Price Too High and Rising:
The Facts About America's Broadband Affordability Gap

S. Derek Turner

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EXECUTIVE SUMMARY

Barely two months into the job, President Biden made a statement that was obvious and incontrovertible to almost anyone: Americans pay too much for internet access.

But this otherwise-anodyne observation provoked a fierce response from the wealthy ISP industry lobby, which got to work quickly trying to convince policymakers and the media that despite all known facts, U.S. broadband prices are affordable and declining.

The pandemic should have taught those trapped in this kind of beltway bubble alternate reality that our nation cannot prosper in the long run if we continue to ignore equity. Yet inequity is plain to see in the broadband market. By the start of 2020, nearly 80 million people still did not have adequate internet at home. A disproportionate number of those disconnected are Black, Latinx, and Indigenous people. Many of those people kept offline couldn't afford to pay the high price for a high-speed connection, no matter what wild claims lobbyists want to make about prices getting better and better for internet users.

That was true before the pandemic made internet connections even more essential and finances even tighter, especially for demographics hardest hit by COVID-19. Last year our nation was forced to confront the consequences of this "affordability gap." The response was largely nothing but a short-term "pledge" by profitable Internet giants to not immediately disconnect customers who no longer had money to pay for the connections they and their children needed to continue living. That's not good enough.

Because of high entry barriers, the ISP industry is never going to be as "naturally" competitive as most other industries. For the past two decades policymakers have largely ignored this fundamental economic reality, and have chosen instead to embrace hopes for future competition to one day bring prices down to a more affordable level (all while refusing to implement policies that actually could work to preserve and improve broadband competition). Meanwhile prices continue to rise far faster than the rate of inflation, and ISP profit margins soar to new heights.

The telecom lobby's freak-out response to the President's call for more affordable broadband shows these companies don't just want to have their cake and eat it too – they want all the cakes. ISPs want to ignore the issue of affordability for all. They throw the very poorest families crumbs, making them jump through hoops to get a means-tested lower-priced service, while they push the overall market into more profitable tiers, where service prices continue to increase at a dizzying rate.

This report lays out the facts on pricing and profits for the U.S. broadband industry. We discuss the varying ways to measure prices, the important differences between these methods, and how certain methods can be used to obfuscate the reality of what is happening in the market and at the kitchen table. We present government and industry data, noting the strength and weaknesses in each form, and highlight how the ISP industry and its apologists use this kind of data to mislead. Some of our findings include:

Monthly Broadband Bills Continue to Rise Far Faster than the Rate of Inflation

- According to the Bureau of Labor Statistics ("BLS") Consumer Expenditures Survey ("CEX") data,[1] in "real" terms (*i.e.*, adjusted for inflation), the average U.S. household's expenditures for internet services increased 19 percent in the first three years of the Trump era, and the increase will surely be above that once 2020 data is reported.[2]
    - That means the typical internet customer's monthly broadband bills increased far faster than the rate of general inflation during those three years.
- The BLS Consumer Expenditures Survey indicates that from the end of 2016 to the end of 2019, the real, inflation-adjusted increase in household cellular phone service expenditures was 1.8 percent. This increase was lower than the one seen in the home internet market, but still exceeded the rate of inflation in the general economy.
- U.S. ISPs grew their profits before and during the pandemic by increasing actual charges at a pace far exceeding the rate of inflation.
    - Between 2016 and 2020 the average price paid by a Comcast customer for residential internet service increased 15.9 percent, more than double the rate of inflation of all goods and services during that four year period.
        - In 2020 Comcast enjoyed its largest-ever single year growth in its number of residential high-speed internet customers and its revenues. Comcast's cable segment (which includes the company's internet and pay TV customers) saw its operating profit margin jump significantly to 42.1 percent, despite continued declines in its traditional cable TV business.
    - Charter's residential internet customers also paid 15.4 percent more each month on average in 2020 than they did in 2016, double the rate of general inflation.
        - Charter saw its largest-ever single year growth in residential high-speed internet customers and revenues during 2020. Charter's operating profit margin jumped significantly to 38.3 percent, with its largest single year increase in profit margin since it closed its acquisitions of Time Warner Cable and Bright House Networks in 2016.
- Though published prices do not accurately measure what people actually pay, due to the prevalence of introductory offers and other special discounts and overages imposed on individual customers, we can see that broadband providers continue to increase their published prices too.

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[1] The raw BLS CEX data for internet services and cellular services is located in the agency's "integrated tables." However, the BLS has published summaries of this data in the "Means, Variances, and Percent reporting Tables," for which 2013-2019 data can be found here: https://www.bls.gov/cex/csxresearchtables.htm#allnew. The BLS notes that the reported expenditures for products that are purchased by only a small percentage of households have a high error rate. It urges caution when interpreting the results for products with coefficients of variation ("CV") exceeding 25 percent. This caution however does not apply to the results for internet and cellular service expenditures, which have high levels of adoption and low CVs (1.2 and 1.3 percent respectively).

[2] The original version of our report *Price Too High and Rising* was released on May 6, 2021. We have subsequently made slight revisions in this May 20 update, in order to further clarify certain interpretations of the CEX data. The revisions include additional language that notes the reported CEX values represent average expenditures for internet access and cellular service across all households, not just those that report purchasing these services. These clarifications do not change the fundamental findings of the original report, namely that actual monthly expenditures made by internet-subscribing households are increasing at a rate that is far above the general rate of inflation. That finding is supported not only by the CEX data but also by major ISPs' reported average revenues per user. *See infra* note 17 for a detailed explanation.

- According to the FCC's Urban Rate Survey ("URS"), the median non-promotional published price for standalone cable modem service (the technology used in nearly two-thirds of U.S. internet homes) increased more than 34 percent between 2015 and 2020, approximately four-times the rate of general inflation during that time.

Low-Priced Offerings Are Disappearing, Threatening to Cement the Digital Divide and Disrupt the Post-COVID Economic Recovery

- Low-priced entry-level options for high-speed internet service are disappearing, raising the adoption barrier for low-income families.
  - The FCC's Urban Rate Survey data indicate that the non-promotional rates for lower-priced standalone broadband tiers (those in the 25th percentile of all offerings in terms of price) rose 20 percent between 2015 and 2020, more than double the rate of inflation.
  - ISPs are eliminating their budget tiers. Entry level prices in some markets have increased by 50 percent or more in the past four years.

- Even quality-adjusted prices are on the rise, according to data from the BLS.
  - After years of single digit year-over-year increases, quality-adjusted prices for home internet services declined significantly in 2015 and continued to do so until the middle of 2018, but then they rose once again. These quality-adjusted prices have consistently risen since then.
  - The year-over-year change in the BLS wireless price index was below zero percent (meaning this quality-adjusted price was dropping) consistently between 2012 and the middle of 2020. Following the consummation of the T-Mobile/Sprint merger, this wireless services CPI spiked. Quality-adjusted wireless prices at the end of 2020 were 4.1 percent higher than they were at the end of 2019. Before that, the year-over-year change in this quality-adjusted price index had not increased by more than 1 percent in any time since the BLS began tracking this in 1998.

U.S. Government Data Contradict ISPs' Claims About U.S. Price Superiority

- In the FCC's 2020 Communications Marketplace Report, which includes a congressionally-mandated international broadband comparison, the FCC found that the U.S. ranks 21st out of the 26 countries it tracked in both standalone fixed broadband price and in mobile broadband price.

ISPs Are Enjoying Record Profits as They Increase Prices and Reduce Investments

- Broadband price hikes come even as ISPs' own costs to provide service continue to drop.
  - Capital investment by broadband providers large and small declined during the previous four years, with substantial declines at large companies like AT&T (where 2020 investment was 52 percent below the 2016 total for the company on an inflation-adjusted basis) and Comcast (where 2020 cable segment investment was 22 percent below 2016's level on an inflation-adjusted basis).
  - According to the most-recent Census data, in 2019 the U.S. telecom industry as a whole saw the largest non-recession year decline in capital investment since the aftermath of the 2001-2003 "telecom bubble" bursting. Based on data from leading ISPs, 2020's industry-wide investments are expected to be even lower than 2019's.

This data is broad and indisputable. Despite industry's claims, broadband prices are increasing far faster than the rate of inflation. And the best-available data indicates that the pain of these rate increases

is most acute for low-income consumers and others who seek lower-cost service offerings. This should worry anyone who wants to see the economic and racial digital divides closed. It should also be a top concern for policymakers, as they contemplate how to best ensure that everyone who needs internet access can get connected and stay connected.

The Trump era is over. It's time to move past the fact-free policy debates that plagued our discourse for far too long. Progress requires listening, analysis and courageous leadership. But that progress won't come if we're not all operating from the same set of facts, even as there are many legitimate debates to be had about how to respond to those facts.

And the central fact is **Americans pay too much for the internet**.[3]

Introduction: Monthly Broadband Bills Keep Going Up, Up & Away

If Ben Franklin were alive today, he'd have to amend his famous quote that "nothing can be said to be certain except death and taxes" to include the absolute certainty of annual broadband price hikes.

While plenty of goods and services get more expensive over time, broadband stands out for several critical reasons.

First, broadband prices consistently increase faster than the rate of inflation while the providers' own costs do not.[4] This makes this increasingly-critical infrastructure service both more expensive in real terms to users and more profitable for the ISPs.

Second, in almost all consumer product markets, particularly those involving technology, producers offer a wide array of service offerings that attract buyers of all means. But as the broadband market matures, the nation's top ISPs are increasingly moving away from low-priced entry level tiers in favor of higher-priced, higher-speed packages, which they market as having increased value.

