

## **The Economics of Broadband Data Caps and Usage-Based Pricing**

*Eric Fruits, Kristian Stout, & Geoffrey A. Manne*

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## I. Introduction

The rapid growth of internet traffic and growing demand for high-speed broadband services have been met with broadband offerings that incorporate data caps and usage-based pricing from internet service providers (ISPs).<sup>1</sup> Data caps set limits on the amount of data a customer can use within a billing cycle, while usage-based pricing charges customers based on their actual data consumption. In practice, most providers offer hybrid plans that offer a flat rate for an initial data allowance and usage-based pricing for data consumed in excess of that allowance. In contrast, under flat-rate plans, customers pay a fixed fee for unlimited data use. The combination of data allowances and usage-based pricing create a more direct relationship between a customer's internet usage and the price they pay for service.

These practices have come under scrutiny, with some advocating for the Federal Communications Commission (FCC) to ban data caps and regulate usage-based pricing under Title II of the Communications Act. The FCC has taken a step in that direction with a recently issued notice of inquiry (NOI) that seeks comments regarding “whether data caps cause harm to competition or consumers’ ability to access broadband Internet services.”<sup>2</sup>

This white paper argues that federal regulation limiting the use of data caps and usage-based pricing would be misguided and could lead to unintended consequences that harm consumers and stifle innovation in the broadband market. Drawing upon insights from law & economics, we demonstrate that data caps and usage-based pricing serve important functions in the broadband ecosystem. Indeed, these practices may help internet service providers (ISPs) to better manage network congestion, ensure fair allocation of network resources, and provide a means for ISPs to recover the large, fixed costs associated with building, maintaining, and upgrading broadband infrastructure—in part, to enable deployment of more capacity for increased data

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\* Eric Fruits is a senior scholar with the International Center for Law & Economics (ICLE). Kristian Stout is ICLE's director of innovation policy. Geoffrey A. Manne is ICLE's president and founder. ICLE has received financial support from numerous companies, foundations, and individuals, including firms with interests both supportive of and in opposition to the ideas expressed in this and other ICLE-supported works. Unless otherwise noted, all ICLE support is in the form of unrestricted, general support. The ideas expressed here are the authors' own and do not necessarily reflect the views of ICLE's advisors, affiliates, or supporters.

<sup>1</sup> Chris Velazco, *If Data Caps Are Making Your Online Life Harder, the FCC Wants to Know*, WASH. POST (Jun. 24, 2023), <https://www.washingtonpost.com/technology/2023/06/21/fcc-home-internet-data-cap-investigation/> (“many of the country's largest internet providers have some sort of limit on how much data you can use”).

<sup>2</sup> Notice of Inquiry, *In the Matter of Data Caps in Consumer Broadband Plans*, WC Docket No. 23-199 (Oct. 15, 2024), available at <https://docs.fcc.gov/public/attachments/FCC-24-106A1.pdf> [hereinafter “NOI”].

usage. Moreover, usage-based pricing can promote economic efficiency by aligning the costs of broadband consumption with the prices consumers pay, thereby encouraging responsible use of network resources.

The paper also makes the argument that banning data caps and regulating usage-based pricing would be an overly restrictive and heavy-handed approach. Usage-based pricing can foster fairness and economic efficiency. More importantly, usage-based pricing can improve broadband affordability and, in turn, foster increased adoption. Under flat-rate pricing, all consumers pay the same amount regardless of usage, potentially leading to overuse by heavy users and cross-subsidization by light users. With usage-based pricing, consumers who use less data pay less, consumers who use more pay more, and no group of consumers cross-subsidize usage by other users. Service that was unaffordable to some consumers under flat-rate pricing may become affordable to those who use less data, thereby expanding adoption among that cohort. Regulations that ban or severely restrict data caps and usage-based pricing run the risk of reducing affordability, hindering adoption, and producing outcomes that many would see as unfair.

Moreover, usage-based pricing provides more options for consumers than flat-rate pricing and can generate additional revenue to fund network improvements and expansion. Importantly, these usage-based pricing strategies can make previously unprofitable broadband deployments economically viable, particularly in underserved areas. By enabling ISPs to recover more of their investment costs from heavy users, while potentially offering lower-priced plans to light users, usage-based pricing can drive increased broadband deployment and adoption, as well as foster a more robust, innovative internet ecosystem. Regulations that ban or severely restrict usage-based pricing therefore could also have the undesired consequence of stifling innovation, investment, and deployment.

Instead of resorting to blanket prohibitions and prescriptive regulations, we propose a more nuanced policy framework that balances the need for consumer protection with the benefits of market-driven innovation. This framework emphasizes transparency—such as current regulations that require ISPs to make clear and transparent consumer disclosures of their data-cap and usage-based-pricing policies. It would rely on antitrust law, FCC oversight, and the Federal Trade Commission’s (FTC) existing authority to address any anticompetitive or deceptive practices on a case-by-case basis. By examining the law & economics of broadband data caps and usage-based pricing, this white paper contributes to the ongoing policy debate, and offers a principled case against federal bans of such practices.

## **II. Background and Recent History**

One of the most notable effects of the COVID-19 pandemic is that it has contributed to what appears to be a lasting increase in internet use. According to Pew Research, as of 2023, 95%

of U.S. adults said they used the internet, and 80% said they had at-home broadband,<sup>3</sup> compared with 90% who used the internet and 73% who had at-home broadband in 2019.<sup>4</sup> Moreover, the U.S. Census Bureau reports that 11% of American households lack a fixed-broadband subscription but rely on a “cellular data plan” for internet access.<sup>5</sup>

**TABLE I: Share of Broadband Subscribers by Speed Tier and Data Usage<sup>6</sup>**

Speed Tier	Share of Subscribers		Data Usage (GB): Share of Subscribers (2023)				
	2019	2023	0-100	100-500	500-1,000	1,000-2,000	> 2,000
< 50 Mbps	22%	6%	3.5%	1.1%	0.7%	0.5%	0.1%
50-100 Mbps	27%	4%	2.0%	1.2%	0.5%	0.3%	0.1%
100-200 Mbps	35%	16%	5.3%	6.4%	2.6%	1.4%	0.3%
200-400 Mbps	10%	34%	7.1%	13.3%	8.8%	4.1%	0.7%
500-900 Mbps	3%	7%	0.7%	2.1%	2.1%	1.6%	0.5%
1,000+ Mbps	3%	33%	2.6%	7.9%	9.9%	9.6%	3.0%
		<b>Total</b>	<b>21.3%</b>	<b>32.0%</b>	<b>24.6%</b>	<b>17.5%</b>	<b>4.7%</b>

**SOURCE:** OpenVault

Not only are more people using the internet, but they are also using more data at higher speeds and lower prices.

- According to OpenVault, between 2019 and 2022, average monthly data usage increased by 70%, from 344 GB to 586 GB.<sup>7</sup>
- In 2019, only 16% of subscribers were on a speed tier with download speeds of 200 Mbps or more. As of 2023, 74% had such speeds, and a third of subscribers had speeds of 1,000 Mbps or more (Table 1).<sup>8</sup>

<sup>3</sup> *Internet, Broadband Fact Sheet*, PEW RESEARCH CTR. (Jan. 31, 2024), <https://www.pewresearch.org/internet/fact-sheet/internet-broadband>.

<sup>4</sup> *Id.*

<sup>5</sup> 2022 American Community Survey 1-Year Estimates, U.S. Census Bureau (2022), Table Id. S2801, <https://data.census.gov/table?q=s2801&y=2022>.

<sup>6</sup> *Broadband Industry Report (OVBI): 3Q 2019*, OPENVAULT (Nov. 2019), available at <https://s3.amazonaws.com/media.mediapost.com/uploads/OpenVaultQ32019.pdf>; *Broadband Insights Report (OVBI): 4Q23*, OPENVAULT (Feb. 2024), available at [https://openvault.com/wp-content/uploads/2024/02/OVBI\\_4Q23\\_Report\\_v3.pdf](https://openvault.com/wp-content/uploads/2024/02/OVBI_4Q23_Report_v3.pdf).

