

# Taxing High-Speed Services

*A Quantification of the Effects on the DSL Industry and Universal Service*



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**Taxing High-Speed Services:  
A Quantification of the Effects on the  
DSL Industry and Universal Service**

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# Taxing High-Speed Services: A Quantification of the Effects on the DSL Industry and Universal Service

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## Executive Summary

The moratorium on state and local taxes on Internet services recently expired and has led to some debate on whether the Internet should be taxed. For example, one proposal in the U.S. Senate bill would immediately allow state and local governments to tax Internet access by taxing high-speed telecommunications transport services used by Internet Service Providers (ISPs).<sup>1</sup> An extension of the previous Internet tax moratorium created in 1998 would have much of the same effect, i.e. allow state and local taxation of telecommunications services. Proponents of permitting state and local taxes on Internet services point out that the bill is necessary, since many state and local governments have experienced serious shortfalls in their fiscal budgets. However, opponents claim that taxing high-speed Internet services, such as Digital Subscriber Line (DSL) services, would harm a vital and growing information technology (IT) service that has yet to be ubiquitously deployed or available at prices affordable for all Americans.

This paper investigates the impact of imposing state and local taxes on Internet services, including taxes on the transport used by DSL providers to serve their customers. The major findings of this paper are as follows:

- State and local taxes imposed on the transport portion of DSL services would flow through to ISPs and, ultimately, be passed along to consumers in the form of higher prices. Therefore, taxing high-speed telecommunications facilities is merely a backdoor way to increase prices on broadband consumers.
- DSL services are *price elastic*, meaning that an increase in price would produce a larger decrease in demand and cause total industry revenue to fall. In general,

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<sup>1</sup> Senate bill S. 2084, 108<sup>th</sup> Congress, 2nd session, introduced Feb. 12, 2004, also known as the *Alexander-Carper* bill.

public finance theory shows that taxing an elastic service is inefficient and inappropriate. This is because taxing elastic services, like DSL, would have repressive effects on demand, employment and investment.

- This paper finds that imposing state and local taxes at the same rate as imposed on other telecommunications services would lead to a \$4.3 billion reduction in gross revenue over the next five years and a \$10.3 billion revenue loss after taxes. This reduction in revenues would mean that DSL employment and investments would be reduced, and so would the current employment, property and income taxes that all businesses currently pay. Specifically, this paper estimates that the reduction in industry revenues would lead to a one-year loss of 11,900 direct jobs, including 7,600 unionized jobs. There will also be a sizable loss of jobs in other industries.
- Because universal service programs used to support low-income residents, high-cost areas, and schools, libraries and rural health care providers are financed by a levy on all interstate telecommunications revenues, this study finds that a reduction in DSL revenues caused by imposing new taxes would produce a reduction in universal service contributions of \$280 million over the next five years. Because universal service programs are already under financial strain, this could put these social programs in even more jeopardy.
- Taxing DSL transport would push some consumers to buy cable modem services, the dominant form of high-speed services. Because cable modem providers would not pay state and local taxes, taxing DSL transport services would encourage consumers to switch to cable modem providers or disconnect from high-speed services altogether, thereby avoiding taxes and universal service charges.

In summary, proposals to levy taxes on DSL services or DSL transport are ill conceived and grossly inefficient as a means of public finance. The imposition of state and local taxes would seriously reduce industry revenues and universal services support, as well as have repercussions on jobs and investment. That, in turn, would reduce the collection of employment, property and income taxes. Policymakers should resist taxing elastic services and find revenue sources that would not cause large market distortions and

industry losses, such as simply increasing general tax funds. Allowing the high-speed services market to grow would spur jobs and investment, as well as protect universal service programs for low-income consumers, high-cost areas and support for schools, libraries and rural hospitals.

# **Taxing High-Speed Services: A Quantification of the Effects on the DSL Industry and Universal Service**

## **Introduction**

In 1998, Congress passed its first Internet tax moratorium, which prohibited state and local taxes on Internet services. This moratorium was justified, in part, on the idea that Internet services were relatively new and that taxes on these services would have an adverse effect on the industry's nascent development. However, the recent expiration of the moratorium has led to a debate whether the Internet should now be taxed. In fact, one proposed U.S. Senate bill would immediately permit state and local governments to tax telecommunications facilities, including high-speed facilities, used by Internet Service Providers (ISPs). ISPs frequently buy these services to carry traffic between their customers and the Internet. In effect, portions of what ISPs buy to provide consumers high-speed Digital Subscriber Line Services (DSL) would become taxable.<sup>2</sup> In addition, the bill would extend the state and local tax moratorium on retail Internet services for two more years.

This paper will focus on the economic merits of imposing state and local taxes on the Internet and discuss the general effects that taxes would have on high-speed DSL services, consumers and the economy. Based on this discussion, the paper will investigate and quantify effects that state and local taxes would have on industry revenues, as well as the effects on public policies used to promote the widespread availability of affordable telecommunications service, referred to as *universal service policies*.

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<sup>2</sup> To serve retail customers, many Internet Service Providers (ISPs) purchase and utilize wholesale facilities to transport traffic between the customer and the Internet. These transport facilities may include Internet backbone and last-mile equipment and capacity. Transport services purchased by ISPs, wireless, local and long distance telecommunications providers would be immediately taxable under Senate bill S. 2084.