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[3] *See* "FACT SHEET: The American Jobs Plan," The White House Briefing Room (Mar. 31, 2021). This summary of the American Jobs Plan contains several sections on broadband, most dealing with deployment and adoption. The section addressing broadband affordability was largely centered around the notion that in the long run, it is a waste of scarce resources to subsidize broadband at a price that is well above what an ISP would earn in a more-competitive market. The section in full stated: "Reduce the cost of broadband internet service and promote more widespread adoption: President Biden believes that building out broadband infrastructure isn't enough. We also must ensure that every American who wants to can afford high-quality and reliable broadband internet. While the President recognizes that individual subsidies to cover internet costs may be needed in the short term, he believes continually providing subsidies to cover the cost of overpriced internet service is not the right long-term solution for consumers or taxpayers. Americans pay too much for the internet – much more than people in many other countries – and the President is committed to working with Congress to find a solution to reduce internet prices for all Americans, increase adoption in both rural and urban areas, hold providers accountable, and save taxpayer money."

[4] We discuss price increases in detail below. Technological advances that increase operational efficiency, the continued decline in the capital cost of broadband infrastructure, and the ability to impose price increases have made this a more profitable business for ISPs. We also discuss the recent trend in declining capital investments, as well as the related trends in "capital intensity" (the proportion of service revenues spent on capital investments) which reflect the overall increasing profitability of the ISP business.

Third, in most markets the prices are transparent to buyers. But not in the wired broadband market. Providers market promotional prices to new customers, but sometimes refuse to publish what the monthly charge will be after the introductory rate expires, or bury it in fine print.[5] In addition, many wired ISPs impose additional charges such as data overage fees and equipment rental fees, as well as hidden fees like non-autopay penalties.[6] These practices are particularly burdensome for families, as these rental fees (which also continue to rise even as the ISPs' own costs to procure this equipment decline) are often for modems and routers that users could purchase from retail providers. But the customers are unaware of this option, confused by the ISPs' disclosures of this fact, or run into issues even if they know their rights.[7] And until Congress stepped in recently, some ISPs would charge their customers a fee even if they declined to use the providers' rental equipment.[8]

Fourth, though it moved away from the practice for a time, the U.S. wireless market has now again fully embraced upfront handset device subsidies as a way of getting customers to enter into expensive two- and three-year service agreements. While this arrangement may seem beneficial to some customers, it has the impact of distorting the markets both for handsets and wireless service, and it reduces pressure on wireless providers to compete on price. (The recently completed T-Mobile/Sprint merger only exacerbates this problem of reduced wireless pricing competition).

Finally, while there was once a period when savvy customers who lived in areas with a modicum of home internet competition could negotiate a lower rate when their promotional period ended, that is increasingly difficult as carriers focus on higher-return customers, and as cable ISPs have widened their lead over telco DSL providers. ISPs such as Charter and Frontier have stated that they've stopped or reduced customer retention efforts, and anecdotes from other ISPs' customers reflect the industry as a whole moving away from retention policies.[9] Thus for many customers, they're stuck on a non-promotional rate, and have to go through the headache (and switching costs)

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[5] For example, a customer of Comcast XFinity's 200 Mbps internet service in the D.C. region will pay $45 to $55 per month (depending on their enrollment in autopay) for the first year, but the price massively spikes to $95 per month once the promotion ends. Comcast discloses this on its website, but only after you click through. The fine print in its recent television ads makes no reference to the post-promotion price spike.

[6] For example, customers of Comcast's XFinity internet service must pay $10 more each month if they are not enrolled in an autopay program, a requirement that disproportionately harms the unbanked. Though Comcast does allow customers to use their own modems, it heavily promotes its own $14 per month XFi Gateway modem/wifi device. Anecdotes are not data, but there are ample examples on internet forums and other social media of customers being given a hard upsell, and running into issues when trying to provision their own equipment.

[7] *See, e.g.*, Jon Brodkin, "One man's losing fight to use his own cable modem," *Ars Technica* (Feb. 10, 2017).

[8] 47 U.S.C. § 562 (as added by section 1004(a) of The Television Viewer Protection Act of 2019, Pub. L. No. 116-94, 133 Stat. 2534 (2019)). *See also* Jon Brodkin, "Frontier customer bought his own router—but has to pay $10 rental fee anyway," *Ars Technica* (July 2, 2019).

[9] *See, e.g.*, Comments of Thomas M. Rutledge - Chairman & CEO, Charter Communications, Inc. at MoffettNathanson Media and Communications Summit (May 14, 2019). Rutledge was asked "are you part of that group that is a little more comfortable with saying that it's okay for some customers to leave? [. . .] Is there –- just to the extent that your – with your new pricing and packaging and you're less inclined to start throwing promotional offers to save customers, does that naturally result in a better mix of video ARPU because you just have fewer customers getting sort of stupidly low prices to save them?" He responded in part, "Well, it is okay [if they leave]. . . you can maintain a customer base of – decently – a decent margin business on the remaining base."

to chase a potentially lower promotional rate from a different ISP, if they're even fortunate enough to have a reasonably comparable alternative.

This is the reality of the internet access marketplace, and it's one that policymakers should take the time to fully understand.

There Are Different Ways of Measuring Broadband Prices. Understanding Each is Important for Policymakers' Efforts to Promote Competition and Close the Digital Divide.

The broadband market is not like many product markets, where the price advertised is the price everyone pays. Prices in markets for many consumer goods, commodities and even utilities are far more transparent and easier for researchers to measure. In contrast, the broadband market is a complicated maze for users, with a myriad of promotional and non-promotional prices, hidden fees, and constant price hikes excused by carriers as "value enhancements."

With broadband, there are three main ways to measure price, and within each there are variations:

- Price Paid: This is the most important metric when discussing broadband prices, as it is the actual dollar amount customers fork over each month to their ISP. This amount often includes not only the main service price, but additional fees for equipment rental, data use charges, and other fees that the ISP or the government may add on.

- Published Price/"Rack Rate": Though ISPs' published prices are often the easiest metric to track down, this price does not reflect the reality of what consumers are actually paying each month for broadband service. Further, the published prices are often a promotional rate; and because many ISPs make it difficult or impossible to know what prices they charge after promotional periods end, the utility of this metric for policy purposes is limited (though as we discuss below, certain data sources like the FCC's Urban Rate Survey require ISPs report their standalone, non-promotional prices, also known as the "rack rate"). However, this published price does have some informative value, as it reflects the approximate price new customers can initially expect to pay, and gives an indication of whether and how ISPs are serving different customer segments (*e.g.*, entry-level, lower-cost tiers vs. higher-priced "Cadillac" tiers).

- Quality-Adjusted Price: ISPs and those who would like to put a positive spin on the constant price increases in this market often cite another pricing metric: quality-adjusted prices. These data are usually calculated from published rates (either advertised promotional or rack rates) divided by the downstream speed of the service, producing a unit of "price per megabit." While this data (like all data) is informative, it is often presented in misleading ways, without clearly noting that it is a quality-adjusted price, not the actual price advertised or paid. However, as we discuss further below, quality-adjusted prices are far removed from the impacts people feel when their ISP increases its prices. A customer may be perfectly happy with their current service package, and not look favorably upon a 10 percent price increase that comes with a 25 percent increase in downstream speeds. It is important to keep in mind

that this is a technology consumer product market, where the expectation should be for quality-adjusted prices to continually decline.[10]

Though the actual price customers pay every month is the most important metric to have for economic analysis and policymaking, it's not something that is easily obtainable at a granular level.[11] However, we are able to gauge it using two methods: First, by using each publicly-traded ISP's SEC filings, we can often calculate the Average Revenue per User ("ARPU") for residential broadband services.[12] There are some limitations to this method however, which is why it is important to utilize as many different types of pricing data as possible in order to gain a full understanding of the broadband market.[13]

Second, in addition to ARPU, there are a variety of surveys that estimate what people are paying on average for broadband and wireless service. By far the most comprehensive of these surveys is the Bureau of Labor Statistics' Consumer Expenditures Survey ("CEX"). This massive survey is conducted quarterly and gives a window into the typical household's outlay on internet access services and many other goods and services. Unlike data from ARPU, the BLS CEX data captures the entire U.S. broadband market, not just what is happening at large publicly-traded firms. While we view the BLS CEX as a very high-quality data source, it does have certain limitations. Like all survey data, it requires the respondents to actually have accurate knowledge of their broadband expenditures. And further complications are introduced when respondents have to estimate the portion of their bill that is allocated to the broadband product alone when so many people purchase broadband as part of a "bundle" with cable television and/or telephone services. Because the data represents the average expenditures across all households, that also means the reported values for services with low adoption rates will have higher error rates.

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[10] For many technology markets, both absolute and quality-adjusted prices decline over time. In 2001, at the start of the broadband era, an entry-level Apple laptop computer was priced at $3,499 ($5,216 in today's dollar value). This was for a computer with a 400MHz processor, 10GB hard drive, and 128MB of memory. Today Apple's entry-level laptop is priced at $999, for a 3.2 GHz processor, 256GB solid state drive and 8GB of memory. *See, e.g.*, Evan Comen, "Check out how much a computer cost the year you were born," *USA Today* (June 22, 2018).

[11] By granular we mean data drawn from a multitude of subgroups, across different geographic, demographic, and product markets. For example, we need to measure prices paid in certain markets, which differ by not only geography but also the demographics of the local area as well as the level of local ISP competition; what lower-income households actually pay each month, vs. what higher-income households pay; and the difference in actual prices charged by a particular ISP for a certain speed threshold, as compared to other similarly situated ISPs.

[12] Several publicly-traded ISPs either directly report residential broadband ARPU, or report residential broadband revenues and the number of residential broadband subscriptions, which can be easily transformed into ARPU.

[13] For example, if an ISP's customers purchase a bundle that includes broadband, the amount of revenue (or reported ARPU) allocated to just the broadband portion of that bundle is entirely up to the ISP to determine, and different ISPs may have different standards on how to allocate revenues across a bundle. Further, ARPU is a more straightforward and stable metric for residential broadband when compared to ARPU for mobile services. Mobile services include data along with voice and text service, and may include device financing payments. Further, with the growth of low-data, lower-priced "connected devices" services such as in-car connections, the overall picture of a carrier's ARPU may be misleading. Fortunately for most wireless carriers, they report multiple average revenue figures, including pre- and post-paid phone average revenues per user, as well as Average Revenue per Account ("ARPA") that include all services and devices on a single monthly bill *(i.e.*, an entire family's wireless plan).

