentioned increased video channel capacity as one of the reasons for their recent cable system upgrades.<sup>23</sup> AT&T announced that it is accelerating TCI's upgrade in part to increase video capacity.<sup>24</sup> TCI believes that digital video is a widely appealing product that will achieve high penetration among its customers, and has thus made virtually all of its headends capable of delivering digitally compressed tiers. Cox,

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<sup>21</sup> *Annual Assessment of the Status of Competition in Markets for the Delivery of Video Programming*, CS Docket No. 98-102, Federal Communications Commission, 12/17/98, p. 13.

<sup>22</sup> “[S]ome operators have chosen to increase channel capacity through the deployment of digital platforms. Through upgrades and rebuilds, ... operators can increase the bandwidth of their networks, thus enabling them to offer additional channels of video service, as well as other services (i.e. Internet access, telephony) Through digital compression techniques, ... operators can have the option offering their customers more video channels or a higher quality of resolution and reception.” (*Annual Assessment of the Status of Competition in Markets for the Delivery of Video Programming*, CS Docket No. 98-102, Federal Communications Commission, 12/17/98, p. 11).

<sup>23</sup> See *Annual Assessment of the Status of Competition in Markets for the Delivery of Video Programming*, CS Docket No. 98-102, Federal Communications Commission, 12/17/98, p. 25. Together, Comcast and TCI serve about a third of the nation's cable subscribers. (*Ibid.*, Table C-3).

<sup>24</sup> See AT&T press release, “AT&T provides financial guidance for 1999,” 1/8/99, <http://www.att.com/press/item/0,1193,274,00.html>.

Comcast, Time Warner, and MediaOne are all offering digital video services. Analysts predict that digital penetration for six of the nation's largest MSOs will reach between 25%-50% within the next three years.<sup>25</sup> <sup>26</sup> Digital TV service will add about a third to the average cable TV subscribers' bill.<sup>27</sup> Clearly, cable companies are not relying solely on *Internet* transport revenues to justify broadband facility investments. Nonetheless, to err on the conservative side, I have not included these several sources of additional revenue in my calculations.

#### 2.4.2. Reasons For Choosing AT&T To Study

The next two sections present a quantitative analysis of AT&T's investment decision. I chose AT&T as the subject of my study for a number of reasons. First, AT&T has often stated publicly that it will not invest, or will invest more slowly, in the facilities necessary to provide broadband Internet access services, if it is required to provide non-discriminatory access to unaffiliated ISPs.<sup>28</sup> Second, AT&T is an instructive example because it has announced plans to provide a bundle of advanced services on its new cable systems. Third, AT&T is the most important example, since, with or without the MediaOne merger, it will be the largest cable company.<sup>29</sup> In addition, analysts estimate that with its agreements to provide telephony services to the subscribers of other cable

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<sup>25</sup> See *Annual Assessment of the Status of Competition in Markets for the Delivery of Video Programming*, CS Docket No. 98-102, Federal Communications Commission, 12/17/98, pp. 30-31.

<sup>26</sup> See *Annual Assessment of the Status of Competition in Markets for the Delivery of Video Programming*, CS Docket No. 98-102, Federal Communications Commission, 12/17/98, pp. 30-31.

<sup>27</sup> Merrill Lynch and Credit Suisse Boston Corporation report that digital cable service generates \$15 and \$16, respectively, for Media One Group. Credit Suisse Boston says that the average Media One Group video subscriber pays \$41 per month (exclusive of digital TV service). See "Media One Group," Merrill Lynch Capital Markets report, April 30, 1999; and "Media One Group," Credit Suisse First Boston Corporation report, 1/7/99. The FCC reports that the in 1998, the average cable subscriber paid \$42 per month. (*Annual Assessment of the Status of Competition in Markets for the Delivery of Video Programming*, CS Docket No. 98-102, Federal Communications Commission, 12/17/98, p. 17)

<sup>28</sup> See footnote 1.