## **The Internet Economy**

A moratorium on Internet taxes was established to provide the industry a business environment conducive to growth and investment. Today, three out of four persons living in the United States, 204 million people, have Internet access in their home,<sup>3</sup> 20% use other locations such as schools, libraries and public cafes, and 30% surf the Internet from work.<sup>4</sup> A recent study estimated that 73% of the twenty-two million small businesses in the U.S. subscribe to some form of Internet access, including 48% that use high-speed Internet services.<sup>5</sup> As of the end of June 2003, there were nearly 24 million high-speed Internet lines in the U.S., and, if the latest trend continues, these lines may reach 39 million by the end of 2004.<sup>6</sup> Although the deployment of advanced high-speed networks is far from complete, the Internet has been a source of brisk growth and technological change in the entire economy.

Studies have concluded that a ubiquitous deployment of high-speed networks would produce huge consumer benefits and a substantial increase in new jobs, but only if government interference is minimized. Two separate studies estimated that an expansion of telecommunications investments for high-speed telecommunications services would cascade throughout the economy and lead to 1.2 million new jobs.<sup>7</sup> Furthermore, if these high-speed services are ubiquitously deployed, one study estimated that the consumer benefits throughout the economy would reach \$500 billion.<sup>8</sup> However, these studies all assumed a minimal level of regulation and taxation.

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<sup>3</sup> Nielsen//NetRatings, News release, March 18, 2004.

<sup>4</sup> Robyn Greenspan, "Two-Thirds Hit the Net," April 17, 2002, Internet.Com, [www.internetnews.com](http://www.internetnews.com).

<sup>5</sup> Stephen B. Pociask, "A Survey of Small Businesses' Telecommunications Use and Spending," TeleNomic Research, under contract by the Small Business Administration's Office of Advocacy, SBA-HQ-02-M-0493, March 2004, p. ii.

<sup>6</sup> "High-Speed Services for Internet Access: Status as of June 30, 2003," Federal Communications Commission, December 2003, Table 1. 2004 estimate based on latest 6-month trend reported in Table 1.

<sup>7</sup> This result was reported in two independent studies using different methodologies, see Stephen Pociask, "Building a Nationwide Broadband Network: Speeding Job Growth," TeleNomic Research, Herndon, VA, February 25, 2002; and Robert W. Crandall, Charles L. Jackson and Hal J. Singer, "The Effect of Ubiquitous Broadband Adoption on Investment, Jobs and the U.S. Economy, Criterion Economics for the New Millennium Research Council, September 2003.

<sup>8</sup> Robert W. Crandall and Charles L. Jackson, "The \$500 Billion Opportunity: The Potential Economic Benefit of Widespread Diffusion of Broadband Internet Access," Criterion Economics, L.L.C., July 2001.

As the IT sector has expanded, so has the overall economy. One study showed that the health of the IT sector is inextricably linked to the health of the U.S. economy.<sup>9</sup> Another study showed that technological investments, including telecommunications investments, have contributed to over 30% of the acceleration of GDP growth.<sup>10</sup> Additionally, IT-using industries have accounted for nearly all of the economy's productivity growth.<sup>11</sup> Therefore, public policies that promote Internet services and the IT sector growth are policies that stimulate broader economic activity. However, the opposite is also true – namely, increasing regulations and taxation on these industries can have a substantial repressive effect on economic activity.

The effects of the latest economic recession, as well as other factors, have left the IT sector in economic turmoil. For example, telecommunications service investment has fallen 50%, bankruptcies have increased sharply, company debt has increased by a trillion dollars and market value has fallen trillions of dollars.<sup>12</sup> While the general economy has been out of the latest recession since November 2001,<sup>13</sup> in terms of jobs, the IT industry has yet to recover and now stands 1.2 million IT jobs below the January 2001 level of employment.<sup>14</sup> Overall, the health of the Internet industry closely mirrors the IT sector and now employs 135,000 fewer workers compared to January 2001.<sup>15</sup> Thus, the health of the Internet industry, like much of the IT sector, remains fragile, despite the apparent growth in Internet subscribers. As a result, while the Internet has grown tremendously in recent years and has gained widespread appeal among consumers, policymakers should exercise caution when considering the imposition of regulations or taxes on the industry.

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<sup>9</sup> Kevin J. Stiroh, "Investing in Information Technology: Productivity Payoffs for U.S. Industries," *Current Issues in Economics and Finance*, Federal Reserve Bank of New York, 7:6, June 2001.

<sup>10</sup> For example, see Dale W. Jorgenson, Mun S. Ho and Kevin J. Stiroh "Growth of U.S. Industries and Investments in Information Technology and Higher Education," Draft, October 7, 2002, Table 1.

<sup>11</sup> *Digital Economy 2002*, Chapter 4, p. 34.

<sup>12</sup> For some estimates of this decline see, "The State of Local Competition 2003," Association for Local Telecommunications Services, April 2003.

<sup>13</sup> The timing of the eight-month recession was established in "Business Cycle Memo," Business Cycle Dating Committee, National Bureau of Economic Research, Cambridge, MA, July 17, 2003.

<sup>14</sup> Data is from the Bureau of Labor Statistics, January 2001 to January 2004. IT sector is defined as Information services and IT manufacturing industries.

<sup>15</sup> This includes Internet service providers, search portals and data processing services, and Internet publishing and broadcasting services industries.

## Taxing Telecommunications and DSL Transport

Many state and local governments are facing serious budget shortfalls, making the fast growing Internet services market a potentially lucrative source of tax revenues.<sup>16</sup> As a result, Congress is debating whether or not to allow state and local governments to tax high-speed Internet services in the same manner as telecommunications services are taxed. Senate bill S-2084 would permit state and local governments to tax the telecommunications transport services used by Internet Service Providers (ISPs) to serve their customers.<sup>17</sup> Telecommunications providers often provide transport services to ISPs for DSL, wireless and other online Internet access services for the purpose of carrying traffic between their customer and the Internet. While the Internet had been subject to a moratorium on state and local taxes, some have argued that these transport facilities, while used by ISPs for Internet traffic, should be subject to the same taxes levied on telecommunications providers. In addition, due to a loophole in the previous moratorium designed to protect Universal Service programs, some states have argued their existing telecommunications taxes apply to high-speed telecommunications Internet access, or DSL, under the moratorium in existence since 1998.