Besides the FCC's Urban Rate Survey, there are a variety of sources for "published" or advertised prices. Recent reports by Open Technology Institute and Broadbandnow offer examples of this, and involve looking at the rate ISPs publish on their website, and making additional assumptions about how to apply and weight those findings nationally.[14]

The URS itself is a large data set of standalone, non-promotional rack rate prices reported by a wide variety of ISPs across a representative geographic sample, encompassing all levels of service and technology types. The Commission collects this information in order to determine what it deems a "reasonably comparable" rate for the purposes of Universal Service Fund subsidies.

While comprehensive, there are some caveats to using the URS data to determine how prices are changing over time. Because these are rack rates for standalone broadband, they do not accurately convey what people are actually paying, as users may be under contract for a package that is not the rack rate at the time an ISP reports to the FCC; and a substantial number of customers still purchase broadband in a bundle. Also, the URS has recently been misused in a number of bad faith analyses of price changes, by adjusting the reported prices to produce a figure for the price per megabit without carefully noting that adjustment, then using this adjusted figure to argue that broadband prices are falling.[15] Furthermore, these analyses use average and not median published prices from the URS. This too is misleading, because between 2015 and 2020 there was a sharp decline in the extremely high prices of "Cadillac" fiber service tiers. As we discuss below, an honest look at the URS data reflects the reality that even published rack rate prices are continuing to rise, with substantial increases in the lower-priced service tiers.

With these data types in mind, we now turn to how U.S. broadband prices have changed over the years. For consumers, the results are not good: no matter how you look at it, broadband prices continue to rise far faster than the rate of inflation. Furthermore, the lower-priced tiers that are attractive to newcomers to the market and lower-income families are disappearing.

U.S. Government Survey Data Indicates The Average U.S. Household's Monthly Expenditures for Home Internet Access Service Increased At Four-Times the Rate of General Inflation Between 2016 and 2019.

According to the BLS Consumer Expenditures Survey data, in "real" terms (*i.e.,* adjusted for inflation), the average household's monthly broadband expenditures increased 19 percent in the first three years of the Trump era, and the increase will surely be above that once 2020 data is reported. That means the nominal increase is more than four times the rate of inflation during those three years

[14] *See* Becky Chao & Claire Park, "The Cost of Connectivity 2020," Open Technology Institute, New America Foundation (July 2020); Tyler Cooper & Julia Tanberk, "The State of Broadband in America, Q4 2020," Broadbandnow.com (Jan. 2021).

[15] *See, e.g.*, *In the Matter of Restoring Internet Freedom* et al., WC Docket Nos. 17-108, 17-287, 11-42, Order on Remand, 35 FCC Rcd 12328 (2020) (Statement of Chairman Ajit Pai). Former Chairman Pai cited an ISP industry-paid operative using quality-adjusted URS data to make a comparison between average quality-adjusted prices in 2015 and 2020, without noting the data is not reflective of actual price paid, and without confronting the impact that the decline in "Cadillac" fiber tier prices had on the average values but not the median. This same data shows median prices rose during the same period that Pai cites. *See infra* for discussion of the URS and how it has been used to mislead on the reality of price changes in recent years.

(see Figure 1).[16] Adjusted for subscription rate, this indicates the typical broadband subscriber bill increased 2.2 times the rate of general inflation during this period.[17]

Figure 1: BLS Consumer Expenditure Survey Data for Internet Access Service

Year	Percent of Households Reporting	Annual Household Expenditures for Internet Access (nominal)	Monthly Household Expenditures for Internet Access (nominal)	standard error (annual)	Yearly Percent Change in Monthly Household Expenditures for Internet Access (nominal)	Annual Household Expenditures for Internet Access (2020-dollar value)	Monthly Household Expenditures for Internet Access (2020-dollar value)	standard error (2020-dollar value)	Yearly Percent Change in Monthly Household Expenditures for Internet Access (2020-dollar value)	Average Annual CPI-U (BLS; 1982-1984=100)	Average Annual Inflation Rate (U.S., all items)
2013	61.54%	$346.26	$28.86	$5.99	N/A	$387.01	$32.25	$6.70	N/A	232.957	1.47%
2014	61.77%	$357.80	$29.82	$6.50	3.33%	$396.91	$33.08	$7.21	2.56%	236.736	1.62%
2015	65.35%	$413.14	$34.43	$5.16	15.47%	$458.64	$38.22	$5.73	15.55%	237.017	0.12%
2016	65.35%	$437.71	$36.48	$6.10	5.95%	$472.25	$39.35	$6.58	2.97%	240.008	1.26%
2017	66.39%	$481.23	$40.10	$6.75	9.94%	$508.47	$42.37	$7.13	7.67%	245.120	2.13%
2018	70.49%	$518.80	$43.23	$6.95	7.81%	$537.89	$44.82	$7.21	5.79%	251.107	2.44%
2019	72.85%	$556.50	$46.38	$6.72	7.27%	$564.07	$47.01	$6.81	4.87%	255.657	1.81%

Source: Bureau of Labor Statistics Consumer Expenditures Survey. Values reported are for Consumer Unit expenditures on "Computer Information Services (Internet)." Expenditure values represent the average across all consumer units, including non-subcribers. Average annual inflation rates are calculated based on Bureau of Labor Statistic reported monthly CPI-U values (not seasonally adjusted, with 1982-1984 being the base value of CPI-U=100).

This level of increase may not seem significant to those who are well-off and don't live paycheck to paycheck. But for tens of millions of families, these increases are felt deeply, forcing difficult decisions about which services to forgo so they can maintain critical internet access services.

These constant outsized increases mean the price of entering the broadband market – moving from having no access or limited cellphone access to a real broadband connection – is an increasingly high barrier to face. As the headlines indicate all too well, for so many this barrier is insurmountable.

The pandemic has only exacerbated this problem – for families, certainly not for ISPs. Broadband companies had a banner year, with record customer and revenue growth (see below).

It's not only wired home internet expenditures that continue to climb faster than the rate of inflation. From the end of 2016 to the end of 2019, the nominal increase in cellular phone service

[16] The nominal increase in household monthly internet access expenditures from 2016 to 2019 was 27.14 percent (from $36.48 to $46.38). The rate of inflation in the general economy is calculated using the BLS-reported values for (CPI-U) (which normalized the base year to 1984). Between 2016 and 2019 the general economic inflation metric (CPI-U) increased from 240.008 to 255.657, a 6.5 percent increase.

[17] Because the CEX values represent expenditures across all "consumer units," the reported values include households that do not purchase internet service. To approximate the monthly bill of those who did subscribe in a given year, we can divide the average value by the percentage of households reporting purchasing the service. This indicates the average internet subscriber's expenditures increased 14 percent between 2016 and 2019 (from $55.82 to $63.66), 2.2 times the rate of general inflation.

expenditures was 8.4 percent. The rate of inflation during that same period was 6.5 percent (see Figure 2 below).[18]

Figure 2: BLS Consumer Expenditure Survey Data for Cellular Service

Year	Percent of Households Reporting	Annual Household Expenditures for Cellular Phone Service (nominal)	Monthly Household Expenditures for Cellular Phone Service (nominal)	standard error (annual)	Yearly Percent Change in Monthly Household Expenditures for Cellular Phone Service (nominal)	Annual Household Expenditures for Cellular Phone Service (2020-dollar value)	Monthly Household Expenditures for Cellular Phone Service (2020-dollar value)	standard error (2020-dollar value)	Yearly Percent Change in Monthly Household Expenditures for Cellular Phone Service (2020-dollar value)	Average Annual CPI-U (BLS; 1982-1984=100)	Average Annual Inflation Rate (U.S., all items)
2013	67.05%	$913.18	$76.10	$10.39	N/A	$1,020.66	$85.06	$11.61	N/A	232.957	1.47%
2014	69.39%	$962.73	$80.23	$13.80	5.43%	$1,067.96	$89.00	$15.31	4.63%	236.736	1.62%
2015	72.02%	$1,022.85	$85.24	$11.96	6.24%	$1,135.50	$94.62	$13.28	6.32%	237.017	0.12%
2016	75.26%	$1,123.69	$93.64	$12.03	9.86%	$1,212.35	$101.03	$12.98	6.77%	240.008	1.26%
2017	74.35%	$1,117.91	$93.16	$16.54	-0.51%	$1,181.18	$98.43	$17.48	-2.57%	245.120	2.13%
2018	75.54%	$1,187.85	$98.99	$15.50	6.26%	$1,231.56	$102.63	$16.07	4.27%	251.107	2.44%
2019	76.90%	$1,218.08	$101.51	$15.53	2.54%	$1,234.65	$102.89	$15.74	0.25%	255.657	1.81%

Source: Bureau of Labor Statistics Consumer Expenditures Survey. Values reported are for Consumer Unit expenditures on "Cellular Phone Services." Expenditure values represent the average across all consumer units, including non-subcribers. Average annual inflation rates are calculated based on Bureau of Labor Statistic reported monthly CPI-U values (not seasonally adjusted, with 1982-1984 being the base value of CPI-U=100).

People are spending more on cellular services in "real" terms, as the prices they pay rise faster than the rate of inflation. But the rate of increase is far lower for wireless than the rate seen in the home internet access market. That's likely for a number of reasons, such as the greater level of competition in the cellular market at least when compared to the home internet market, and the more robust resale practices in the wireless market that result in greater market segmentation and lower priced "value-segment" offerings from prepaid carriers.

Leading U.S. Broadband Providers Grew Their Profits Before and During the Pandemic by Increasing Average Broadband User Revenues At A Rate Exceeding the Rate of Inflation in the General Economy.

The dominant home internet providers routinely raise home internet prices, and do so by amounts that vastly exceed the rate of inflation in the general economy. And not surprisingly, these price increases along with their own declining costs are increasing the profitability of these ISPs' already highly-profitable home internet businesses.