<sup>29</sup> For cable MSOs' market shares, see *Annual Assessment of the Status of Competition in Markets for the Delivery of Video Programming*, CS Docket No. 98-102, Federal Communications Commission, 12/17/98, Appendix C-5.

companies, AT&T will be able to market cable telephony services to almost two thirds of homes passed by cable, about 60 percent of all households in the U.S.<sup>30</sup>

It is important to remember that other cable operators could adopt strategies similar to the one described below, by bundling cable TV, broadband Internet transport, and local and long distance phone service, perhaps with an affiliated long distance carrier. Indeed, the bundling of cable TV and broadband Internet transport began several years ago in the US, by most of the major cable operators including TCI, Time Warner, Comcast, MediaOne and Cox. Bundled provision of cable TV and local telephony has been commercially successful elsewhere for several years, for example in the United Kingdom. Thus, while the calculations below are somewhat specific to AT&T's situation, the analysis would be similar for all large cable companies.

#### 2.4.3. Quantitative Investment Analysis Method

The standard method for analyzing investment decisions is the net present value (NPV) method.<sup>31</sup> The analysis I perform is a simplification of that method; I simplify by making conservative assumptions at every turn. A standard NPV analysis in this case would start by presuming that AT&T would continue to offer cable TV services, and is considering offering advanced services as an increment to cable TV. In my analysis I used the same framework. I assumed that AT&T prefers keeping its cable TV companies to selling them, and tested whether the NPV of offering advanced services is as great as the NPV of keeping its cable companies.<sup>32</sup> Under the assumption that keeping the cable companies is

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<sup>30</sup> "Following the successful conclusion of the UMG merger, Comcast partnership and Time Warner JV, we anticipate that AT&T will have the ability to market cable telephony services to an approximate 62.5M homes passed." (Merrill Lynch analyst's report, "AT&T Gets UMG and (Amazingly) Comcast JV Without Bidding War – Very Positive!," 5/7/99).

<sup>31</sup> In a net present value analysis, the cost of the investment is subtracted from the net present value of the incremental cash flow from the investment. If the NPV is positive, the investment is worth making. The present value of cash flows is calculated using an appropriate interest rate (or a "discount factor") to adjust for the fact that one dollar in a future year is worth less than a dollar today, because money held today could be invested to yield a dollar plus interest at the future date. (See R. Brealey and S. Myers, Principles of Corporate Finance, 5<sup>th</sup> ed., NY, McGraw Hill, 1996).

<sup>32</sup> This assumption is valid even if AT&T were to assert that without the opportunity to invest in local telephony and broadband Internet transport it would not have purchased its cable companies. That would be a *strategic* decision by AT&T about the lines of business in which it wants to participate, not evidence that the cable companies are not worth maintaining as standalone investments if the other services were not

a positive NPV project, and a simplifying assumption about operating cost,<sup>33</sup> investing in the facilities necessary for advanced services is a positive NPV project (worth investing in) if the revenue per dollar of investment from advanced services is at least as large as the revenue per dollar of investment from cable TV. So, for simplicity and due to data constraints, I compare revenue per dollar of investment from advanced services to revenue per dollar of investment for cable TV service. Under the conservative assumptions I have made, this is equivalent to the NPV method.<sup>34</sup>

I analyze two investment decisions cable companies face. First, I analyze the decision to invest in facilities necessary to produce both phone, and broadband data transport for Internet access service, together. Second, I analyze the incremental decision to offer broadband Internet services assuming that the decision to provide phone service has already been made. In this second analysis, I balance the incremental payoff to the cable operator from offering broadband Internet access services against the *incremental* investment necessary to provide broadband Internet access given that the facilities necessary to provide telephone services are already committed. The following table below summarizes the inputs to the two analyses:

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an option. Both TCI and MediaOne were, and for that matter all of the major cable companies are, viable standalone companies with publicly traded stock. That there is active buying and selling of their shares demonstrates that the financial markets collectively conclude that these companies are viable, positive NPV investments.