The cost of continuing the moratorium and ending state and local taxation on DSL is estimated to be \$40 million.<sup>18</sup> Therefore, if state and local taxes are prohibited, the risk to state and local budgets is negligible compared to what state and local governments currently spend – roughly 0.003%.<sup>19</sup> However, the downside of permitting state and local taxation on DSL services may not be trivial. If telecommunications taxes were applied to the transport portions of high-speed Internet services, the Internet industry would face enormous increases in costs. Telecommunications taxes are generally regressive<sup>20</sup> and

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<sup>16</sup> This view is stated in “NGA Supports Reasonable Extension of the Internet Tax Freedom Act,” National Governors Association, downloaded from [www.nga.org/cda/files/0204ITFA.PDF](http://www.nga.org/cda/files/0204ITFA.PDF).

<sup>17</sup> The wholesale services that telecommunications firms provide ISPs can include local connections to the customer’s premise, high-capacity transport between network points and backbone services. As a generality, this paper refers to these wholesale services as simply *transport service*.

<sup>18</sup> This estimate comes from the Congressional Budget Office. See “Letter to the Honorable Lamar Alexander from Douglas Holtz-Eakin,” Congressional Budget Office, U.S. Congress, Nov. 5, 2003.

<sup>19</sup> Total state and local government consumption expenditures and gross investment totaled \$1.3 trillion in 2002, according to the *Statistical Abstract of the United States: 2003*, U.S. Census Bureau, Table No. 435.

<sup>20</sup> One economist points out that that telecommunications and Internet taxes represent among the more regressive forms of taxes in our economy. See Jeffrey A. Eisenach, “Creating the Digital State: A Four-Point Program,” Release 6.4, Progress and Freedom Foundation, August 1999, p. 5.

usually higher than other business taxes. With telecommunications tax rates reaching as high as 35%, these services rank among the most heavily-taxed goods and services in America, along with tobacco, alcohol and gasoline.<sup>21</sup> One study estimated that telecommunications firms pay 40% more state and local taxes than other firms.<sup>22</sup> Another study estimated that telecommunications service firms pay on average 17% just for state and local transactions taxes, compared to 6% in other industries.<sup>23</sup> In addition, these firms pay other state and local business taxes, as well as income taxes.

Transport is a significant portion of Internet costs for both cable modem and DSL services. For the cable industry, 30% of cable modem revenues, about \$9 to \$12 per subscriber each month, are kept by cable's ISP partners, with the remaining 70% attributable to cable's transport costs.<sup>24</sup> Therefore, if cable modem providers sell its services for \$45 per month, the line and transport revenues would be approximately \$31.50.

The price of DSL transport appears to be similar to the price of cable TV's transport. By one source, publicly listed DSL wholesale prices range from \$29.95 to \$39 per month with a median value of \$30.75.<sup>25</sup> Therefore, if telecommunications transport used by DSL providers were taxed, the effect on DSL prices paid by customers could be significant, while the loss of not taxing DSL service appears small.<sup>26</sup>

### **Cable Modems vs. DSL Services**

The Senate's proposal to tax telecommunications transport used to provide DSL services does not levy the same tax on cable modem providers. This is because regulations do not

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<sup>21</sup> Jeffrey A. Eisenach, "Creating the Digital State: A Four-Point Program," Release 6.4, Progress and Freedom Foundation, August 1999, pp. 4-5.

<sup>22</sup> Telecommunications Taxes: 50-State Estimates of Excess State and Local Tax Burden," Ernst & Young, November 2001.

<sup>23</sup> "2001 State Study and Report on Telecommunications Taxation," Telecommunications Tax Task Force of the Council on State Taxation, Tax Management Inc., BNA, Vol. 9, No. 2, 2002, p. S-4.

<sup>24</sup> "Cable Open Access Primer," Cable Datacom News, Kinetic Strategies, Phoenix, AZ. Downloaded March 23, 2004 from [www.cabledacomnews.com](http://www.cabledacomnews.com).

<sup>25</sup> "Reply Affidavit of John S. Habeeb Regarding Structural Separation of Advanced Services, WC Docket No. 02-306, FCC, pp. 3-4. Median was calculated from a series of estimates provided in his testimony.

<sup>26</sup> The potential loss from taxation will be estimated later in this paper.

require cable's transport facilities to be unbundled as is the case for some telecommunications providers. In addition, the Federal Communications Commission (FCC) has ruled cable modem services to be an information service, while DSL transport services are still regarded as a telecommunications service.<sup>27</sup> Therefore, while cable modems are functionally equivalent to DSL high-speed services, their revenues are not subject to state and local taxation under the proposed Senate bill.

The divergence in tax policy between cable modem and DSL services creates an artificial advantage favoring cable modems services. Differences in the regulatory treatment of cable modem services and DSL services may explain, in part, why cable modem services are the dominant form of high-speed Internet services in use today.<sup>28</sup>

Differences in regulatory and tax treatment between cable modem services and DSL services are also apparent in the funding of universal service support programs, programs designed to encourage the ubiquitous deployment of affordable telephone services. Currently, interstate telecommunications revenues are assessed a Universal Service Fund (USF) charge of 8.7% (referred to as the *USF factor*). Because the telecommunications transport services used by ISPs are classified as an Interstate telecommunications service, they must contribute to the USF. Contributions to the USF are used to support a number of public programs, including support for high cost telecommunications areas, low-income residential customers, and deployment of high-speed capabilities to schools, libraries and rural healthcare providers. Telecommunications carriers are permitted to recover USF charges by charging their customers. As a result, USF charges on DSL transport service providers raise their costs and, in turn, raise Internet Service Provider prices. Ultimately, consumers of Internet services pay for these charges.