<sup>7</sup> *Broadband Insights Report (OVBI): 4Q22*, OPENVAULT (Feb. 2023), available at [https://openvault.com/wp-content/uploads/2023/02/OVBI\\_4Q22\\_Report.pdf](https://openvault.com/wp-content/uploads/2023/02/OVBI_4Q22_Report.pdf); *OV Broadband Insights Report (OVBI): 2Q24*, OPENVAULT (Aug. 2024), available at [https://openvault.com/wp-content/uploads/2024/08/OpenVault\\_2Q24\\_OVBI\\_Report\\_v3.pdf](https://openvault.com/wp-content/uploads/2024/08/OpenVault_2Q24_OVBI_Report_v3.pdf).

<sup>8</sup> *Id.*

- The median U.S. fixed-broadband connection now delivers more than 240 Mbps download service, a 110% increase over the pre-pandemic median speed (Figure 1).<sup>9</sup>
- A broadband pricing index published annually by USTelecom reports that inflation-adjusted broadband prices for the most popular speed tiers fell 54.7% from 2015 to 2023, or an average of 5.6% a year.<sup>10</sup> Prices for the highest-speed tiers have fallen 55.8% over the same period.
- The Producer Price Index (PPI) for residential internet-access services fell by 12.3% from 2015 through 2023.<sup>11</sup> In contrast, the PPI for “services less trade, transportation, and warehousing” increased by 23.5% over the same period.<sup>12</sup>
- OpenVault reports that 22.2% of subscribers used 1 TB or more of data per month in 2023 (Table 1). By contrast, in 2019, only 4.2% of subscribers used 1 TB or more.<sup>13</sup> At one time, these subscribers were called “power users” because they represented a small share of the market. Now, such “power usage” is commonplace.

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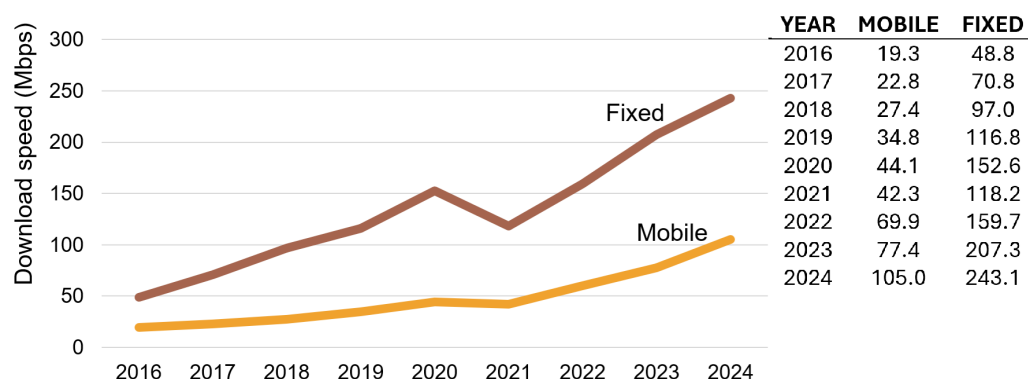
<sup>9</sup> *United States Median Country Speeds July 2024*, SPEEDTEST GLOBAL INDEX (2024), <https://www.speedtest.net/global-index/united-states> (prior years retrieved from INTERNET ARCHIVE); see also Camryn Smith, *The Average Internet Speed in the U.S. Has Increased by Over 100 Mbps since 2017*, ALLCONNECT (Aug. 4, 2023), <https://www.allconnect.com/blog/internet-speeds-over-time> (average download speed in the United States was 30.7 Mbps in 2017 and 138.9 Mbps in the first half of 2023).

<sup>10</sup> Arthur Menko Business Planning Inc., *2023 Broadband Pricing Index*, USTELECOM (Oct. 2023), available at <https://ustelecom.org/wp-content/uploads/2023/10/USTelecom-2023-BPI-Report-final.pdf>.

<sup>11</sup> U.S. Bureau of Labor Statistics, *Producer Price Index by Commodity: Telecommunication, Cable, and Internet User Services: Residential Internet Access Services [WPU374102]*, retrieved from FRED, FEDERAL RESERVE BANK OF ST. LOUIS (Oct. 17, 2024), <https://fred.stlouisfed.org/series/WPU374102>.

<sup>12</sup> U.S. Bureau of Labor Statistics, *Producer Price Index by Industry: Services Less Trade, Transportation, and Warehousing [PCUATTDSVATTDSV]*, retrieved from FRED, FEDERAL RESERVE BANK OF ST. LOUIS (Oct. 17, 2024), <https://fred.stlouisfed.org/series/PCUATTDSVATTDSV>.

<sup>13</sup> *OpenVault Broadband Industry Report (OVBI): 1Q 2019*, OPENVAULT (May 2019), available at [https://openvault.com/wp-content/uploads/2021/05/OVBI\\_Q1\\_Report\\_UPDATE.pdf](https://openvault.com/wp-content/uploads/2021/05/OVBI_Q1_Report_UPDATE.pdf).

**FIGURE 2: Median Download Speed in the United States (Mbps)**

**SOURCE:** SpeedTest

### III. What Are Data Caps and Usage-Based Pricing?

In the broadband market, data caps and usage-based billing refer to offerings with limits on the amount of data a subscriber can consume within a given billing cycle before triggering some other effect. It has been argued that this approach allows ISPs to better manage network congestion and allocate resources more efficiently, while also serving as a revenue-generating strategy.

Usage-based billing charges customers based on the amount of data consumed during a billing period. This pricing model resembles how utilities like electricity or water are commonly billed. Customers are charged a predetermined rate per-unit of data, with the total cost varying based on their individual consumption patterns. With data caps, customers are allotted a specific amount of data they can use each month, typically measured in gigabytes or terabytes. Once a customer exceeds their data cap, they may face charges to consume additional data, or experience throttled internet speeds until the next billing cycle begins.

Many ISPs also offer hybrid plans with both a flat fee for a data allowance and usage-based billing, in which the consumer is charged a flat fee for a specific amount of data and an additional amount for any data used over the monthly allotment. These are also known as *three-part tariffs*, because there are three dimensions related to pricing: (1) a fixed monthly fee, (2) an allotment of monthly data usage, and (3) a price per-unit above the allowance.<sup>14</sup>

In the early days of the commercial internet in the 1990s, most consumers accessed the internet via dial-up connections. These connections were slow—averaging around 56 Kbps—and content was limited. It could take a minute or more for a single image file to load. These factors placed

<sup>14</sup> Three-part tariffs are an economic term describing pricing that has three components and is unrelated to rate tariffs under common carrier and similar regulation.

natural limitations on internet use. Rather than limiting the amount of data used, dial-up services would limit the number of hours subscribers used each month.<sup>15</sup> As broadband rolled out in the 2000s and content proliferated—especially peer-to-peer and video applications—demand for more and faster data increased, straining providers’ networks.<sup>16</sup>

In August 2008, the FCC ruled that Comcast had been secretly throttling bandwidth-hogging peer-to-peer applications, such as BitTorrent.<sup>17</sup> The agency ordered the company to abandon the throttling practices and to better disclose its network-management methods to customers. Economist Thomas W. Hazlett predicted data caps would be one response to the FCC’s ruling: “When one rationing scheme is excluded, others emerge. Download limits, upload limits, and tiered service pricing are the most obvious.”<sup>18</sup>

Indeed, soon after the FCC’s ruling, Comcast announced it would set a monthly cap of 250 GB for residential users. Rather than charging for overages, the company indicated that consumers who exceeded caps twice in a six-month period might be terminated from service.<sup>19</sup> In 2012, the company moved to a tiered pricing program in which consumers would pay a set fee for data used in excess of the monthly allotment, such as \$10 for 50 GB.<sup>20</sup> In 2013, the Open Internet Advisory Committee reported that no major ISP stopped providing service to consumers without notifying them and offering additional options, such as tier upgrades or overage charges.<sup>21</sup>

Before the widespread adoption of the smartphone, particularly Apple’s iPhone, mobile-data usage was limited. When the iPhone was introduced in 2007, AT&T had a five-year agreement to be the exclusive provider of mobile service on the device. The company reported that it experienced a 5,000% increase in 3G data traffic in the first three years of the agreement. In

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<sup>15</sup> *Open Internet Advisory Committee 2013 Annual Report*, FCC OPEN INTERNET ADVISORY COMMITTEE, (Aug. 20, 2013), available at <https://transition.fcc.gov/cgb/oiac/oiac-2013-annual-report.pdf> [hereinafter “OIAC Report”].