<sup>33</sup> Due to the absence of good information about operating costs, I make the simplifying assumption that operating cost per dollar of revenue is the same for advanced services as for the cable operator as a whole, if it offers just cable TV. This is a conservative assumption. The cost of operation as a whole includes overhead, whereas advanced services operating cost, because it is incremental, would incur much less overhead. Details about this assumption may be found in Appendix B.

<sup>34</sup> I discuss the relationship between revenue per dollar of investment and NPV in Appendix B, and provide a simple proof that my study is equivalent to an NPV study under the assumptions I have specified.

	<b>Decision 1</b> phone and broadband together	<b>Decision 2</b> broadband incremental to phone
<b><u>Investment</u></b>	joint cost incremental phone cost incremental broadband cost	incremental broadband cost
<b><u>Revenue</u></b>	phone revenue broadband revenue	broadband revenue

To ensure further that the analysis is conservative, I made the following "worst case" assumptions:

- The income earned by a vertically-affiliated ISP (such as Excite@Home or Road Runner) falls to zero under open access.
- Cable companies get no incremental revenue from cable TV services provided by investments in broadband digital facilities, such as expanded channel capacity, enhanced reception quality, or subscription to advanced cable TV services.
- There is no revenue from other services, such as fax and video conferencing.
- No broadband facilities are yet deployed; both new *and* existing investment must be justified by telephone and broadband Internet transport revenue.
- Open access does not increase transport revenues due to quality and variety improvements.<sup>35</sup>

Where differing but plausible estimates of costs or revenues were available, I chose the estimates least favorable for investment. For example, I had estimates of toll revenue per incremental residence customer as high as \$67 for Sprint customers and \$49 for MCI customers (and Sprint and MCI customers are the incremental customers, since AT&T will get no *incremental* revenue from its current customers), yet I used AT&T's own

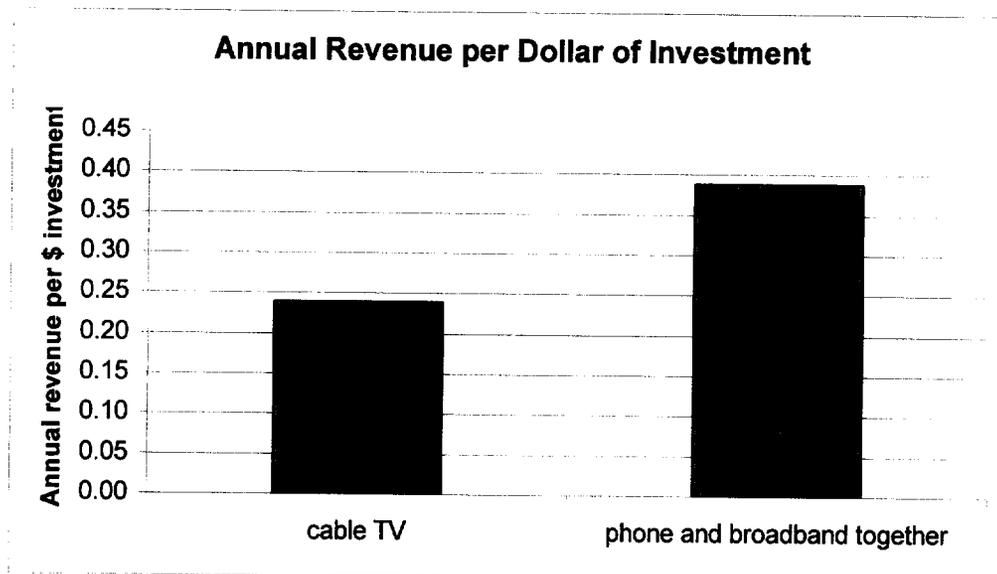
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<sup>35</sup> See the next section for a demonstration that broadband last-mile transport revenue would increase under open access.