[18] Because the CEX values represent expenditures across all "consumer units," the reported values include households that do not purchase wireless services. To approximate the monthly bill of those who did subscribe in a given year, we can divide the average value by the percent of households reporting purchasing the service. This indicates the average cellular service subscriber's expenditures increased 10.7 percent, 1.6 times the rate of general inflation.

For example, in 2016 Comcast's residential customers on average paid $53.71 per month for home internet service.[19] This increased to $62.26 in 2020, a 15.9 percent increase – more than double the rate of inflation (7.8 percent) of all goods and services during that four year period.[20]

In its SEC filings, Comcast has repeatedly made it perfectly clear that its growing profitability is due in part to broadband price hikes. We estimate that nearly half of the increase in Comcast's broadband revenues during the past four years came from rate increases, with the remainder due to customer growth.[21]

And unlike its devastating impact on most of the rest of the economy, COVID-19 has actually been a boon for Comcast's broadband business. Last year, Comcast enjoyed its largest-ever single year growth in residential high-speed internet customers and revenues. And its cable segment operating profit margin jumped significantly to 42.1 percent, despite continued declines in its traditional cable TV business (see Figure 3).[22]

Figure 3: Comcast Operational Results (2016-2020)

Comcast Key Operational Results	2016	2017	2018	2019	2020	% Change From 2016 to 2020
Residential High-Speed Internet Revenue	$14,421,000,000	$15,681,000,000	$17,144,000,000	$18,752,000,000	$20,599,000,000	42.8%
Residential High-Speed Internet Subscriptions (average)	22,376,500	23,499,250	24,631,250	25,871,000	27,572,000	23.2%
Residential High-Speed Internet Subscriptions (year-end)	22,827,000	23,863,000	25,097,000	26,414,000	28,351,000	24.2%
Residential High-Speed Internet ARPU (mo.)	$53.71	$55.61	$58.00	$60.40	$62.26	15.9%
Annual High-Speed Internet Revenue Increase*	$1,061,000,000	1,260,000,000	1,463,000,000	1,608,000,000	1,847,000,000	74.1%
% High-Speed Internet Reveue Increase From Price Increases**	31.8%	41.4%	47.3%	N/A	N/A	N/A
% High-Speed Internet Revenue Increase from Customer Growth**	68.2%	58.6%	52.7%	N/A	N/A	N/A
Cable Communications Operating Margin (as-reported)***	39.6%	38.5%	38.7%	40.1%	42.1%	9.4%

**Under the prior accounting standard, Comcast recorded $13,532,000,000 in residential high-speed internet revenues for 2016, 6.2 percent lower than the value reported under the new standard. Under the prior accounting standard Comcast's residential high-speed internet revenues increased by 8.51 percent from 2015 to 2016. The value shown above for this revenue increase for 2016 is based on the data under the prior accounting standard.*

*** These values are calculated from the proportions of revenue increases attributed to either customer growth or rate increases, as described in Comcast's 10-K filings. Comcast did not disclosue these figures in its 2019 and 2020 10-Ks.*

**** Value for 2016 not directly compariable to later values due to accounting change. Between 2017 and 2020 Comcast's operating margin increased by 3.6 percentage points. This represents a 9.4 percent increase in the operating margin value.*

[19] In January 2018, Comcast adopted the Financial Accounting Standards Board's new guidance on revenue recognition. This change impacted the comparability of revenues reported using the older and newer standard. Comcast did report revised values for 2016 and 2017 for many metrics. Comcast does not directly report residential high-speed internet customer ARPU. We calculated these values using Comcast's reported annual residential high-speed internet customer revenues, divided by the average number of residential high-speed internet customers during that year (using the values reported for each quarter).

[20] According to the BLS, the average annual value for the general economic inflation metric (CPI-U) went from 240.008 to 258.811 between 2016 and 2020, a 7.83 percent increase. If we adjust for inflation, this means the average Comcast residential internet customer's monthly bill increased from $57.95 per month to $62.26 per month, a 7.4 percent "real" increase in their monthly broadband bill during the Trump era.

[21] Unfortunately in 2019 Comcast stopped reporting the percentages of its revenue increases attributed to customer growth vs. rate increases. Prior to this, Comcast would describe its residential high-speed internet increases as "primarily due to . . . [i]ncrease[s] in the number of residential customers receiving our high-speed internet services . . . [and] [i]ncrease[s] in average high-speed internet rates." *See, e.g.*, Comcast 2018 10-K, at 43 (2019).

[22] Annual values are more instructive than quarterly, as they even out seasonality and many unique events. However, we note that Comcast's first quarter 2021 cable segment operating margin increased again to 43.2 percent.

Charter, the nation's second-largest home broadband provider, also has a history of increasing its profits in large part by charging more for broadband.

During the past four years the average Charter residential internet customer went from paying $50.64 per month to $58.46, a 15.4 percent increase, which is nearly double the rate of inflation seen during the Trump administration era.[23]

Like it did for Comcast, 2020 also brought Charter its largest ever single-year growth in residential high-speed internet customers and revenues. Charter's operating profit margin jumped significantly to 38.3 percent, the largest single year increase in profit margin since it closed its acquisitions of Time Warner Cable and Bright House Networks in 2016.[24]

Figure 4: Charter Operational Results (2016-2020)

Charter Key Operational Results	2016	2017	2018	2019	2020	% Change From 2016 to 2020
Residential High-Speed Internet Revenue	$12,684,000,000	$14,101,000,000	$15,181,000,000	$16,667,000,000	$18,521,000,000	46.0%
Residential High-Speed Internet Subscriptions (average)	20,872,250	22,145,000	23,220,750	24,442,500	26,403,500	26.5%
Residential High-Speed Internet Subscriptions (year-end)	21,374,000	22,518,000	23,625,000	24,908,000	27,023,000	26.4%
Residential High-Speed Internet ARPU (mo.)	$50.64	$53.06	$54.48	$56.82	$58.46	15.4%
Annual High-Speed Internet Revenue Increase	$1,389,000,000	1,417,000,000	1,080,000,000	1,486,000,000	1,854,000,000	33.5%
Operating Margin (as-reported)*	34.8%	36.8%	36.8%	36.7%	38.3%	10.1%

2016 Values are pro-forma and include Charter, TWC and BHN. All values are under the new accounting standard Charter adopted January 2018.

** Operating margin is the value of adjusted EBITDA as a percent of revenues. The change from 2016 to 2020 was 3.5 percentage points, which represents a 10.1 percent increase in the operating margin value.*

While many publicly-traded ISPs report residential broadband ARPU (or the revenue and subscriber data necessary to calculate it), not all do. Below in Figure 5 we present the available residential broadband ARPU values for the nation's top publicly-traded ISPs during the prior four-year period. As these data indicate, providers are continuing to increase ARPU at a pace well above the general inflation rate. These data, along with the statements from the companies themselves, the BLS CEX data, and the published pricing data (see below) indicate that a significant portion of this ARPU growth is coming from price increases, and not simply from customers migrating to higher-priced tiers.

[23] Adjusted for inflation, this is an increase from $54.63 per month to $58.46, a 7 percent increase in real-dollar value.

[24] Annual values are more instructive than quarterly, as they even out seasonality and many unique events. However, we note that Charter's first quarter 2021 operating margin increased again to 39.5 percent.

Figure 5: Top ISPs' Residential Broadband ARPU (2016-2020)

Top ISPs' Broadband ARPU	2016	2017	2018	2019	2020	% Change From 2016 to 2020
Comcast	$53.71	$55.61	$58.00	$60.40	$62.26	15.9%
Charter	$50.64	$53.06	$54.48	$56.82	$58.46	15.4%
AT&T (IP Broadband ARPU)	$49.31	$48.36	$48.55	$50.87	$52.40	6.3%
Lumen (CenturyLink)	N/A	N/A	$48.12	$50.59	$52.66	N/A
Altice	N/A	$54.09	$58.82	$64.38	$71.20	N/A
Cincinnati Bell	$40.39	$41.39	$46.89	$49.78	$51.87	28.4%
Cable One	$61.30	$62.96	$68.28	$71.64	$74.23	21.1%
Subcriber-Weighted ARPU (for companies shown)	$51.59	$49.71	$54.57	$57.20	$59.30	14.9%

All values nominal, as-reported (or calculated from reported revenue and subscriber totals). Lumen (CenturyLink) did not report consumer segment broadband revenue prior to 2018. Cincinnati Bell's results for 2016-2018 are pro forma with Hawaii Telecom. Cincinnati Bell's and Cable One's 2020 results are based on reported totals for January-September and estimated values for the fourth quarter. Other top wireline ISPs such as Verizon and Frontier do not report the data necessary to calculate residential Internet customer ARPU.

Other data sources track these ISP-specific results. Kagan, a media research group within the TMT offering of S&P Global Market Intelligence, estimates that for the U.S. residential broadband market as a whole, nominal monthly ARPU increased from $49.85 in 2016 to $57.37 in 2020.[25] This is a 15.1 percent increase, nearly twice the rate of general economic inflation during that time.[26] That all of these ARPU values differ from the survey-generated responses in the BLS Consumer Expenditures Survey is not surprising. The CEX data represents average spending across all households, including non-subscribers, while ARPU is an average across a company's broadband subscribers.[27] ARPU is also impacted by how a company classifies different customers as "residential" (which for some ISPs could include small business connections), the inherent differences between surveys and accounting methodologies, and the differences in the universe of customers (with the S&P Global estimate based on the reporting of top publicly-traded ISPs, while the BLS is a survey of customers of a wide cross-section of internet service providers).