<sup>16</sup> For a history of internet congestion, see Steven Bauer, David D. Clark & William Lehr, *The Evolution of Internet Congestion*, SSRN (Aug. 15, 2009), <https://ssrn.com/abstract=1999830>.

<sup>17</sup> *In the Matters of Formal Complaint of Free Press and Public Knowledge Against Comcast Corporation for Secretly Degrading Peer-to-Peer Applications; Broadband Industry Practices Petition of Free Press et al. for Declaratory Ruling that Degrading an Internet Application Violates the FCC’s Internet Policy Statement and Does Not Meet an Exception for “Reasonable Network Management”*, File No. EB-08-IH-1518; WC Docket No. 07-52 (adopted Aug. 1, 2008), available at <https://docs.fcc.gov/public/attachments/FCC-08-183A1.pdf>.

<sup>18</sup> Thomas W. Hazlett, *A Squelchy Net Neutrality Ruling by the FCC*, FINANCIAL TIMES (Sep. 30, 2008).

<sup>19</sup> John Mahoney, *Comcast’s 250GB Data Caps Now Official, Starting in October*, GIZMODO (Aug. 28, 2008), <https://gizmodo.com/comcasts-250gb-data-caps-now-official-starting-in-octo-5043253>.

<sup>20</sup> Press Release, *Comcast to Replace Usage Cap With Improved Data Usage Management Approaches*, COMCAST (May 17, 2012), <https://corporate.comcast.com/comcast-voices/comcast-to-replace-usage-cap-with-improved-data-usage-management-approaches>.

<sup>21</sup> OIAC Report, *supra* note 15.

2010, Apple rolled out the iPad, placing further strain on AT&T's network. In response, AT&T announced that year it would replace its unlimited data plans with two tiers of plans: (1) \$15 a month for 200 MB, plus \$15 for each additional 200 MB, and (2) \$25 a month for 2 GB, plus \$10 for each additional GB. Verizon soon followed with similar tiers.<sup>22</sup> Since that time, both fixed and wireless ISPs have implemented various combinations of flat-fee thresholds and usage-based pricing.

More recently, in the early days of the COVID-19 pandemic in 2020, several ISPs temporarily increased customer data caps, while others waived overage fees for exceeding the cap; some smaller ISPs permanently eliminated data caps.<sup>23</sup>

The FCC has taken a keen interest in usage-based pricing and data caps, but has never previously offered any firm conclusions regarding the practices or how such practices should be regulated:

- In its 2010 Order, the FCC concluded that “prohibiting tiered or usage-based pricing and requiring all subscribers to pay the same amount for broadband service, regardless of the performance or usage of the service, would force lighter end users of the network to subsidize heavier end users. It would also foreclose practices that may appropriately align incentives to encourage efficient use of networks.”<sup>24</sup>
- In its 2015 Order, the agency offered “no blanket findings” regarding data caps, noting that such practices were the “norm” and that consumers benefit from more options among service choices, but that the practices could “potentially... disadvantage competing over-the-top providers.”<sup>25</sup>
- In its 2016 approval of Charter Communications’ acquisition of Time Warner Cable and Bright House Networks, the FCC prohibited the merged firm from imposing data caps or usage-based pricing for its residential broadband service.<sup>26</sup>

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<sup>22</sup> *AT&T Institutes Wireless Data Cap*, MORNING EDITION (Jun. 7, 2010), <https://www.npr.org/2010/06/07/127525710/at-t-institutes-wireless-data-cap>.

<sup>23</sup> Mark Hachman, *Which Internet Providers Are Lifting Data Caps During the Coronavirus, and Which Aren't*, PC WORLD (Jun. 19, 2020), <https://www.pcworld.com/article/398900/which-internet-providers-are-lifting-data-caps-during-the-coronavirus-and-which-arent.html>.

<sup>24</sup> *In the Matter of Preserving the Open Internet Broadband Industry Practices, Report and Order*, GN Docket No. 09-191, WC Docket No. 07-52 (Dec. 23, 2010), at 72, available at <https://docs.fcc.gov/public/attachments/FCC-10-201A1.pdf> [hereinafter “2010 Order”].

<sup>25</sup> *In the Matter of Protecting and Promoting the Open Internet, Report and Order on Remand, Declaratory Ruling, and Order*, GN Docket No. 14-28 (Mar. 12, 2015), at 153, available at <https://docs.fcc.gov/public/attachments/FCC-15-24A1.pdf>.

<sup>26</sup> *In the Matter of Applications of Charter Communications, Inc., Time Warner Cable Inc., and Advance/Newhouse Partnership*

- In June 2023, FCC Chair Jessica Rosenworcel asked her fellow commissioners to support a formal notice of inquiry (NOI) to learn more about how broadband providers use data caps on consumer plans, despite a “demonstrated technical ability to offer unlimited data plans.”<sup>27</sup> The FCC simultaneously opened a “data portal,” which solicited “narrative information” about consumers’ experiences with data caps.
- In November 2023, the commission adopted digital-discrimination rules, under which data caps and pricing could be regulated to “prevent[] digital discrimination of access based on income level, race, ethnicity, color, religion, or national origin.”<sup>28</sup>
- The commission’s 2024 Order also provided no “blanket findings,” concluding that data caps and usage-based pricing may be beneficial to consumers if used to manage congestion and to offer lower-cost broadband to consumers who use less broadband, but also may be harmful to consumers if not used for these purposes. The agency indicated it would evaluate individual data-cap practices on a case-by-case basis under the order’s general-conduct standard.<sup>29</sup>
- In October 2024, the commission issued its NOI, soliciting comment on whether data caps affect consumers’ ability to use the internet; whether they discourage consumers from purchasing and using any over-the-top applications, services, and devices (particularly smart devices); and whether they affect free speech.<sup>30</sup>

It’s not clear how many households are currently under a usage-based pricing service agreement. The FCC reported that, in 2023, approximately 48.9% of Affordable Connectivity Plan subscribers were on plans that had some form of data cap.<sup>31</sup> Among providers surveyed by OpenVault, the number of subscribers on usage-based pricing plans grew from less than 60% in 2018 to approximately 70% in 2022.<sup>32</sup>

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*For Consent to Assign or Transfer Control of Licenses and Authorizations*, Memorandum Opinion and Order, MB Docket No. 15-149 (May 10, 2016), available at <https://docs.fcc.gov/public/attachments/FCC-16-59A1.pdf>.

<sup>27</sup> Press Release, *Chairwoman Rosenworcel Proposes to Investigate How Data Caps Affect Consumers and Competition*, F.C.C. (Jun. 15, 2023), available at <https://docs.fcc.gov/public/attachments/DOC-394416A1.pdf>.

<sup>28</sup> *In the Matter of Implementing the Infrastructure Investment and Jobs Act: Prevention and Elimination of Digital Discrimination*, Report and Order and Further Notice of Proposed Rulemaking, GN Docket No. 22-69 (Nov. 20, 2023), at 4, 102, available at <https://docs.fcc.gov/public/attachments/FCC-23-100A1.pdf>.

<sup>29</sup> *In the Matter of Safeguarding and Securing the Open Internet, Restoring Internet Freedom*, Declaratory Ruling, Order, Report and Order, and Order on Reconsideration (Apr. 4, 2024), at 535, available at <https://docs.fcc.gov/public/attachments/DOC401676A1.pdf>.

<sup>30</sup> NOI, *supra* note 1 at 20.

<sup>31</sup> NOI, *supra* note 1 at 13.

<sup>32</sup> *Supra* note 7 (calculations based on weights assigned by OpenVault).

In a 2019 interview, OpenVault’s CEO reported that only 1-2% of subscribers within each speed tier exceed their plan’s data allotment.<sup>33</sup> Moreover, OpenVault reports a trend among many providers with usage-based pricing to offer unlimited data to their subscribers on 1 Gbps or higher speed tiers.<sup>34</sup> Indeed, information in Table 1 shows that about 57% of consumers using 1 TB or more of monthly data are on a gigabit speed tier. In summary, more subscribers appear to be served by usage-based pricing ISPs, but fewer are subject to data caps—largely because they are on higher speed tiers and only a few of those subject to caps ever exceed them.

#### IV. Managing Network Congestion

Data caps initially arose as a congestion-management tool. Congestion is, however, less of an issue today than it was in the early days of data caps. As currently implemented, data caps appear to be blunt tools that only indirectly affect peak-period usage, when the risk of congestion is highest. As discussed in this section, however, innovative uses of usage-based pricing and data caps—such as dynamic pricing—could play a large role in managing network congestion going forward.