However, just as cable modem services are not subject to telecommunications taxes, they also do not pay into the USF. Therefore, increasing taxes on DSL may unintentionally

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<sup>27</sup> The FCC position has been challenged in the courts.

<sup>28</sup> Empirical evidence supporting this view can be found in Stephen B. Pociask, "Putting Broadband on High Speed: New Public Policies to Encourage Rapid Deployment," Economic Policy Institute, Washington, DC, 2002.

reduce USF support by encouraging consumers to drop high-speed services and, in some cases, encourage other consumers to switch to cable modem services. As a result of a DSL tax increase, an increase in cable modem service demand would not help state and local governments raise taxes nor would it help fund universal service programs.

USF programs have been under considerable financial strain, in part because of growing forms of alternative communications services that compete against traditional telecommunications services. In fact, a number of these alternative services have eroded traffic from traditional telecommunications services. According to FCC data, access lines and revenues have been on decline for several years now, in part due to increased competition from wireless, high-speed and other service providers.<sup>29</sup> In addition, a host of computer-based communications services, such as email and instant messaging, have reduced telephone traffic, particularly interstate long distance traffic, which is also subject to USF fees. For example, voice-over-Internet protocol services, a service that uses packet technology to emulate regular voice communications, are now bypassing entire telephone networks, completely avoiding USF charges.

The result of this migration of traffic away from traditional telecommunications services has put a strain on USF funding. This has led to a sharp increase in the USF factor leveled on interstate revenues. In 1998, second quarter USF factor was 3.14%, increasing to 6.68 three years later, and increasing again to 8.7% for the second quarter of 2004. The continued migration of revenues and traffic away from telecommunications networks to computer and cable-based networks would jeopardize USF programs and lead to even further increases in the USF factor. Therefore, if an increase in state and local taxes reduces DSL revenues and USF funding, that would leave public policymakers with a choice of cutting USF programs or further increasing the USF factor. However, increasing the USF factor on the remaining telecommunications services would further

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<sup>29</sup> For example, FCC's ARMIS 43-01 data shows a marked decline in billable access lines, including toll and access revenues of the incumbent local exchange companies that are subject to USF charges. In addition, interexchange carrier (long distance) revenues were lower in 2002 than in 1996, according to Trends in Telephone Service, FCC, August 2003, Table 15.4. This trend is likely to continue as a result of increased competition and falling prices.

repress demand for telecommunications services and speed the migration of traffic off traditional networks.

### **Tax Policy vs. Economic Theory**

The direct and indirect effects of taxes are not always well understood. For this reason, current tax policies sometimes diverge from accepted economic theory. For example, taxes are often levied on producers instead of consumers, as if this would somehow shield consumers from the cost of taxation. In reality though, when taxes are levied on producers of goods and services, the cost of producing goods and services increases, and these costs are passed along to all consumers in the form of higher prices. Therefore, taxing producers does not spare consumers the cost burden of taxation.

Similarly, the Senate bill permits state and local governments to tax telecommunications transport services used by Internet services providers, as if this would have no effect on the consumer price for DSL services and no effect on USF funding.<sup>30</sup> If state and local taxes were imposed on the transport portion of DSL service providers, these taxes would represent an increase in the DSL industry costs and, when passed through to consumers, an increase in DSL prices paid by consumers. As ISP prices increase, assuming that consumers are sensitive to price changes, as they usually are, the number of DSL subscribers would decrease.<sup>31</sup> A decrease in DSL subscribers would lead to a loss in industry employment and investment, exacerbating the recent IT meltdown. In effect, an increase in taxes would have repressive effects on the DSL market, assuming that consumers are very sensitive to changes in DSL price.

### **High-Speed Internet Services are Price Elastic**

Taxes are generally imposed on goods and services that are price *inelastic*. A price inelastic service is one in which the demand for a service is not easily affected by a change in price. For example, a price is said to be *inelastic* if a 1% increase in price

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<sup>30</sup> The Senate bill states that it will not “prevent the imposition or collection of any fees or charges used to preserve or advance Federal universal service.” See S. 2084, 108<sup>th</sup> Congress, 2<sup>nd</sup> Session, Feb. 12, 2004.

<sup>31</sup> Consumer response to changes in DSL price is an important factor in measuring the effects of taxes on the DSL industry and consumers. This issue will be addressed extensively in the next section.

produces less than a 1% decrease in demand. For inelastic services, if prices increase as a result of a tax increase, then total industry revenues increase, since demand falls by less than the increase in price. In other words, for inelastic services, an increase in taxes would not lead to a reduction in the tax base. Therefore, taxes are more efficiently collected from price inelastic services. Services such as tobacco and gasoline are price inelastic services, making them well suited for taxation.

On the other hand, economic theory suggests that services that are *price elastic* should never be taxed.<sup>32</sup> The demand for a good or service is said to be *price elastic* when it is very price sensitive. If the demand for a good or service is price elastic, a small increase in price results in a large decrease in demand. Increasing taxes on a good or service that is price elastic would result in a decrease in demand that is greater than the increase in price, as well as a decrease total industry revenue.<sup>33</sup> Ironically, taxing an elastic service means that the tax base itself would decline. Therefore, taxing a price elastic good or service would be counter to sound public finance and ineffective for raising taxes, as well as producing large economic losses for the industry and consumers.