[25] *See* Tony Lenoir, "US broadband affordability steady in 2020, compares favorably to utilities," *S&P Global* (Feb. 11, 2020). This headline and article is myopic in its characterization of "affordability" being "steady," as the analysis ignores the impact of price increases on lower-income households and others experiencing the economic fallout from COVID-19. The article fails to note that its observed ARPU increase for the U.S. residential broadband sector during 2020 was 2.5 percent, more than double the 1.2 percent rate of inflation for the general economy last year. Further, the article contextualizes the historical increase in broadband ARPU against increases in average household income. Changes in average household income are of little informative value, because the gains at the very top of the income ladder skew the results for the overwhelming majority of households. This is why the Census Bureau commonly uses median household incomes when discussing household economic growth. The Census Bureau has not yet released data on median household incomes in 2020. However, if this recession is anything like prior recessions, we expect median household incomes will have declined in 2020, and may continue to decline for years after the recession officially ends. This means that for many families, the pain of these continued broadband price hikes will be even deeper than it might otherwise have been.

[26] In "real" inflation-adjusted terms this is a 6.7 percent increase, from $53.78 in 2016 to $57.37 in 2020.

[27] *See, e.g.*, *supra* note 17. If we adjust the average consumer unit CEX values by dividing the total by the percent of respondents reporting purchasing the service, the resulting values are closer to typical residential broadband ARPUs.

Though Published Prices Do Not Measure What People Actually Pay, Broadband Providers Continue to Increase Their Published Prices.

The gold standard for broadband pricing data is one the public does not get to see. This is data that each ISP itself has: the actual price paid by each customer. Such data could be made available to researchers if aggregated in a way to protect user privacy, and it would offer economists the information needed to properly analyze the broadband market. This type of information is routinely disclosed on a confidential basis to the FCC and Department of Justice when they conduct merger reviews.[28] But despite the FCC's own determination (stemming from the recommendations of the National Broadband Plan) a decade ago that it should require ISPs to report this type of aggregated, granular pricing data, the agency still refuses to collect this vital information.

Thus, the next best type of pricing data is the BLS CEX and ARPU data discussed above, as it more closely reflects what people actually pay for broadband service.

And though this is what we really need to know more than anything – how the price people actually pay is changing over time – much of the discussion of broadband prices is based on information collected about the prices that ISPs advertise on their websites (or disclose to the FCC in the URS). These data are of limited value, because in this market there's only a loose relationship between what all customers actually pay and the promotional rate ISPs advertise as what they will charge a new customer for a limited period of time (or in the case of the URS, what they might charge for a hypothetical standalone broadband customer coming off a contract at a particular point in time).

Despite these limitations of published-price data, there are still lessons to be gleaned from this information. Notably, we can use published-price data to track how promotional (and non-promotional) rates for entry-level tiers are changing over time. These offerings are of particular importance to new broadband adopters and low-income households. We can also compare published-price data to ARPU data to get a sense of how much of a disconnect there is between what ISPs are actually earning from their customers and what their published prices may indicate at first glance.

The FCC's Urban Rate Survey data indicates that median prices have increased since 2015 (the first year the Commission collected a large sample that is comparable to subsequent years). Figure 6 below summarizes the URS for all ISPs' technologies and tiers. These data indicate that the median non-promotional rack rate rose 9 percent between 2015 and 2020, and 7.5 percent between 2016 and 2020. These increases are close to the rate of inflation for all goods and services during that time (9.2 percent and 7.8 percent respectively).

[28] *See, e.g.*, Letter from William T. Lake, Chief, Media Bureau, Federal Communications Commission, to Kathryn A. Zachem, Senior Vice President, Comcast Corporation, MB Docket No. 14-57 (Aug. 21, 2014).

Figure 6: Weighted Advertised Non-Promotional Rates for Standalone Broadband Services (FCC Urban Rate Survey, 2015-2020)

Year of Data Collection*	All URS Reponses Standalone Non-Promotinal Published Rate, as Reported to the FCC, Weighted by the Number of Potential Subscribers and Other Sampling Weights						
	Minimum	25th Percentile	Median	Average	75th Percentile	90th Percentile	Maximum
2015	$6.99	$49.99	$66.95	$80.10	$92.00	$119.99	$899.00
2016	$14.15	$52.00	$67.99	$76.08	$82.99	$114.99	$950.00
2017	$14.95	$54.00	$69.99	$79.08	$94.95	$126.98	$605.00
2018	$9.95	$60.00	$74.95	$80.03	$96.95	$124.99	$1,459.97
2019	$5.00	$56.00	$70.37	$79.68	$100.00	$125.99	$599.95
2020	$14.95	$59.99	$73.00	$78.75	$97.95	$119.99	$639.95

Source: Free Press analysis of FCC Urban Rate Survey data

** The FCC confusingly names each release of the URS for the forthcoming year, as the data is used to set the next year's USF rate benchmark. We have listed the year that the data was collected.*

However, these data indicate that the rack rates for the lower-priced standalone broadband tiers rose much faster than the rate of inflation. The 25th percentile of responses showed a 20 percent increase from $49.99 in 2015 to $59.99 in 2020. (These percentiles are based on price, not downstream speed, but the two are correlated.)

The figure above illustrates how the URS can be misleading without proper context. Notice the divergence between median and average values, with the average hardly changing while the median showed a significant increase. This is because the prices of the most-expensive service tiers declined substantially, which influenced the changes in the average values (though note too the wild variation in the maximum rates from year to year).

These changes at the high-end are largely a result of the changes in non-promotional standalone prices reported for fiber-to-the-home service ("FTTH"), which was extremely expensive in earlier years. This is totally consistent with how newer, "Cadillac" technologies are priced, as carriers move from marketing solely to eager early adopters towards marketing to the masses.

We can see this by removing FTTH from the data. As shown below, the reported non-promotional standalone prices measured either by median or average increase when FTTH is removed. Excluding FTTH, the median standalone non-promotional broadband published price increased by 22 percent between 2016 and 2020, approximately three times the rate of inflation during that four-year period. Yet the average also increased by 15.3 percent, about twice the rate of inflation during that time.

Figure 7: Weighted Advertised Non-Promotional Rates for Standalone Broadband Services
All Service Types Excluding FTTH (FCC Urban Rate Survey, 2015-2020)

Year of Data Collection*	All URS Reponses, Excluding FTTH Standalone Non-Promotinal Published Rate, as Reported to the FCC, Weighted by the Number of Potential Subscribers and Other Sampling Weights						
	Minimum	25th Percentile	Median	Average	75th Percentile	90th Percentile	Maximum
2015	$6.99	$49.95	$62.00	$68.24	$78.95	$107.99	$899.00
2016	$14.15	$51.95	$62.00	$69.83	$82.00	$104.94	$950.00
2017	$14.95	$50.00	$64.95	$71.13	$83.99	$104.99	$605.00
2018	$9.95	$56.00	$69.99	$73.72	$89.99	$114.99	$1,459.97
2019	$5.00	$56.00	$69.99	$73.70	$90.00	$111.95	$599.95
2020	$14.95	$61.00	$75.72	$80.24	$99.99	$123.49	$639.95

Source: Free Press analysis of FCC Urban Rate Survey data. Includes all data except for FTTH service.

** The FCC confusingly names each release of the URS for the forthcoming year, as the data is used to set the next year's USF rate benchmark. We have listed the year that the data was collected.*

Looking at just the reported standalone non-promotional published prices for FTTH further illustrates this "early adopter/Cadillac" phenomenon. Five years ago, AT&T was at the start of its DirecTV merger condition-mandated FTTH deployment. As it completed this deployment it moved to promote its FTTH service as a mass market product, and this is reflected in the substantial declines finally seen in 2020 (see Figure 8 below).[29]

Figure 8: Weighted Advertised Non-Promotional Rates for Standalone FTTH Services
(FCC Urban Rate Survey, 2015-2020)

Year of Data Collection*	URS Reponses for FTTH Standalone Non-Promotinal Published Rate, as Reported to the FCC, Weighted by the Number of Potential Subscribers and Other Sampling Weights						
	Minimum	25th Percentile	Median	Average	75th Percentile	90th Percentile	Maximum
2015	$19.95	$84.99	$104.99	$141.54	$204.99	$304.99	$499.95
2016	$15.00	$74.99	$104.99	$125.13	$155.94	$299.95	$445.99
2017	$15.00	$80.00	$98.99	$116.85	$124.99	$204.99	$445.00
2018	$15.00	$85.00	$100.00	$106.67	$119.99	$204.99	$299.99
2019	$15.00	$70.00	$100.00	$102.63	$109.95	$204.99	$204.99
2020	$15.00	$44.95	$69.99	$69.05	$79.99	$89.99	$399.95

Source: Free Press analysis of FCC Urban Rate Survey data. Includes only FTTH responses.

** The FCC confusingly names each release of the URS for the forthcoming year, as the data is used to set the next year's USF rate benchmark. We have listed the year that the data was collected.*

The URS data for cable modem and DSL services provides further confirmation of the actual trends.

These data indicate that cable modem services – which comprise nearly two-thirds of the residential broadband market's subscriptions[30] – have seen substantial increases in their standalone

[29] AT&T first reported FTTH service in the URS in 2017, with a median price of $80 and a maximum price of $119. The median price rose to $90 in 2018 and 2019 (with a maximum price of $100 in those years). But in 2020, AT&T's median FTTH price dropped to $69.99 with the maximum falling to a near-identical $70.36.

[30] *See, e.g.*, Comments of Free Press, GN Docket No. 20-269, at 43 (filed Sept. 18, 2020) (analyzing industry data showing that between 2014 and 2020 cable company ISPs' share of the home internet market increased from 59 percent to 68 percent).

non-promotional price. The median value increased more than 34 percent between 2015 and 2020, approximately four times the rate of general inflation during that time (while the average rate increased 18.4 percent, still two-times the rate of inflation).

The results for DSL are very dependent on which year we use as the starting point for comparison. Regardless, the data indicates that the rack rates for standalone DSL have not moved much in real terms, but that reflects the reality of a product with a consistently declining number of subscribers using infrastructure that was long ago fully depreciated.