A 2014 U.S. Government Accountability Office (GAO) study reported that surveyed mobile providers indicated they employed usage-based pricing “to address the usage of heaviest users, manage their networks, or address congestion.”<sup>35</sup> Similarly, all but one of the fixed providers surveyed indicated that usage-based pricing was used to “address the usage of the heaviest data users.”<sup>36</sup>

Network congestion occurs when the aggregate data demand from users exceeds a network’s capacity, leading to slower speeds and degraded performance.<sup>37</sup> As discussed above, congestion was a significant issue in the early days of broadband. Whether users notice degraded performance depends on many factors—particularly, which applications they are using. For example,

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<sup>33</sup> Sarah Barry James, *Cable Data Expert Sees Benefits, Misconceptions Around Usage-Based Billing*, S&P GLOBAL MKT. INTELLIGENCE (Jan. 7, 2019), <https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/cable-data-expert-sees-benefits-misconceptions-around-usage-based-billing-49228422>.

<sup>34</sup> *Broadband Insights Report (OVBI): 4Q22*, OPENVAULT (Feb. 2023), available at [https://openvault.com/wp-content/uploads/2023/02/OVBI\\_4Q22\\_Report.pdf](https://openvault.com/wp-content/uploads/2023/02/OVBI_4Q22_Report.pdf).

<sup>35</sup> GAO-15-108, *FCC Should Track the Application of Fixed Internet Usage-Based Pricing and Help Improve Consumer Education*, U.S. GOV’T ACCOUNTABILITY OFFICE (2014), available at <https://www.gao.gov/assets/gao-15-108.pdf>.

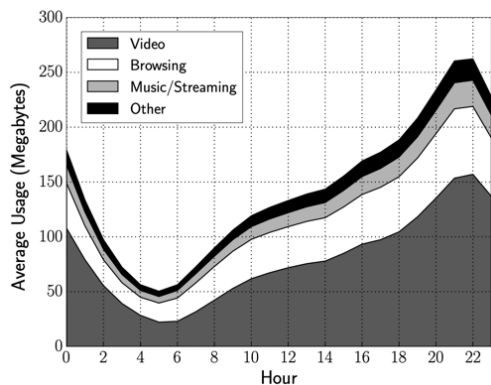
<sup>36</sup> *Id.*

<sup>37</sup> *Eleventh Measuring Broadband America Fixed Broadband Report*, F.C.C. (Dec. 31, 2021), <https://www.fcc.gov/reports-research/reports/measuring-broadband-america/measuring-fixed-broadband-eleventh-report> (“During network congestion, both latency and packet loss typically increase. High packet loss degrades the achievable throughput of download and streaming applications.”); see also Jacob B. Malone, Aviv Nevo, & Jonathan W. Williams, *The Tragedy of the Last Mile: Economic Solutions to Congestion in Broadband Networks*, NET Institute Working Paper No. 16-20 (May 30, 2021), [https://jonwms.web.unc.edu/wp-content/uploads/sites/10989/2021/06/Congestion\\_WP-2021.pdf](https://jonwms.web.unc.edu/wp-content/uploads/sites/10989/2021/06/Congestion_WP-2021.pdf) (showing increased packet loss in hours of the day with the heaviest data usage).

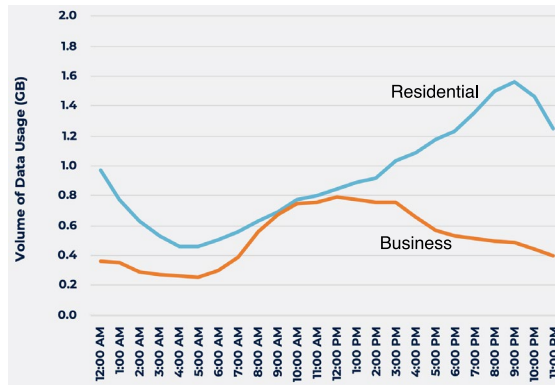
“mild” congestion may diminish the quality of highly interactive applications, such as video calls, multi-player gaming, or high-definition video streaming (e.g., by requiring “buffering”). More severe congestion may degrade less data-intensive applications, such as standard-definition streaming or web browsing. Congestion may also affect speeds, as the protocols governing internet traffic reduce speeds when congestion is detected.<sup>38</sup>

It is important to note that congestion is a second-by-second phenomenon, rather than a monthly phenomenon. It’s well-known that data usage is lowest among residential customers around 4 a.m., increases throughout the day, and peaks around 9 p.m., as shown in Figure 2.<sup>39</sup> Thus, if monthly data caps are seen as one way to relieve congestion, it is crucial to evaluate whether there is a connection between monthly usage and that temporal usage that contributes to congestion. Research indicates that, at best, this connection is indirect.

**FIGURE 2: Data Usage by Hour of Day**



SOURCE: Malone, et al. (2021)



SOURCE: OpenVault (2024)

Scott Jordan’s 2017 survey of the literature on data caps reports: “The correlation between heavy monthly usage and users’ contributions to congestion remains somewhat unclear,” citing two studies.<sup>40</sup> One study reported that heavy users are active during peak periods, and their usage also peaks during peak periods.<sup>41</sup> Another found that 83% of “heavy users” are among

<sup>38</sup> Scott Jordan, *A Critical Survey of the Literature on Broadband Data Caps*, 41 TELECOMM. POL’Y 813 (Oct. 2017).

<sup>39</sup> Malone et al., *supra* note 37; *Broadband Insights Report (OVBI): 4Q23*, OPENVAULT (Feb. 2024), available at [https://openvault.com/wp-content/uploads/2024/02/OVBI\\_4Q23\\_Report\\_v3.pdf](https://openvault.com/wp-content/uploads/2024/02/OVBI_4Q23_Report_v3.pdf).

<sup>40</sup> *Supra* note 38.

<sup>41</sup> Jacob B. Malone, John L. Turner, & Jonathan W. Williams, *Do Three-Part Tariffs Improve Efficiency in Residential Broadband Networks?* 38 TELECOMM. POL’Y. 1035 (2014). These results are supported by more recent data in Malone, et al., *supra* note 37.

the top 1% of bandwidth users during peak hours.<sup>42</sup> In short, most customers are heavier users during peak times, and “heavy” or “power” users are among them.

Because of the fairly tenuous connection between monthly data usage and congestion, the practice of usage-based pricing to reduce congestion is similarly indirect and tenuous. It’s thought that, if usage-based pricing can either reduce or slow the increase of monthly data usage, then peak-period usage would also be reduced. Jacob Malone and his co-authors, however, concluded that “the pattern in daily usage does not consistently relate to the level of a consumer’s overall usage.”<sup>43</sup> Thus, it’s unlikely that reducing monthly data usage would do much to reduce peak-period usage and thereby ease congestion.

In response to this phenomenon, some have pointed to the “potential” for “peak period” usage-based pricing, in which the price of data is higher when the network is at-risk of congestion, and lower during off-peak periods.<sup>44</sup> Another alternative would be a form of “zero rating,” in which off-peak data usage would not be counted against a customer’s data cap.<sup>45</sup>

Demand for data is, however, largely driven by everyday factors that are often beyond a customer’s control. Residential demand for data increases as people come home from work and peaks after dinner, when households gather to stream video content. Thus, it is understandable why Malone and his co-authors find “the intra-day elasticity of usage is quite small;” consumers cannot easily shift their data usage from peak to off-peak periods.<sup>46</sup>

While consumers may not be willing to shift their data-usage patterns, the devices they use may be able to. Figure 2 shows that video accounts for most of the data consumed by residential consumers. Moreover, most of the video is used via an over-the-top video device, such as Roku, Amazon Fire, or a smart TV. These devices can cache (*i.e.*, “download”) content during off-peak periods, store the content on the device, and provide the cached content to a consumer viewing during the peak period. Malone *et al.* argue that such innovations would be well-suited for peak-period pricing programs, as they would simultaneously reduce peak-period usage and the risk of congestion, while also reducing peak-period charges incurred by consumers.<sup>47</sup>

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<sup>42</sup> Benoit Felten, *Do Data Caps Punish the Wrong Users?*, FIBEREVOLUTION (Nov. 2011), <https://web.archive.org/web/20111203014824/http://www.fiberevolution.com/2011/11/do-data-caps-punish-the-wrong-users.html>.