Empirical evidence suggests that high-speed services are indeed price elastic. One study estimated that a 30% reduction in price would yield a 130% increase in subscribers.<sup>34</sup> This study agrees closely with the observations of noted futurist George Gilder, who predicted that a one-unit decrease in bandwidth price would produce a five-unit increase in demand.<sup>35</sup> Kridel, Rappoport and Taylor developed a demand equation using a large

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<sup>32</sup> One exception is the use of taxes on an elastic service in order to stop or severely reduce its consumption. Say, for example, that fireworks are a price elastic service that, when used, result in substantial property damage and physical risks to consumers. Taxing this service would curtail its use and reduce some unwanted social costs. However, it seems inconceivable that public policymakers would seek to tax DSL services in order to curtail its use or correct for some market externality.

<sup>33</sup> For an illustration of this tax effect see Neil M. Singer, *Public Microeconomics*, Little, Brown and Co., Boston, MA, Second Edition, 1976, p. 243.

<sup>34</sup> "What Drives High-Speed Internet Services Home?" Parks Associates, News Release, Dallas, TX, Dec. 4, 1998.

<sup>35</sup> This is one of his "Twenty Laws of the Telecomm," see George Gilder, *Telecosm: How Infinite Bandwidth Will Revolutionize Our World*, Free Press, New York, NY, 2000.

set of data and concluded that cable modem demand was price elastic.<sup>36</sup> Their study concluded that a 1% increase in price would yield between a 1.1% to 1.8% decrease in subscription. A study of Internet subscribing households estimated that a 1% increase in high-speed installation charges would produce a 141% decrease in installations, which explains why high-speed providers frequently discount their installation charges.<sup>37</sup> Another study found both cable and DSL services to be elastic as well.<sup>38</sup> Later work by Kridel, Rappoport, Taylor and Duff-Demo concluded that the price elasticity for broadband services was econometrically measured to be  $-1.5$ ,<sup>39</sup> meaning a 1% increase in price would produce a 1.5% decrease in subscribers. This estimate is within the range of other estimates presented in this paper and will be used later in quantifying the effects of taxation on high-speed Internet services.

Because DSL services are price elastic, small changes in taxes can have large effects on the subscription of the service and DSL industry revenues. For example, if taxes increase in the price of an elastic service, the quantity of the service demanded would decrease and total service revenue would fall. As a result, if state and local governments raise taxes on DSL services, the increase in taxes would not make up the decrease in industry revenue (on an after tax basis). For this reason, taxing an elastic service like DSL is unwise.

### **Quantifying Tax Effects on DSL Services**

Using the estimates of elasticity of service and the current USF factor described earlier in this paper, it is possible to quantify the effects of an increase in state and local taxes on DSL service revenue. The average DSL price is assumed to be \$42.75, representing

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<sup>36</sup> Don Kridel, Paul Rappoport and Lester Taylor, "The Demand for High-Speed Access to the Internet: The Case of Cable Modems," presented at the Thirteenth Biennial Conference of the International Telecommunications Society, Buenos Aires, Argentina, July 2000.

<sup>37</sup> This is the price elasticity for nonrecurring charges. See Kevin Duff-Deno "Demand for High-Speed Access to the Internet Among Internet Households," International Communications Forecasting Conference, Seattle, WA, Sept. 27, 2000. He also found the monthly high-speed price to be elastic.

<sup>38</sup> J. Gregory Sidak, Robert W. Crandall and Hal J. Singer, "The Empirical Case Against Asymmetric Regulation of Broadband Internet Access," Berkeley Technology Law Journal, Vol. 17, No. 3, summary 2002.

<sup>39</sup> Paul Rappoport, Don Kridel, Lester Taylor and Kevin Duff-Demo, "Residential Demand for Access to the Internet," University of Arizona Working Paper, Spring 2001, Table 10.

\$30.75 in median transport revenue and \$12.00 in ISP revenue. The number of high-speed telecommunications-based lines is taken from the FCC report.<sup>40</sup> The number of high-speed lines was extrapolated to the end of 2004 using the latest six-month growth rate of 15.6%, a figure modestly below cable modem's current 20% growth rate. From 2004 to 2008, it was assumed that high-speed service growth would decline by 25% per year, falling to 10.7% by 2008, as consumer markets become more saturated.

To illustrate the impact of telecommunications taxes on DSL services, a scenario was considered where DSL transport services would be subject to a 10.9% increase in state and local taxes, the difference between average transactions taxes for telecommunications services (16.90%) and average general business taxes (6.00%).<sup>41</sup> Based on these assumptions and estimates, **Figure 1** (below) shows how an increase in state and local taxes on telecommunications transport would affect high-speed industry revenues and USF support.

**Figure 1: Effects of a 10.9% State and Local Tax Increase on Telecommunications Transport Services Used for High-Speed Services (Millions of Dollars)**

<u>Year</u>	<u>DSL Revenue No Tax Scenario</u>	<u>DSL Revenue With Taxes</u>	<u>Lost DSL Revenue</u>	<u>Lost USF Support</u>
<b>2004</b>	\$ 7,054	\$ 6,713	(\$342)	(\$22)
<b>2005</b>	\$ 8,840	\$ 8,412	(\$428)	(\$28)
<b>2006</b>	\$ 10,517	\$ 10,008	(\$509)	(\$33)
<b>2007</b>	\$ 12,014	\$ 11,433	(\$582)	(\$37)
<b>2008</b>	<u>\$ 13,297</u>	<u>\$ 12,653</u>	<u>(\$644)</u>	<u>(\$41)</u>
<b>5-Year Total</b>	\$ 51,723	\$ 49,218	(\$2,505)	(\$161)

<sup>40</sup> "High-Speed Services for Internet Access: Status as of June 30, 2003, FCC, December 2003. Table 1 provides the estimate of asymmetrical DSL lines and other wireline high-speed services, including symmetrical DSL and other telecommunications-based broadband services. All of these services would be subject to taxation under the Senate bill.