Figure 9: Weighted Advertised Non-Promotional Rates for Standalone Cable Modem Services (FCC Urban Rate Survey, 2015-2020)

Year of Data Collection*	URS Reponses for Cable Modem Standalone Non-Promotinal Published Rate, as Reported to the FCC, Weighted by the Number of Potential Subscribers and Other Sampling Weights						
	Minimum	25th Percentile	Median	Average	75th Percentile	90th Percentile	Maximum
2015	$6.99	$49.95	$66.95	$72.47	$79.95	$114.95	$252.41
2016	$14.15	$51.95	$69.99	$76.31	$89.95	$125.00	$253.91
2017	$14.95	$49.99	$74.95	$77.83	$95.95	$139.95	$252.98
2018	$9.95	$63.99	$84.95	$79.97	$99.95	$124.99	$299.99
2019	$9.95	$65.99	$84.95	$80.67	$100.00	$125.99	$599.95
2020	$14.95	$69.99	$89.99	$85.78	$103.00	$129.99	$599.95

Source: Free Press analysis of FCC Urban Rate Survey data. Includes only Cable Modem responses.

** The FCC confusingly names each release of the URS for the forthcoming year, as the data is used to set the next year's USF rate benchmark. We have listed the year that the data was collected.*

Figure 10: Weighted Advertised Non-Promotional Rates for Standalone DSL Services (FCC Urban Rate Survey, 2015-2020)

Year of Data Collection*	URS Reponses for DSL Standalone Non-Promotinal Published Rate, as Reported to the FCC, Weighted by the Number of Potential Subscribers and Other Sampling Weights						
	Minimum	25th Percentile	Median	Average	75th Percentile	90th Percentile	Maximum
2015	$14.99	$39.95	$47.00	$52.37	$57.00	$78.99	$149.00
2016	$19.70	$52.00	$57.99	$64.16	$74.95	$92.00	$250.00
2017	$19.99	$50.00	$59.00	$64.11	$72.94	$87.94	$149.00
2018	$19.99	$56.00	$61.00	$63.37	$70.00	$81.98	$179.00
2019	$5.00	$53.99	$60.00	$59.11	$64.95	$70.00	$149.00
2020	$14.99	$49.00	$61.00	$61.36	$69.99	$70.36	$199.95

Source: Free Press analysis of FCC Urban Rate Survey data. Includes only DSL responses.

** The FCC confusingly names each release of the URS for the forthcoming year, as the data is used to set the next year's USF rate benchmark. We have listed the year that the data was collected.*

Low-Priced, Entry-Level Options Are Disappearing, Raising the Adoption Barrier for Low-Income Families.

As we noted above, lower-priced entry-level services fulfill an important role in the broadband market. They are often the choice of new adopters, who may not need the transfer speeds that come in the higher-priced tiers. Similarly, lower-priced tiers are of critical importance to lower-income households. While these households – like all households – have varying internet capacity needs, having a low-priced option that is more than adequate to facilitate basic uses of the internet is critical. A lower-priced option for wired service is literally the difference between a

family having to rely on data-capped wireless service versus having a wi-fi connection for the entire family to use at home.

Thus it is troubling to see the data in Figure 6 above for all URS responses, which indicated the 25th percentile price group packages saw a 20 percent increase in standalone non-promotional published prices over the past five years. And as Figure 9 shows, the increase in 25th percentile price group cable modem packages reported in the URS was 40 percent over the past five years, an alarming data point that strongly suggests broadband is becoming less affordable for those with less ability to pay.[31]

Another way of examining what the URS data indicates about changes at the lower end of the market is to look at service offerings below 25 megabits per second ("Mbps"). As Figure 11 shows, the median rack rate for this slower tier of services has increased by 22 percent since 2015, more than two-times the rate of inflation in the general economy.

Figure 11: Weighted Advertised Non-Promotional Rates
for Standalone Internet Services Below 25 Mbps Downstream
(FCC Urban Rate Survey, 2015-2020)

Year of Data Collection*	URS Reponses for Services At or below 25 Mbps Downstream Standalone Non-Promotinal Published Rate, as Reported to the FCC, Weighted by the Number of Potential Subscribers and Other Sampling Weights						
	Minimum	25th Percentile	Median	Average	75th Percentile	90th Percentile	Maximum
2015	$6.99	$40.99	$49.99	$50.61	$62.00	$67.99	$200.00
2016	$14.15	$47.00	$52.00	$54.17	$62.00	$72.00	$799.95
2017	$14.95	$49.00	$53.99	$54.25	$59.00	$67.94	$509.00
2018	$9.95	$45.00	$56.00	$53.63	$61.00	$66.98	$309.00
2019	$5.00	$45.00	$56.00	$52.85	$60.37	$61.32	$200.00
2020	$14.99	$34.99	$61.00	$55.99	$63.91	$70.36	$499.95

Source: Free Press analysis of FCC Urban Rate Survey data. Includes only responses for tiers below 25 Mbps

** The FCC confusingly names each release of the URS for the forthcoming year, as the data is used to set the next year's USF rate benchmark. We have listed the year that the data was collected.*

Other data sources that track advertised prices confirm the ongoing increase in the price of lower-priced tiers. Since 2009, Kagan has published a semi-annual sampling of major ISPs' standalone and bundled offerings across a number of U.S. cities. These data offer anecdotal evidence that it is increasingly difficult for those who prioritize a low price to find it, either at a promotional or non-promotional rate. For example, according to Kagan, Comcast's lowest promotional rate in Atlanta during the second half of 2016 was $19.99. But Comcast's lowest-priced offering in Atlanta during the second half of 2020 was $30, a whopping 50 percent increase, which was more than six times the rate of general inflation.

This trend is seen for other ISPs too. CenturyLink's lowest available price in 2016 was $34.99, according to Kagan's data. But in the second half of 2020, CenturyLink's lowest promotional price was $49, a 40 percent increase, more than five times the rate of inflation. In 2016, Cable One offered a "lite" tier for $25 promotional, increasing to $40 after the initial period's rate

[31] Non-promotional rates generally do not factor much into the analysis of what subscribers pay when switching. However, if the carrier requires the customer to sign a contract to obtain the promotional rate, and that requirement can only be met with a credit check (or enrollment in an autopay program), this raises yet another cost-barrier to those households who are unbanked and/or who have poor credit scores (a metric that is often the result not solely of a person's actual credit history, but one negatively impacted by formulas that are infected with structural racism).

expired. This tier disappeared in 2020, according to Kagan's database. Now Cable One's lowest-priced offering is $39, increasing to $55 after the promotional period. This represents a 56 percent increase in Cable One's lowest-priced promotional offering and a 38 percent increase in its lowest-priced non-promotional offering. Adding further insult to injury, Cable One's 2016 "lite" plan came with a 500 gigabyte ("GB") monthly cap. It's entry-level package in 2020 came with a very low 300 GB monthly data cap.

Lies, Damn Lies, and ISP Lobbyists' Statistics: Big Broadband Continues to Mislead, But Even the Pai FCC's Research Shows U.S. Broadband Prices Are Higher Than Those in Other Nations.

International comparisons can be instructive, but they hold little currency at the proverbial kitchen table. The instinct of policymakers is often to view their actions through the lens of some sort of global competition, when the reality is the people in this country need them to focus on making our systems work better regardless of what is going on overseas.

How to make comparisons between various broadband metrics for different countries was a hotly debated topic at the dawn of the mass market broadband era.[32] In the early aughts, the U.S. had begun to turn away sharply from the broadband competition liberalization policies it once championed on the international stage (*e.g.*, reliance on wholesale access instead of price regulation in order to promote competitive outcomes that are otherwise impossible in a highly concentrated market with insurmountable barriers to entry like this one).[33] Analyzing in full the U.S.'s move to embrace facilities-based competition alone while some other countries maintained the open access approach is beyond the scope of this report.

But it is important to emphasize that this debate was always complex, and then and now requires historical context. International comparisons require this context because we are discussing policy choices for markets with very different starting points. This is the case in particular for the broadband market. An often overlooked fact influencing international broadband comparisons – one that has impacts for today's two-way broadband market beyond just the contours of the current policy debates about speeds and prices – is the decades-old difference between the U.S. and other countries in one-way cable TV infrastructure deployment. Long before high-speed internet went mass market, the U.S. saw a far greater level of cable TV infrastructure deployment than most other nations whose media systems were more reliant on over-the-air television and later satellite. This means that the move beyond first-generation cable modem and DSL broadband to advanced broadband is far less expensive for U.S. ISPs than for the monopoly copper-based telcos in other countries, yet this comparative advantage had little or nothing to do with telecommunications regulation.

[32] The debates around international comparisons and the poor quality of FCC broadband data collection led to the adoption of the Broadband Data Services Improvement Act, which contained the requirement that the FCC on a periodic basis conduct an international comparison of broadband markets. *See* 47 U.S.C § 1303(b).

[33] *See* S. Derek Turner, "Universal Service Reform & Convergence: USF Policy for the 21st Century," Presented at the 34th Research Conference on Communication, Information, and Internet Policy (TPRC) September 29-October 1, 2006, Arlington, VA (Sept. 2006).

But despite these differences, the data has long shown and continues to show that the monthly cost of broadband is generally higher in the U.S. than in many of our peer nations. The U.S. ISP trade associations understand this, so they've resorted to a host of misleading tactics designed to convince policymakers that the U.S. broadband market is working well for U.S. families. It's not. The ISP lobbyists are simply wrong to assert that prices are lower in the U.S. than in other comparable nations.