<sup>43</sup> Malone *et al.*, *supra* note 37 at 12.

<sup>44</sup> *Id.* at 38.

<sup>45</sup> *Id.* at 32.

<sup>46</sup> *Id.* at 35.

<sup>47</sup> *Id.* at 38.

Practically speaking, data caps are one of many ways providers can use pricing and data allowances to manage network congestion. Even so, consumer demand appears to guide providers away from data caps. According to Statista, 45% of mobile consumers say they have unlimited data plans.<sup>48</sup> Perhaps that's why OpenVault reports a "trend" among many operators to provide unlimited data to their gigabit subscribers.<sup>49</sup> Additionally, the expansion of cable-wireless providers—such as Spectrum Mobile and Xfinity Mobile—are likely imposing competitive pressure on mobile providers to offer unlimited data plans.<sup>50</sup> If this trend continues, data caps and usage-based billing may be practices of the past, much like long-distance telephone charges. The Electronic Frontier Foundation's (EFF) comments to the FCC matter echo this observation:

Given abundant capacity, throttling, paid prioritization, and data caps become all the more unreasonable. This is already apparent in broadband plans, both wireline and mobile, where increasingly there are very high to no data caps. As more fiber is laid, data caps should disappear altogether. Certainly, the need to manage the volume of traffic as a matter of "reasonable network management" will be even less plausible than it is today as time goes on.<sup>51</sup>

In summary, while data caps arose partly as a congestion-management tool, congestion is less of an issue today in both fixed and mobile broadband. More importantly, as currently implemented, data caps and usage-based pricing are blunt tools that only indirectly affect peak-period usage, when the risk of congestion is highest. It is therefore reasonable to be skeptical of claims that data caps and usage-based pricing are necessary to address network congestion.

## V. The Economics of Data Caps and Usage-Based Pricing

Even if the historical justification for data caps largely no longer applies, the economics of such pricing demonstrate that such practices may still serve useful purposes. To better understand the economics of usage-based pricing, Boston College Law School's Daniel Lyons provides a helpful analogy of a hypothetical airline.<sup>52</sup> He explains that, at \$700 a ticket, a fare covers the

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<sup>48</sup> *Most Common Mobile Data Plans in the U.S. as of September 2023*, STATISTA (Nov. 2023), <https://www.statista.com/forecasts/997206/most-common-mobile-data-plans-in-the-us> (Response to the question, "How large is your monthly data volume according to your main smartphone contract/prepaid service?" Note that most many "unlimited" plans have a "soft cap" (such as a reduction in a user's internet speed) after certain monthly thresholds are met.)

<sup>49</sup> *Supra* note 34.

<sup>50</sup> Decl. of Jonathan Orszag, *Applications of T-Mobile US, Inc. and United States Cellular Corporation for Consent to Transfer Control of Licenses and Authorizations*, GN Docket No. 24-286 (Sep. 13, 2024), 40-41, <https://www.fcc.gov/ecfs/document/109132166915081/7> (reporting the companies offer unlimited mobile data for an effective price of \$20 a month or less).

<sup>51</sup> *Comments of the Electronic Frontier Foundation*, WC Docket No. 23-320 (Dec. 14, 2023) at 7.

<sup>52</sup> Daniel A. Lyons, *Internet Policy's Next Frontier: Usage-Based Broadband Pricing*, 66 FED. COMM. L. J. 1, 23 (2013).

average cost associated with the passenger—the marginal cost plus an allocation of fixed costs. At \$500, the fare would cover marginal costs, but not all of the allocated fixed costs. In other words, if the airline could fill every flight with \$700 fares, it would break even, but it would lose money if everyone paid \$500.

In reality, the airline charges a range of fares: \$700 for a standard ticket, \$1,000 for a last-minute business traveler, and \$500 to a college student if the flight hasn't filled up. Because business travelers value their time more highly, they will be willing to pay more. The airline is willing to charge only \$500 to the student, because that's better than getting nothing from flying with an empty seat. Everyone seems to benefit from this form of price discrimination: prices are more closely aligned to willingness-to-pay, the airline covers its costs, and everyone gets a seat.

Lyons points out that, if the airline charges \$700 to every person on every seat, it may not fill its flights, price-sensitive passengers would pay more, and some may not travel at all.<sup>53</sup> Lyons, however, does not point out that passengers behave differently if a flight has empty seats than they do with respect to a full flight. If you have an empty seat next to you, you may put your bag on the seat. If the rest of your row is empty, you may lie down to sleep through the flight. In some sense, such consumers are “overusing” airplane seats.

Similarly, with no limits on broadband-data usage, consumers may “overuse” data. For example, they might leave streaming devices on when they aren't home or download videos they have little intention of watching. Usage-based pricing is one method to reduce incentives to overuse data.

Lyons mentions first-class fares as another element of price discrimination.<sup>54</sup> First-class fares have slightly higher marginal cost associated with additional amenities, such as bigger seats, prepared meals, complimentary alcoholic drinks, and blankets. And because first-class passengers are at the front of the plane, they are the first to exit, reducing their total travel time. Most broadband providers offer a range of service tiers in which higher-speed tiers have greater data allotments, with some ISPs offering the highest-speed tiers unlimited data. Thus, not only are high-speed consumers getting more data, but they also are receiving higher speeds, thereby increasing their willingness to pay.

Like airlines, broadband internet is characterized by high fixed and upfront costs, but relatively low marginal costs for delivering data.<sup>55</sup> Between 2002 and 2022, broadband providers invested

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<sup>53</sup> *Id.*

<sup>54</sup> *Id.*

<sup>55</sup> OIAC Report, *supra* note 15 (“Generally, in a high fixed and high sunk cost setting (such as network provision), usage based pricing is about raising revenue over incremental costs and recouping substantial fixed costs.”)

an average of \$95 billion a year, adjusting for inflation (Figure 5). In 2011, the general counsel of Netflix wrote: “The marginal cost of providing an extra gigabyte of data... is less than one cent, and falling.”<sup>56</sup> If that is the case, then a provider charging a price at or near marginal cost would find it impossible to cover its fixed cost or to fund future investments.

The provider’s challenge is to develop a pricing program that simultaneously maximizes revenue and minimizes costs. The appropriate strategy to maximize revenue is not as simple as “raise prices.” Rather, the provider must account for how consumers will respond. Provider entry and intermodal competition from 5G, fixed wireless, and satellite means that more than 94% of U.S. consumers can now access high-speed broadband from three or more providers. This increased competition constrains each provider’s power over pricing. Moreover, the recent rollout of broadband “nutrition labels” provides consumers with information to do an “apples-to-apples” comparison across providers and plans, further increasing competition.<sup>57</sup>

While price discrimination is often associated with market power, the practice is prevalent and accepted among many competitive industries. For example, Lyons points to movie theaters (which offer discounts to children and seniors); publishers (which charge different list prices to consumers and institutional buyers); and haggling at car dealerships.<sup>58</sup> Retail coupons and loyalty programs, happy hours, and in-state vs. out-of-state tuition are also examples of price discrimination in competitive industries. Similarly, multi-part tariffs are common, as anyone who has been to an amusement park or been a member of Costco can attest.

### **A. Promoting Economic Efficiency Through Cost Alignment**

Usage-based pricing is often framed as a method to foster fairness and economic efficiency. More importantly—and often overlooked—is that usage-based pricing can improve broadband affordability and, in turn, increase adoption. That’s because, under usage-based pricing, consumers who use less data pay less, consumers who use more pay more, and no group of consumers cross-subsidizes usage by other users. If consumers who use less data pay less, then plans that would be unaffordable under flat-rate pricing can be rendered affordable under usage-based pricing, thereby by increasing adoption by those who expect to use less data.

The FCC adopted this fairness and economic efficiency framing in its 2010 Order:

However, prohibiting tiered or usage-based pricing and requiring all subscribers to pay the same amount for broadband service, regardless of the performance or usage

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<sup>56</sup> David Hyman, *Why Bandwidth Pricing Is Anti-Competitive*, WALL ST. J. (Jul. 7, 2011), <https://www.wsj.com/articles/SB10001424052702304447804576414220570134518>.

<sup>57</sup> *In the Matter of Empowering Broadband Consumers Through Transparency*, Order, CG Docket No. 22-2 (Jul. 18, 2023), available at <https://docs.fcc.gov/public/attachments/DA-23-617A1.pdf>.