<sup>41</sup> "2001 State Study and Report on Telecommunications Taxation," Telecommunications Tax Task Force of the Council on State Taxation, Tax Management Inc., BNA, Vol. 9, No. 2, 2002, p. S-4.

As **Figure 1** shows, the effect of taxing DSL transport is significant. A 10.9% increase in transport would produce an 8.7% increase in DSL prices. This, in turn, would cause DSL demand to fall by 12%.<sup>42</sup> As a result, industry revenues would fall by \$2.5 billion over a five-year period. Assuming that the USF factor remains unchanged, the fund would collect \$161 million less for universal service programs. Therefore, taxing an elastic service, like DSL, appears to be an inappropriate means to raise taxes, and its imposition would harm industry growth and jeopardize universal service support.

The previous scenario assumed that telecommunications transactions taxes are imposed on telecommunications transport used for DSL services. However, the actual tax increase can be much more severe. In cases where a tax exemption has existed, the average increase in state and local taxes could be 16.90%.<sup>43</sup> Using this assumption, an alternative scenario quantifies the effect of taxes on DSL revenues and USF. These results are shown in **Figure 2** (below).

**Figure 2: Effects of a 16.9% State and Local Tax Increase on Telecommunications Transport Services Used for High-Speed Services (Millions of Dollars)**

<u>Year</u>	<u>DSL Revenue No Tax Scenario</u>	<u>DSL Revenue With Taxes</u>	<u>Lost DSL Revenue</u>	<u>Lost USF Support</u>
<b>2004</b>	\$ 7,054	\$ 6,469	(\$585)	(\$38)
<b>2005</b>	\$ 8,840	\$ 8,106	(\$733)	(\$48)
<b>2006</b>	\$ 10,517	\$ 9,645	(\$872)	(\$57)
<b>2007</b>	\$ 12,014	\$ 11,018	(\$997)	(\$65)
<b>2008</b>	\$ 13,297	\$ 12,194	(\$1,103)	(\$72)
<b>5-Year Total</b>	\$ 51,723	\$ 47,432	(\$4,290)	(\$280)

<sup>42</sup> If the shape of the demand curve were assumed to be convex, the results would be somewhat smaller than shown here. However, the demand response would still be much bigger than the increase in price, as indicative of a price elastic service.

<sup>43</sup> “2001 State Study and Report on Telecommunications Taxation,” Telecommunications Tax Task Force of the Council on State Taxation, Tax Management Inc., BNA, Vol. 9, No. 2, 2002, p. S-4. The tax rate of 16.90% on transport is by no means an upper bound. If the tax moratorium expires in two years, under the Senate bill, ISPs may be subject to additional tax. For example, sales could be imposed directly on Internet services or as a sales tax on e-commerce.

As **Figure 2** shows, the effect of a tax on DSL transport is quite severe. A 16.9% increase in transport would produce a 12.2% increase in DSL prices. This, in turn, would cause DSL demand to fall by 18.2%. As a result, industry revenues would fall by \$4.3 billion over a five-year period. Assuming that the USF factor remains unchanged, the funding would fall by \$280 million dollars over the five-year period. Once again, taxing an elastic service appears to be an example of poor public administration and finance. Clearly, imposition of taxes would harm industry growth and jeopardize universal service support.

One clarification about the industry impact of taxes should be emphasized. While **Figure 2** shows that industry revenues are predicted to fall by \$4.3 billion, the industry must also pay taxes from its gross revenues. When this payment is included, the total loss to the entire DSL and telecommunications industry would be a massive \$10.3 billion over the next five years, not to mention the loss of universal service funding. Therefore, proposals to permit state and local taxation on portions of high-speed data transport would have adverse consequences on the Internet industry, as well as consumers.

### **Employment Effects**

Imposing taxes on DSL transport will lead to a substantial decline in employment. According to quarterly financial reports, the major ILECs employ nearly one-half million workers.<sup>44</sup> Estimates are that approximately 64% of these are unionized workers.<sup>45</sup> If industry revenues fall by \$10.3 billion over five years, reflecting the increase in tax

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<sup>44</sup> The precise figure (494,634) was figure is taken from the fourth quarter financial estimates of BellSouth, Qwest, SBC and Verizon. While these four companies make up the bulk of ILEC employment, there are many other local telephone companies that would be affected by taxation on Internet transport, but were not included. Had employment from these other ILECs been included, the effect of taxation on employment would be somewhat greater.

<sup>45</sup> A number of sources were used to corroborate the number of union workers employed by the major ILECs. One source estimated the number of Communications Workers of America (CWA) and International Brotherhood of Electrical Workers (IBEW) to be 358,000 workers (Nomi Prins, "Whose Jobs? Our Jobs!" *Dollars & Sense*, Issue #246, March/April 2003). However, as the telecommunications market has continued to decline, I estimate the number of CWA and IBEW workers to be less, approximately 317,000 workers.

payments and the loss of revenues from a drop in demand, then a proportionate decrease in employment will ensue.