The most recent FCC study of international broadband markets (contained in the FCC's 2020 Communications Marketplace report) reveals that the U.S. "ranks 21st out of the 26 countries" reported on there, both in standalone fixed broadband price and in mobile broadband price.[34]

Figure 12: Fixed Broadband Price Indexes (PPP Adjusted)

FCC Fixed Broadband Price Study (2020)	Standalone Monthly Price		Bundled Monthly Price		Overall Monthly Price	
Country	Average	Rank	Average	Rank	Average	Rank
Australia	$61.73	16	$61.19	16	$61.37	16
Austria	$59.91	13	$49.29	8	$52.97	12
Belgium	$50.90	9	$50.18	11	$50.43	10
Canada	$69.93	23	$67.39	22	$68.27	22
Czech Republic	$48.74	6	$45.84	5	$46.85	5
Denmark	$48.53	5	$48.53	6	$48.53	6
Estonia	$68.01	20	$64.23	20	$65.54	20
Finland	$38.68	2	$37.53	2	$37.93	2
France	$38.76	3	$38.76	3	$38.76	3
Germany	$49.21	7	$48.82	7	$48.95	7
Greece	$67.31	19	$62.01	17	$63.85	18
Iceland	$72.82	24	$72.82	24	$72.82	24
Ireland	$51.11	10	$50.78	12	$50.89	11
Italy	$44.02	4	$44.02	4	$44.02	4
Latvia	$35.34	1	$33.10	1	$33.88	1
Luxembourg	$72.92	25	$72.92	25	$72.92	25
Mexico	$69.87	22	$69.87	23	$69.87	23
Netherlands	$63.57	17	$63.57	18	$63.57	17
New Zealand	$59.95	14	$59.95	14	$59.95	14
Norway	$84.50	26	$74.51	26	$77.98	26
Portugal	$56.03	12	$53.80	13	$54.57	13
Spain	$64.66	18	$64.66	21	$64.66	19
Sweden	$51.28	11	$49.90	10	$50.38	9
Switzerland	$60.05	15	$60.05	15	$60.05	15
United Kingdom	$49.74	8	$49.74	9	$49.74	8
United States	$68.74	21	$64.23	19	$65.80	21

Source: FCC 2020 Communications Marketplace Report. All prices are reported in purchasing power pairity (PPP) U.S. dollars, which makes values more comparable.

[34] *See 2020 Communications Marketplace Report*, GN Docket No. 20-60, FCC 20-188, App. G (rel. Dec. 31, 2020).

That's the reality, one the ISP defenders will continue to obfuscate and ignore. But we stress that these comparisons offer little insight into what policy choices would best serve U.S. families. When a Mother sits down to pay her bills and sighs at yet another annual ISP rate hike imposed by a corporation whose profit margins continue to grow, it's not as if she's going to pack up the family and move to France because the broadband is cheaper there according to FCC data. That family needs U.S. policy makers to do something about the lack of meaningful price competition in the highly concentrated U.S. broadband market.

Broadband Industry Apologists Like to Use Quality-Adjusted Rates to Argue Prices Are Falling. However, The Government's Own Quality-Adjusted Data Show Home Internet Prices Declined During the Restored Title II Era, and Rose Again Following the Pai FCC's Repeal of the *Open Internet Order*.

As mentioned previously, quality-adjusted prices are not a useful sole indicator of how broadband price changes are impacting broadband subscriber welfare. The expectation should be that absent minor fluctuations, quality-adjusted prices should be flat or declining, because of advances in telecommunications technology.

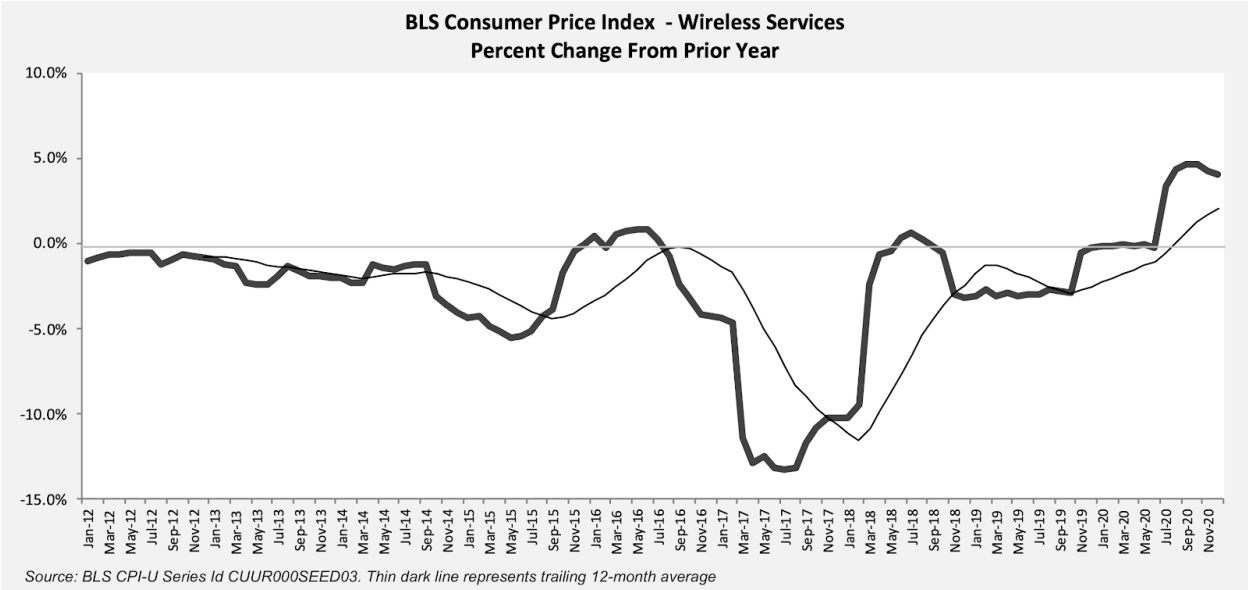
Former FCC Chair Ajit Pai has quoted selective and misleading data from industry-funded analysts to suggest that broadband prices declined under his watch.[35] This is not true in any sense. As shown above, actual prices paid and median published prices rose during Pai's tenure. And the government's best source of quality-adjusted broadband prices also shows that both home internet and wireless prices increased on Pai's watch.[36] This data from BLS described below is far superior to the Urban Rate Survey for monitoring quality-adjusted published prices, as it accounts for promotional and non-promotional rates as well as bundled service offerings.

And as Figure 13 below shows, quality-adjusted prices did indeed rise in the U.S. wireless market. The year-over-year change in the BLS wireless price index was below zero percent consistently between 2012 and the middle of 2020 (as it was before 2012 as well), meaning that wireless prices were indeed dropping in quality-adjusted terms. As Free Press and many others predicted, however, the consummation of the T-Mobile/Sprint merger seems to have put this trend of declining quality-adjusted wireless prices to a stop. The T-Mobile/Sprint merger was finalized on April 1, 2020. Shortly thereafter the BLS wireless services CPI spiked. Prices at the end of 2020 were 4.1 percent higher than they were at the end of 2019. Before that, year-over-year prices had not increased by more than 1 percent in any time since the BLS began tracking this figure in 1998.

[35] *Supra* note 15.

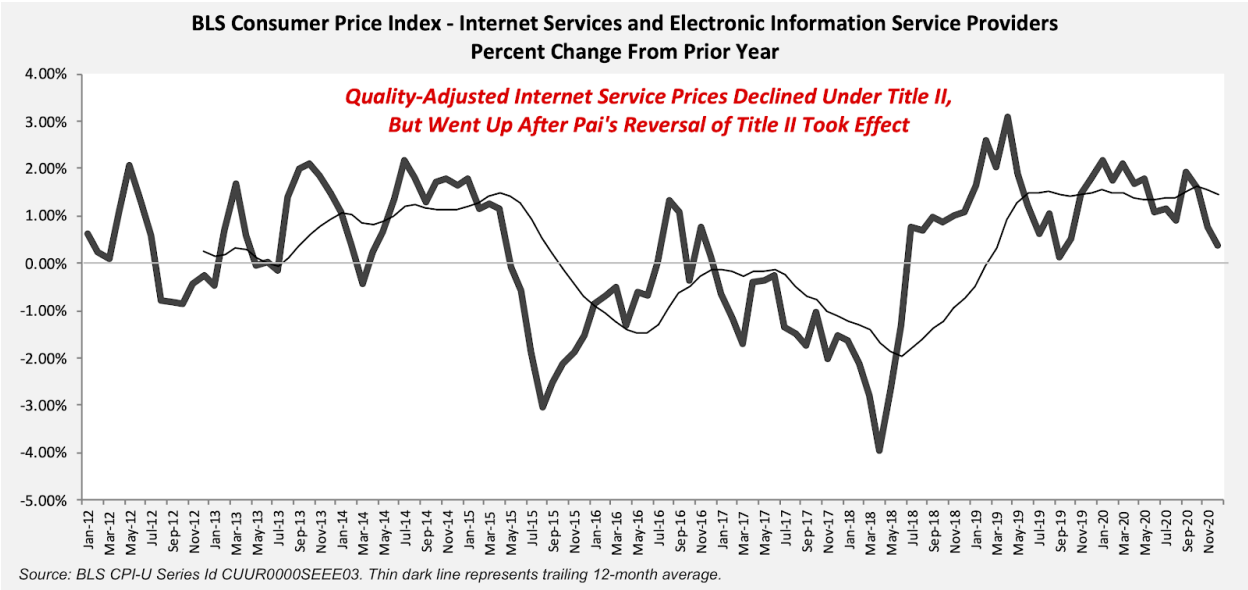
[36] *See* "Measuring Price Change in the CPI: Telecommunications Services," Bureau of Labor Statistics (Dec. 2020).

Figure 13: BLS Wireless Price Index, Year-Over-Year Percent Change (2012-2020)



The home internet access service market is a different story, but with the same ending (see Figure 14). After a lengthy period of single digit year-over-year increases, quality-adjusted prices did decline significantly in 2015, and continued to do so until the middle of 2018, when they rose once again. While we make no causal inference, this and all other pricing data certainly is incongruous with Pai's assertions that the Obama-era restoration of a Title II regulatory framework for broadband internet access resulted in higher prices and reduced investment, while his December 2017 repeal of that framework produced lower prices and increased investment.