<sup>58</sup> *Supra* note 38.

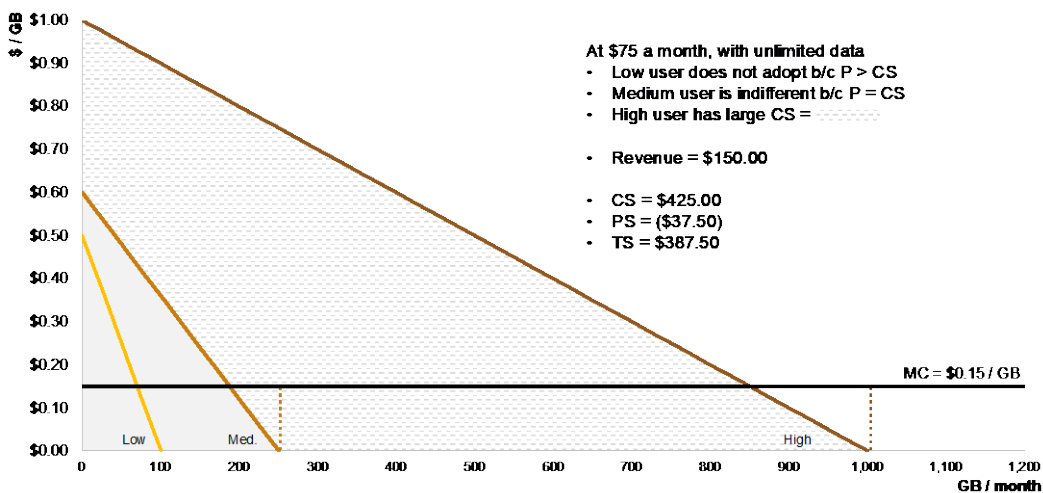
of the service, would force lighter end users of the network to subsidize heavier end users. It would also foreclose practices that may appropriately align incentives to encourage efficient use of networks. The framework we adopt today does not prevent broadband providers from asking subscribers who use the network less to pay less, and subscribers who use the network more to pay more.<sup>59</sup>

Under a flat-rate pricing plan, a consumer using 250 GB of data a month would pay the same as someone using 1,000 GB of data a month on the same speed tier. If the monthly price is \$75, then the light user is paying 30 cents per GB of data, while the heavy users are paying only 7.5 cents per GB. Because one GB of data is no different than another GB of data, some would see it as fundamentally unfair that one customer is paying four times the price per GB than another customer.

Moreover, assume there is another consumer who would like to use 100 GB of data, but not at the price of \$75. If surveyed, this consumer might say that they are “not interested” in broadband, that “it’s not worth it,” or that they “can’t afford it.” But they would be interested, it would be worth it, and they could afford it if the price were \$25 a month or 25 cents per GB

This example is illustrated in Figure 3. With an unlimited (“all-you-can-eat”) data plan, from the user’s perspective, the marginal cost of each GB used is zero, and they will use data until their marginal benefit is zero—*i.e.*, they eat until they are full. At a monthly price of \$75, the high-data user will use 1,000 GB of data, the medium-data user will use 250 GB, and the low-data user will opt out.

**FIGURE 3: Flat-Rate Billing**



<sup>59</sup> 2010 Order, *supra* note 24.

It's important to note that the average price-per-GB is irrelevant to the consumer's choice of how much data to use. That's because, under an all-you-can-eat data plan, the price of using an additional GB of data is zero. Consequently, for both high-use and medium-use consumers, some of the data they use is worth less than the marginal cost to provide the data (e.g., streaming Spotify to an empty room).

In Figure 3, all of the consumer surplus comes from the high-use consumer, who is willing to pay \$500 for all the data used, but only pays \$75 to the provider. The medium-use consumer's willingness to pay for 250 GB of data equals the \$75 paid to the provider. Under this scheme, the provider's producer surplus is negative, because the cost of providing data (\$187.50) exceeds the provider's revenue (\$150).<sup>60</sup>

**FIGURE 4: Usage-Based Billing**

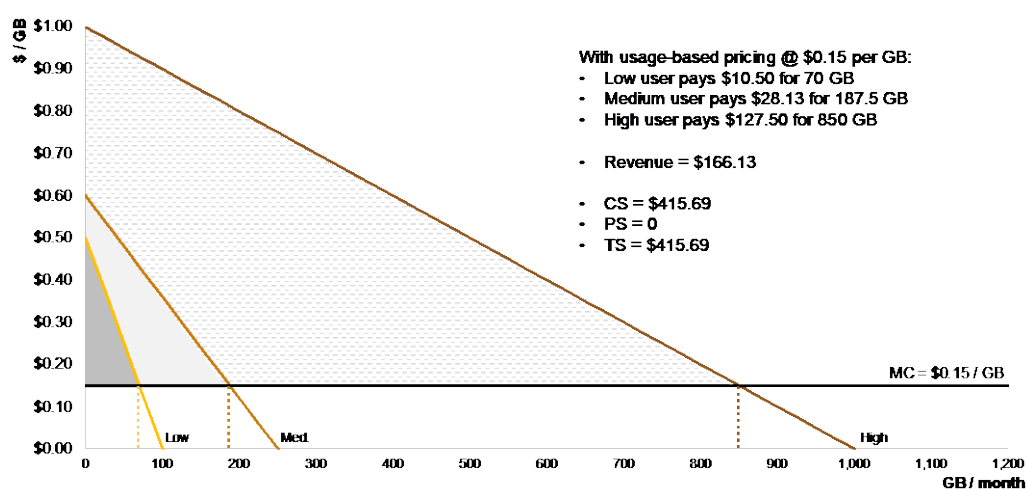


Figure 4 presents the simplest case of usage-based billing, in which the provider charges a flat price per GB used, equal to its marginal cost of production of 15 cents per GB. At this price, the low-data user is willing to adopt broadband, and uses 70 GB a month, paying a total of \$10.50 a month. The medium-data user reduces data consumption relative to the all-you-can-eat pricing scheme, but pays substantially less to the provider. This medium-data user experiences an increase in consumer surplus because the user's willingness to pay (\$70.31) exceeds the amount paid to the provider (\$28.13).

<sup>60</sup> See also Jeremy Blackburn, Rade Stanojevic, Vijay Erramilli, Adriana Iamnitchi, & Konstantina Papagiannaki, *Last Call for the Buffet: Economics of Cellular Networks*, Proceedings of the 19th Annual International Conference on Mobile Computing & Networking (MobiCom '13) (Association for Computing Machinery, Sep. 2013), 111 (“[W]e find that 20% of the users lead to more cost to the network than revenue. This result points to two conclusions—first, unlimited, buffet-type plans attract such unprofitable user behavior and second, this unprofitable user behavior is *cross-subsidized* by other users”) [emphasis in original].

The high-usage customer also reduces data consumption—by 15%—but pays substantially more than she would under flat-rate pricing. As a result, the high-use consumer experiences a decrease in consumer surplus, but is nevertheless receiving a consumer surplus more than six times greater than the low- and medium-usage consumers combined.

The hypotheticals in Figures 3 and 4 represent two extremes of pricing options: “pure” flat-rate pricing and “pure” usage-based pricing. Even so, the differences between the two outcomes highlight some testable hypotheses regarding a shift from flat-rate pricing to usage-based pricing:

- **Lower prices for “entry-level” plans** (from \$75 a month to \$10.50 a month): Konstantinos Poularakis *et al.* find that data caps reduce service prices for “lightweight” users;<sup>61</sup> Juan Sebastián Vélez-Velásquez finds that low-income households benefit from usage-based pricing, while higher-income households are worse off.<sup>62</sup>
- **Increased broadband adoption** (from two consumers to three consumers).
- **Reduced usage** (from 1,250 GB a month to 1,108 GB a month): Malone *et al.* find that “[s]ubscribers facing three-part tariffs have lower average usage than subscribers on unlimited plans,” driven mainly by changes among heavy users;<sup>63</sup> Aviv Nevo *et al.* find that “usage-based pricing is an effective means to remove low-value traffic.”<sup>64</sup>
- **Increased provider revenues** (from \$150 a month to \$166 a month).
- **ISPs recover costs associated with heavy users** (from losses of \$75 a month on high-usage consumers to break-even).
- **A slight decrease in consumer surplus** (driven by a decrease in high-usage consumer’s consumer surplus): Nevo *et al.* find that “usage-based pricing is effective at lowering usage without reducing consumer welfare significantly, relative to a world with just unlimited plans;”<sup>65</sup> Vélez-Velásquez finds a small change in consumer surplus “because winners and losers balance each other.”<sup>66</sup>

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<sup>61</sup> Konstantinos Poularakis, Ioannis Pefkianakis, Jaideep Chandrashekar, & Leandros Tassioulas. *Pricing the Last Mile: Data Capping for Residential Broadband*, Proceedings of the 10th ACM International on Conference on Emerging Networking Experiments and Technologies (CoNEXT ‘14). (Dec. 2014), 295.