statement that, for most residence customers, the average toll bill is only \$17. AT&T paid greater than average prices for its cable companies, yet I assume that if AT&T were to sell them, it would get only the average price paid for cable companies.<sup>36</sup>

#### 2.4.4. Quantitative Investment Analysis Results: Phone and Broadband Together

Despite the several worst-case assumptions, my analysis yields a striking result: investment in cable broadband Internet transport and telephony facilities yields 62% more revenue per dollar of investment than holding cable companies just for TV distribution.<sup>37</sup> If holding cable companies just for TV distribution is expected to earn a normal return, then, under the assumptions I have described, investment in the facilities necessary to produce broadband last-mile transport and phone services together is expected to yield a return 62% above the normal rate of return.<sup>38</sup> This is more than sufficient incentive for cable companies to invest in broadband last-mile facilities, even under open access.



See Appendix B for details

<sup>36</sup> Data sources and selection are discussed in detail in Appendix B.

<sup>37</sup> See Appendix B for my analysis.

<sup>38</sup> Appendix B contains a brief proof that the ratio of revenue per dollar of investment for two investments is equal to the ratio of their returns, under the assumptions I have described.

Given such a strong result based on such conservative assumptions, there can be little doubt that it is in AT&T's interest to invest in broadband and telephony facilities under open access. If the second payoff, vertically-affiliated ISP income, were included in the analysis, investment would appear even more attractive.

#### 2.4.5. AT&T Will Offer Local Telephone Service

In the analysis above I assumed that AT&T will make the decision to invest in local telephone and broadband Internet facilities *together*. That is, I carried out the analysis as if AT&T would invest in *both* or *neither*. Yet AT&T has made it clear that providing facilities-based local telephony is central to its corporate strategy. Therefore, I now proceed to analyze the *separate* decision to invest in broadband Internet transport assuming that with or without open access, AT&T is committed to going ahead with local telephony investment and services.

There can be little doubt that AT&T intends to offer telephone services over its recently acquired cable plant, whether or not it offers broadband Internet access. AT&T has said repeatedly in the press that it intends to do so.<sup>39</sup> AT&T has consistently assured the FCC and other policymakers that it would offer local telephone service when it applied to the FCC for permission to merge with TCI,<sup>40</sup> and the FCC based its decision to approve the merger in part on AT&T's assurance that it would become a local facilities-based telecommunications competitor.<sup>41</sup> Upon the purchase of TCI, AT&T sent letters to its

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<sup>39</sup> "“Americans have been waiting for someone to run another wire to their homes to give them a choice in local phone service and deliver the advanced services they expect in a competitive market,” said AT&T Chairman C. Michael Armstrong in a statement announcing the bid. “Our earlier acquisition of Tele-Communications Incorporated and now our proposal for MediaOne Group should leave no doubt that we are serious about doing just that,” Armstrong said.” (“AT&T makes surprise bid for MediaOne,” CNET News.com, 4/23/99, <http://www.news.com/News/Item/0,4,0-35540,00.html?st.ne.ni.rel>). “As a key part of the company’s strategy... AT&T said it is accelerating plans to offer cable telephony services.” (“AT&T provides financial guidance for 1999,” AT&T press release, 1/8/99, <http://www.att.com/press/item/0.1193,274,00.html>). See also “AT&T Widens Local-Service Phone Plans,” *Wall Street Journal*, 1/11/99, p. A3.

<sup>40</sup> “AT&T currently has concrete plans that appear credible on their face to deploy local exchange and exchange access service in the near term...” (“Memorandum Opinion and Order In the Matter of Applications for Consent to the Transfer of Control of Licenses and Section 214 Authorization from Tele-Communications, Inc., to AT&T Corp.,” Federal Communications Commission, February 17, 1999, p. 62).

<sup>41</sup> “A number of parties representing consumer interests have raised issues concerning AT&T-TCI’s commitment to providing telecommunications services to all Americans on a non-discriminatory basis...”