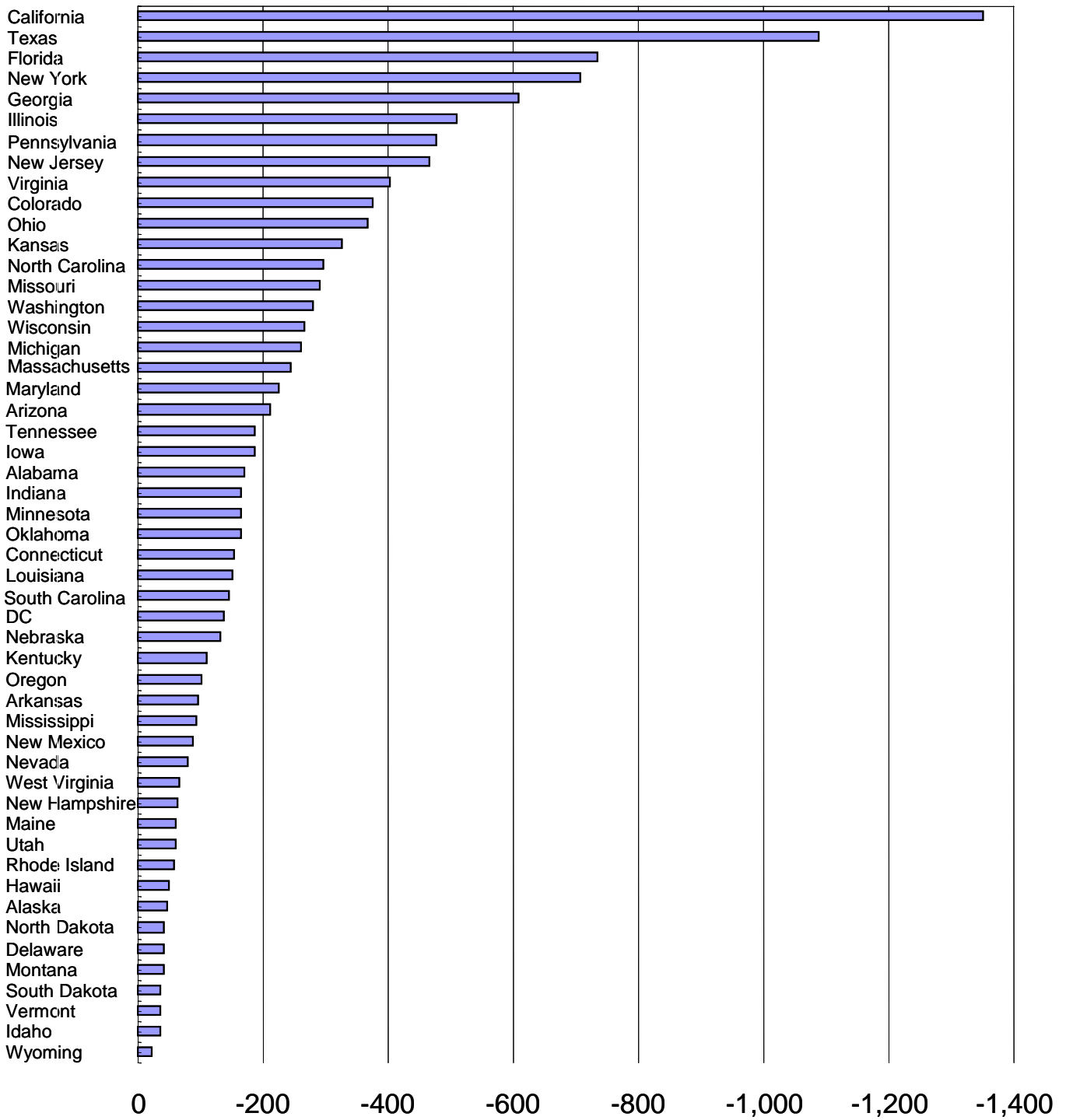
While revenues can be accumulated over the five years, employment cannot and must be shown as a one-year effect.<sup>46</sup> In the fifth year, increased taxes and lost revenues from demand suppression are estimated to be \$1.5 billion and \$1.1 billion, respectively. Assuming a proportionate decrease in revenues and using the ILEC's average revenue per employee (\$223,000), taxing DSL transport results in a one-year loss of 11,900 workers. **Figure 3** (on the next page) shows the one-year job loss by state.

While cable modem service providers may pick up some of this employment, as will be discussed shortly, some of the revenues and corresponding employment will be permanently lost. The reason for this permanent decline in employment is that total industry costs would increase and the comparative advantage given to cable modem providers would reduce competitive pressures on high-speed service prices. This will permit some cable modem providers to raise prices slightly, increasing their profits but decreasing demand. However, even if cable modem services were to pick up some of the employment lost by DSL providers, because cable providers seldom use unionized employees, the taxation of DSL services would lead to a permanent decline in unionized workers. In this case, it is estimated that 7,600 union jobs will be lost, mostly in the maintenance and construction of transport facilities. Therefore, taxing DSL transport will lead to a substantial and permanent loss of union jobs, relative to nonunion jobs.

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<sup>46</sup> This is a distinction based on the concept of flows and stocks. The loss of employment will be estimated for the fifth year of the second scenario depicted in **Figure 2**.

Figure 3: One-Year Job Losses Due To Taxing DSL Services  
By State



Sources: TeleNomic Research estimates, distributed by the relative importance of telecommunications workers using data from the Bureau of Labor Statistics, 2003.

The estimated loss of telecommunications jobs is very conservative, since these losses represent only the direct effects caused by taxing DSL transport. However, the indirect effects would be much greater and would spillover into equipment manufacturers, IT services and other industries. According to one estimate, a \$1 million cut in high-speed infrastructure investment would lead to 18 fewer jobs in the economy and nearly \$3 million less of Gross Domestic Product.<sup>47</sup> Another study estimates that cutting broadband construction by one worker yields four fewer workers elsewhere in the economy.<sup>48</sup> These indirect effects appear to be substantial, though they are not estimated in this study. Therefore, because taxing DSL transport produces sizable declines in demand, the direct and indirect effects on workers would be substantial.