<sup>62</sup> Juan Sebastián Vélez-Velásquez, *Quantifying the Effects of Price Discrimination Under Imperfect Competition*, 72 J. INDUS. ECON. 429 (Mar. 2024).

<sup>63</sup> *Supra* note 41.

<sup>64</sup> Aviv Nevo, John L. Turner, & Jonathan W. Williams, *Usage-Based Pricing and Demand for Residential Broadband*, 84 ECONOMETRICA 411, 440 (Mar. 2016).

<sup>65</sup> *Id.* at 414.

<sup>66</sup> *Supra* note 62 at 449.

- **Increased total surplus** or social welfare (from \$388 to \$416);<sup>67</sup>
- **Increased fairness** (price reflects cost; no cross-subsidy from medium to high-usage consumer): Malone *et al.* find that “the three-part tariff saves network costs and narrows the gap, between light and heavy users, in price per Gigabyte used.”<sup>68</sup>

Usage-based pricing can promote economic efficiency by aligning costs with consumer-usage patterns. Under flat-rate pricing, all consumers pay the same amount regardless of usage, potentially leading to overuse by heavy users and cross-subsidization by light users. In contrast, usage-based pricing allows for more granular pricing that better reflects individual consumption patterns.

This approach can lead to several outcomes: lower prices for entry-level plans; increased broadband adoption; reduced overall usage (particularly among heavy users); increased provider revenues; better cost recovery for serving heavy users; and potentially increased total surplus or social welfare. While there might be a slight decrease in consumer surplus for heavy users, the overall effect on consumer welfare is generally small.

## **B. Recovering High Fixed Costs of Broadband Infrastructure**

Usage-based pricing and data caps offer several advantages over flat-rate models. They provide more options for consumers and generate additional revenue to fund network improvements and expansion. Importantly, these pricing strategies could make previously unprofitable broadband deployments economically viable, particularly in underserved areas. By enabling ISPs to recover more of their investment costs from heavy users, while potentially offering lower-priced plans to light users, usage-based pricing could drive increased broadband deployment and adoption as well as fostering a more robust, innovative internet ecosystem.

Between 2002 and 2022, broadband providers invested an inflation-adjusted average of \$95 billion annually (Figure 5),<sup>69</sup> which amounts to an average of \$785 per U.S. household. Like all firms, broadband providers have limited resources to make such investments. While profitability is necessary for investment, not all profitable investments can be undertaken. Among the universe of potentially profitable projects, firms are likely to give priority to those that

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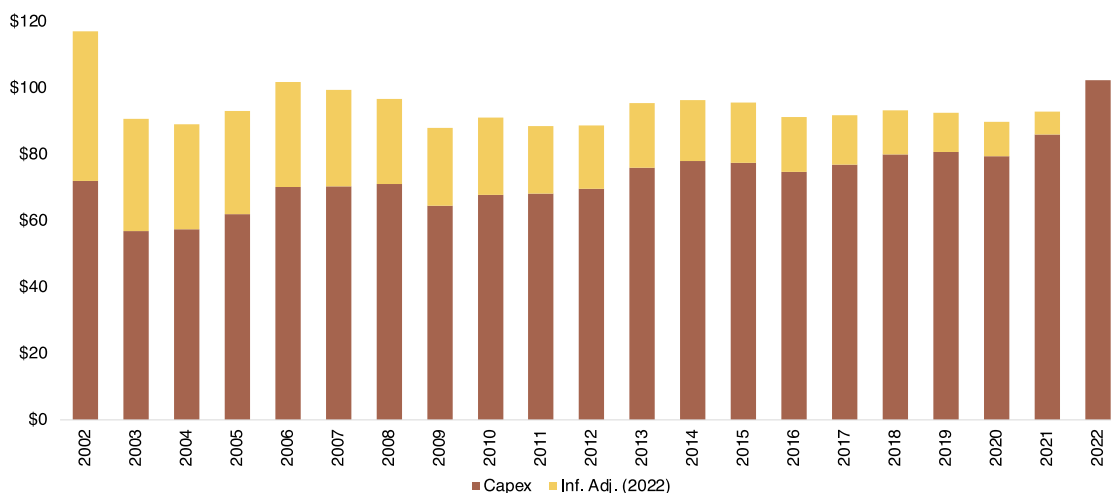
<sup>67</sup> *Supra* note 64 at 414 (“Generally, usage-based pricing shifts surplus from consumers to providers. The magnitude, as well as the effect on total welfare, depends on the prices of the unlimited plans in the counterfactual setting.”)

<sup>68</sup> *Supra* note 41 at 1035.

<sup>69</sup> 2022 *Broadband Capex Report*, USTELECOM (Sep. 8, 2023), available at <https://ustelecom.org/wpcontent/uploads/2023/09/2022-Broadband-Capex-Report-final.pdf>.

promise greater returns on investment relative to those with lower ROI.<sup>70</sup> In other words, providers are more likely to prioritize investments that can generate higher revenues at lower costs.

**FIGURE 5: US Broadband Provider Capital Expenditures (\$B)**



In some cases, usage-based pricing is one way of increasing provider revenues.<sup>71</sup> When this is possible, the additional revenues provide additional resources for investment and improve the expected ROI on deployment. That is, shifting from fixed-rate pricing to usage-based pricing would shift some deployment opportunities from unprofitable to profitable. Thus, usage-based pricing not only eases congestion in the short run, by suppressing data demand, but also reduces congestion eventually, by funding increased investments in speed and capacity.

Geoffrey A. Manne and Berin Szóka note that usage-based pricing is a mechanism for providers to recover more of their investment costs, by charging heavy users more (and reducing prices for those who use less).<sup>72</sup> This can be illustrated in the hypotheticals provided above. In Figure 3, the high-usage consumer paid \$75 and consumed \$150 worth of data; the medium-usage consumer paid \$75 and consumed \$37.50 worth of data, and the provider is losing money. With usage-based pricing in Figure 4, the low-usage consumer enters the market, the medium-

<sup>70</sup> *Comments of Public Knowledge, Benton Institute for Broadband and Society, and Electronic Privacy Information Center*, GN Docket No. 22-69 (Feb. 21, 2023), at 45 (“In many cases, a provider has the choice to build out and provide service in one area, or another. It will likely choose to build out in the more profitable area, even if it could break even or turn a profit serving the other, as well.”).

<sup>71</sup> See Anja Lambrecht, Katja Seim, & Bernd Skiera, *Does Uncertainty Matter? Consumer Behavior Under Three-Part Tariffs*, 26 *MARKETING SCIENCE* 698 (Sep-Oct 2007), (finding if consumers are uncertain about their demand for data, providers can increase revenues with a three-part tariff).

<sup>72</sup> Geoffrey A. Manne & Berin Szóka, *Tears for Tiers: Wyden’s “Data Cap” Restrictions Would Hurt, Not Help, Internet Users*, *TRUTH ON THE MARKET* (Dec. 20, 2012), <https://truthonthemarket.com/2012/12/20/tears-for-tiers-wyden-data-cap-restrictions-would-hurt-not-help-internet-users>.

usage consumer pays less than with fixed-rate pricing, the high-usage consumer pays more, and the provider breaks even. In these examples, fixed-rate pricing would be unsustainable in the long run. But with usage-based pricing, the provider generates sufficient revenue to continue operating in the future.

Forbidding usage-based pricing for internet service can frustrate consumer demand for data and content. With so-called “neutral” pricing, consumers have little ability or incentive to prioritize their own internet use based on their preferences, beyond simply consuming or not consuming the service altogether. This creates deadweight loss, as users forego benefits they could otherwise receive from services they cannot afford under an all-or-nothing full-access model. It also encourages inefficient network-usage patterns, as consumers cannot signal their priorities. Additionally, restricting pricing models would limit innovation in offerings that could leverage more nuanced pricing approaches. The rigid one-size-fits-all nature of “neutral” flat-rate pricing can negatively impact consumer welfare and network efficiency.