### **Other Effects Resulting from Taxes**

This paper has shown that imposing state and local taxes on DSL transport would have adverse consequences on industry demand, revenues and USF support. This paper also discussed that decreases in industry demand would have negative repercussions on industry investment and jobs. However, there are a number of other adverse consequences that would result from an imposition of taxes. These will be briefly addressed.

When price increases lead to a reduction in DSL demand, many, but not all, consumers would switch to cable modem services. Sidak, Crandall and Singer found that a 1% increase in DSL prices would produce a 0.59% increase in cable modem demand.<sup>49</sup> From this, it can be concluded that cable modems and DSL services are substitutes, but that some customers may elect not to buy a high-speed service at all. If consumers discontinue use of the Internet or high-speed Internet services altogether, not only would tax revenues and USF funds decrease, so would taxes on employment, property, state and

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<sup>47</sup> Robert W. Crandall, Charles L. Jackson and Hal J. Singer, "The Effect of Ubiquitous Broadband Adoption on Investment, Jobs and the U.S. Economy, Criterion Economics for the New Millennium Research Council, September 2003.

<sup>48</sup> Stephen Pociask, "Building a Nationwide Broadband Network: Speeding Job Growth," TeleNomic Research, Herndon, VA, February 25, 2002.

<sup>49</sup> J. Gregory Sidak, Robert W. Crandall and Hal J. Singer, "The Empirical Case Against Asymmetric Regulation of Broadband Internet Access," Berkeley Technology Law Journal, Vol. 17, No. 3, summary 2002, Table 1, p.18.

business income. Furthermore, imposing sales taxes on e-commerce may simply send jobs out-of-state or overseas. In effect, imposing higher taxes would affect the collection of other taxes.

If some DSL consumers *do* switch to cable modems, state and local tax revenues and USF funds would not be collected from these customers, since cable modem providers do not pay any of these taxes or fees. Therefore, DSL taxes encourage consumers to migrate to services that are nontaxable.

Since broadband services are not ubiquitously deployed, imposing taxes on DSL services and exempting cable modem services creates a market advantage for cable modem services, affecting high-speed competition and the balanced deployment of broadband services. This asymmetrical treatment of regulation and taxation would stunt the widespread deployment of broadband services, affecting the pace of technical change. Because IT investments have been instrumental in stimulating economic growth and productivity, driving consumers off high-speed networks can have serious effects on the health of the overall economy. The loss of e-commerce and a reduction in the growth of work-at-home businesses would increase highway congestion, as well as increase gasoline consumption and air pollution.

While there appear to be many other potential effects from taxing Internet services, further research is needed to identify and quantify these effects.

### **Summary and Recommendations**

This paper has shown that taxing an elastic service, such as DSL services, would have adverse consequences on industry demand and revenues. A tax on DSL services would produce a much greater decline in DSL subscription, precisely when public policies are seeking to encourage and accelerate the deployment of advanced services. The decline in DSL subscribers, in turn, would affect industry jobs and investment, as well as affect the collection of other business taxes. In particular, this study has shown that the imposition of state and local taxes on DSL transport would result in a five-year decline in USF

funding totaling \$280 million dollars, possibly jeopardizing universal service programs. In effect, not only would the DSL industry suffer from the imposition of these taxes, so would consumers who demand DSL service. On the other hand, ending current DSL taxes would only lead to a loss of only \$40 million of state and local taxes. Clearly, this loss pales in comparison to the harm of imposing state and local taxes on DSL services.

This study has shown that imposing state and local taxes can have adverse effects on DSL services. However, these results may underestimate the total effects on Internet services, since wireless broadband and dialup Internet service also require telecommunications-based transport services. Thus, the effects of imposing taxes may be more severe than shown here and, if this leads to a decrease in overall Internet use, then taxes may produce a digital divide between those who can and cannot afford more expensive Internet services. That would be a major setback for the still fragile IT sector that employs 1.2 million fewer U.S. workers than it did three years ago.

In summary, taxing DSL transport, as recently introduced in the U.S. Senate, is an ill-conceived proposal. Public policymakers should refrain from imposing heavy regulations and taxes on this industry and encourage the widespread deployment of broadband infrastructure.

## **About the Author**

For over twenty years, Mr. Pociask has worked in and consulted for telecommunications and high-tech industries. As president of TeleNomic Research, a consulting firm specializing in public policy analysis for information technology industries, he is responsible for a wide variety of applied economic studies. A number of his studies are filed at both federal and state regulatory commissions, and recently have included topics such as rate reform, deregulation and productivity incentive plans. Mr. Pociask has appeared before the FCC in its open forums and at its staff meetings. He has spoken to numerous state and local legislators on broadband issues, and testified before the Congressional Subcommittee for Telecommunications, Trade and Consumer Protection on Internet and broadband legislation. He has written about deregulation, long-distance industry cost structure, local exchange competition, the economics of multimedia data networking and cable competition. His study, "MCI WorldCom's Sprint Toward Monopoly: An Analysis of the Proposed Telecommunications Merger," co-authored with Dr. Jack Rutner and sponsored by the Economic Policy Institute, accurately predicted the Department of Justice's decision to block the merger. His study, "Putting Broadband on High Speed: New Public Policies to Encourage Rapid Deployment," also sponsored by the Economic Policy Institute, describes how changes in public policies would accelerate IT investment and create 1.2 million new jobs.

He has appeared numerous times in the media, including Bloomberg News, CNBC, Telecommunications Reports, Telephony, Congressional Quarterly, America's Network, NetworkMagazine and CNET Radio.

From 1998 to 2000, Mr. Pociask previously served as chief economist and executive vice president for Joel Popkin and Co., an economic consulting firm in Washington, DC. Before this assignment, he spent eighteen years working in the telecommunications industry. He has completed his Ph.D. coursework in economics and has an M.A. in economics from George Mason University.

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