With undifferentiated pricing, the cost to users is the same for high-value, low-bandwidth data as for low-value, high-bandwidth data, so long as the user’s total bandwidth allotment is not exceeded. Undifferentiated pricing can lead consumers to overconsume lower-value data, such as photo sharing, while under-consuming higher-value uses, like telehealth. Content developers respond by overinvesting in the former and underinvesting in the latter. The result is a net reduction in the overall value of both available and consumed content, along with network underinvestment.

Importantly, limiting ISP pricing flexibility may also hinder faster network construction and ultimately reduce consumer welfare. In a 2016 paper, current FTC Chief Economist Aviv Nevo and co-authors explained:

We find that usage-based pricing is effective at lowering usage without reducing consumer welfare significantly, relative to a world with just unlimited plans. This is driven directly by the finding that marginal content is not very valuable and that consumer welfare is mainly driven by infra-marginal usage.<sup>73</sup>

In an earlier version of the paper, the authors noted that overall (and ISP) welfare could be increased further with \$100 flat-rate monthly pricing on a gigabit network. But as the authors note, “[f]rom the ISP’s perspective, the capital costs of such investment would be recovered in

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<sup>73</sup> Aviv Nevo, John L. Turner, & Jonathan W. Williams, *Usage-Based Pricing and Demand for Residential Broadband*, 84(2) *ECONOMETRICA* 411, 414 (Mar. 2016).

approximately 150...months. Similarly, this estimate is a lower bound on the actual time required.”<sup>74</sup>

While such cost recovery is feasible, it assumes no significant changes in technology, regulation, or demand that would alter the calculation; relatively high population density; and, most importantly, the ability to charge relatively high rates, leading to decreased penetration. And the authors further note that the *optimal* monthly fixed fee for gigabit was almost \$200. While:

[t]his revenue-maximizing price is in the middle of the range of prices currently offered for Gigabit service in the U.S..., due to restrictions on rates from local municipalities, an ISP may have a difficult time charging this rate.<sup>75</sup>

The bottom line is that regulatory pricing restrictions generally reduce welfare and incentives for broadband investment. Broadband policy should avoid adopting such restrictions, particularly without the evidence or economic analysis sufficient to justify them.

## **VI. Policy Framework for Broadband Data Caps and Usage-Based Pricing**

The goal of broadband policy should be to optimize internet use in order to maximize value for consumers, while offering incentives for innovation and investment. Data caps and usage-based pricing are just one approach tailored to address these issues. Since consumer preferences are diverse, a flexible approach is needed, rather than one-size-fits-all mandates. ISPs should have room to experiment with options that encourage users to prioritize data based on their individual needs and willingness to pay. Effective policy aims for an internet that maximizes benefits and incentives for all through flexible, value-driven models.

While usage-based pricing, as practiced today, seems to have little effect on managing network congestion, usage-based pricing could, in many cases, encourage the expansion of network capacity.<sup>76</sup> On the other hand, it’s been argued that differential pricing could provide incentives to generate artificial network scarcity.<sup>77</sup> If that is the concern, however, economic analysis should clearly establish where such risks exist before promulgating tailored regulations. Additionally, regulation should be narrowly targeted only to address proven harms, while avoiding constraints on beneficial incentives for investment, usage, and innovation.

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<sup>74</sup> Aviv Nevo, John L Turner, & Jonathan W. Williams, *Usage-Based Pricing and Demand for Residential Broadband* 37 (Working Paper, Sep. 12, 2013), [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2330426](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2330426).

<sup>75</sup> *Id* at 38.

<sup>76</sup> See generally Robert D. Willig, *Pareto Superior Nonlinear Outlay Schedules*, 11 BELL J. ECON. 56 (1978).

<sup>77</sup> See Nicholas Economides, *Why Imposing New Tolls on Third-Party Content and Applications Threatens Innovation and Will Not Improve Broadband Providers’ Investment* (NYU Center for Law, Economics & Organization Working Paper No. 10-32, Jul. 2010), [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=1627347](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1627347).

### **A. Transparency and Clear Disclosure of Policies to Consumers**

Many consumers today accept and appreciate data caps and usage-based pricing. Such practices are ubiquitous in both fixed and mobile broadband markets. Much of the consumer frustration with data caps and usage-based pricing stems from imperfect information and uncertainty regarding the plans and how they are used. For example, a consumer with a 1,000 GB data cap may not know whether that represents “a lot” or “a little,” particularly with respect to their anticipated usage. A consumer may not know how their usage choices (e.g., browsing, streaming, and gaming) affects their data use, or how much data they use at a particular point in the billing cycle. If they exceed their monthly allotment, they may be unaware of how much they will be charged for the overage.

Much of this uncertainty can be resolved with clear disclosure of provider policies. The FCC has already taken steps in this direction with its longstanding internet-transparency rules<sup>78</sup> and more recent broadband “nutrition labels” rules, which require providers to display important service-plan features in an easy-to-read format.<sup>79</sup> One of the required features is the amount of data included in the monthly price and any applicable charges for additional data usage. Consumers can then use these labels as an “apples to apples” comparison across plans and providers.

Another step—already undertaken by many providers—is to clearly inform consumers of their data usage. Most providers allow users to monitor their usage by viewing their accounts on the provider’s website or mobile app. Many ISPs provide near-real-time updates via email and text when consumers approach their monthly allowance.

### **B. Antitrust Law and Targeted *Ex-Post* Enforcement**

If, as some have alleged, data caps and usage-based pricing practices harm competition or consumers, these concerns can be addressed with a straightforward application of existing antitrust and consumer-protection laws. Antitrust enforcers and courts assess such practices under the rule of reason—an approach that avoids presumptive condemnation, because such practices only rarely result in actual anticompetitive harm. Under a rule-of-reason approach, the effects of potentially harmful conduct are typically evaluated and weighed against the various aims that competition law seeks to promote. Only following that review can it be determined whether particular conduct is harmful and, if so, whether there are procompetitive benefits that outweigh the harm.

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<sup>78</sup> *Supra* note 24 at 55.

<sup>79</sup> *Supra* note 57.

Consumer protection is the purview of the Federal Trade Commission (FTC). Section 5 of the FTC Act prohibits “unfair methods of competition in or affecting commerce, and unfair or deceptive acts or practices in or affecting commerce.” The FTC has a long history of using its authority, such as recent actions to protect the privacy of consumers’ health records. But the FTC has no Section 5 authority over “common carriers subject to the Acts to regulate commerce,” which includes, according to the FTC Act, the “Communications Act of 1934 and all Acts amendatory thereof and supplementary thereto.” If, however, the FCC’s 2024 Order classifying broadband providers as Title II common carriers survives legal challenges, the FCC would strip the FTC of its authority to protect consumers using Section 5.

## **VII. Conclusion**

The debate regarding whether and how broadband data caps and usage-based pricing should be regulated is complex and multifaceted. While these practices initially emerged as tools to manage network congestion, their role has evolved in the face of technological advancements and changing consumer demands. Today, data caps and usage-based pricing serve primarily as economic mechanisms for recovering costs, aligning prices with usage patterns, and potentially funding network expansions and improvements.

Well-implemented usage-based pricing models can promote economic efficiency by more closely aligning costs with consumer willingness to pay. The benefits of such models must, however, be weighed against potential drawbacks, including the risk of artificially constraining data usage or hindering the adoption of data-intensive applications. As the broadband market evolves, policymakers should prioritize a flexible regulatory approach that encourages innovation and investment, while safeguarding consumer interests. This approach should emphasize transparency in pricing and data-usage policies; should rely on existing antitrust and consumer-protection frameworks to address anticompetitive practices; and should avoid overly prescriptive regulations that could stifle market dynamism.

Ultimately, the future of broadband-pricing models will likely be shaped by ongoing technological advancements, changing consumer preferences, and competitive market forces. As providers experiment with various pricing strategies and service offerings, policymakers should monitor their effects on consumer welfare, network investment, and overall economic efficiency. By fostering a regulatory environment that balances these considerations, policymakers can help to ensure that the broadband ecosystem continues to evolve in ways that maximize value for consumers, while promoting innovation and sustainable growth in the industry.