Figure 14: BLS Internet Services Price Index, Year-Over-Year Percent Change (2012–2020)

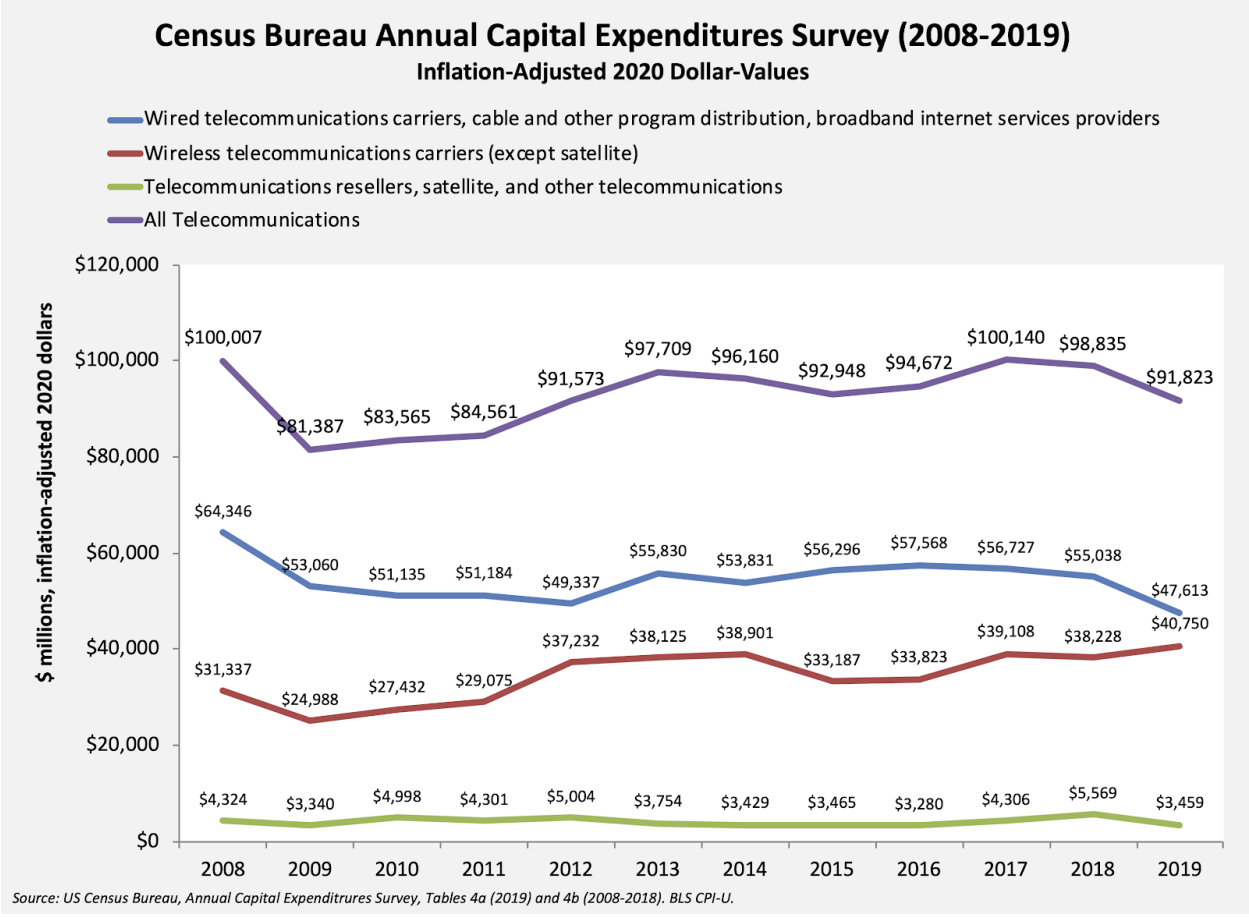


The Trump & Pai Approach Failed To Produce: Broadband Investment Declined at a Historic Pace During Their Tenure Despite Massive Corporate Tax Cuts and Regulatory Gifts to Industry.

We have already well documented that the 2015 *Open Internet Order* did not produce, and was not followed by, a decline in broadband industry investment.[37] However, all available data indicates that the Pai/Trump era did come with a substantial decline in broadband capital investment, despite the claimed powers of Pai's deregulatory agenda and the massive corporate tax cuts and generous bonus depreciation policies of the Trump administration.

The Census Bureau's Annual Capital Expenditures Survey ("ACES") reflects this reality (see Figure 15 below). According to the most recent ACES data, in 2019 the U.S. telecom industry saw the largest non-recession year decline in capital investment since the aftermath of the 2001-2003 telecom bubble bursting. The ACES data indicates that U.S. telecom industry investment increased from 2015 to 2016, and again from 2016 to 2017 (the period when Title II was in effect), then declined from 2017 to 2018, and again from 2018 to 2019 (the period after Pai's Title II repeal).

Figure 15: Census Bureau Annual Capital Expenditures Survey (2008-2019)



[37] *See, e.g.*, S. Derek Turner, "It's Working: How the Internet Access and Online Video Markes Are Thriving in the Title II Era," Free Press (May 2017).

The decline in U.S. telecom sector investment between 2018 and 2019 was more than twice as large as the decline between 2014 and 2015: $7 billion vs. $3.2 billion (in 2020 inflation-adjusted dollar values). U.S. telecom industry investment declined for two straight years during 2018 and 2019. This decline totaled $8.3 billion (inflation-adjusted 2020 values), nearly twice as much as the prior two-year decline during 2014 and 2015 ($4.5 billion), before the *Open Internet Order* was adopted. And while 2017 investment was up from 2016, that was while Title was still in place (even as Pai promised to repeal it). More importantly, we've documented how much of this 2017 investment was planned long before 2017 and long before Trump's 2016 election put Pai in the Chairman's seat.[38]

Figure 16 below contains *pro forma* inflation-adjusted capital expenditure data for publicly-traded ISPs through the end of 2020. Figure 17 that follows compares the percentage change in these values, comparing the three-year 2012-2014, 2015-2017 and 2018-2020 pre-Title II, Title II and post-Title II eras. These data reveal the reality that has long been well known by anyone even casually following the U.S. ISP sector: as usual, some companies saw capex increases as they entered a new investment cycle, some saw declines as they exited one, and the aggregate data reflects the impact of trends at the larger firms. Notably, the 2016 aggregate decline was driven almost entirely by Sprint, with that single company's reported decrease outpacing increases at most of the largest ISPs; and the Pai-era declines were driven by Comcast and Charter completing their DOCSIS 3.1 rollouts, AT&T's capex pullback, and the massive decline in T-Mobile's investment following its acquisition of Sprint in 2020.

[38] *Supra* note 30.

Figure 16: U.S. Publicly-Traded ISP Capital Investment (inflation-adjusted, 2012-2020)

Capital Expenditures ($ thousands, infl.-adjusted)	2012	2013	2014	2015	2016	2017	2018	2019	2020
Comcast (cable segment)	5,560,730	6,051,360	6,833,160	7,744,000	8,203,680	8,456,680	8,031,920	6,978,090	6,605,000
Charter (pro forma)	6,114,430	6,272,000	7,827,720	7,665,900	8,148,600	9,201,860	9,490,000	7,266,950	7,415,000
Altice USA (pro forma)	1,467,288	1,431,153	1,414,005	1,424,326	1,032,126	1,008,430	1,199,733	1,368,904	1,073,955
Mediacom	284,719	296,113	285,915	317,070	361,987	362,271	347,075	299,563	320,953
Wide Open West	178,766	248,528	279,609	255,090	310,500	319,378	326,664	249,975	234,100
Cable ONE (1)	176,964	158,983	196,914	178,023	158,775	190,125	226,477	264,976	293,229
GCI (2)	165,023	202,220	195,481	193,859	211,116	200,728	170,456	149,966	147,095
AT&T (pro forma w/ ATN & Leap) (3)	22,862,239	23,969,049	23,790,630	22,016,500	24,200,640	22,843,000	22,101,040	19,831,350	15,675,000
Verizon (total company)	18,277,750	18,596,480	19,082,010	19,552,500	18,423,720	18,281,820	17,324,320	18,118,390	18,192,000
CenturyLink (pro forma)	4,138,060	4,264,960	4,392,270	4,511,100	4,660,200	4,478,500	3,302,000	3,664,280	3,729,000
Frontier	845,700	710,847	763,787	949,300	1,513,080	1,259,280	1,239,680	1,238,260	1,181,000
Windstream (4)	1,244,356	941,920	873,015	1,160,830	1,068,984	963,116	853,008	887,285	951,200
Cincinatti Bell (pro forma)	502,752	317,173	309,697	420,897	414,980	324,144	276,573	226,038	223,600
TDS Telecom (Wireline and Cable)	179,201	166,190	190,304	211,207	175,151	212,856	241,280	319,160	368,000
US Cellular	945,525	826,001	618,953	586,358	481,713	497,614	535,600	717,100	940,000
Consolidated Comm. (pro forma)	303,939	294,529	276,471	275,102	261,589	244,712	254,609	234,525	217,563
Shenandoah Telecom. Co. (pro forma)	100,630	131,071	75,738	76,647	187,089	155,278	142,107	140,180	120,450
Alaska Communications System	66,549	53,953	56,872	53,325	43,525	34,540	41,792	45,958	50,186
Otelco	7,183	6,976	6,677	7,273	7,429	9,021	8,302	12,564	10,036
Sprint	4,809,280	7,825,440	6,282,600	12,071,400	8,055,720	10,261,860	12,751,440	11,776,600	2,338,000
T-Mobile	3,278,130	4,508,000	4,791,870	5,196,400	5,078,160	5,551,220	5,762,640	6,454,910	11,034,000
Aggregate Total	71,509,215	77,272,947	78,543,695	84,867,107	82,998,766	84,856,432	84,626,716	80,245,023	71,119,367
Aggregate Total w/ Historical DirecTV	75,293,585	81,513,267	82,123,445	86,583,107	82,998,766	84,856,432	84,626,716	80,245,023	71,119,367
Aggregate Total Less Sprint and AT&T (6)	43,837,696	45,478,458	48,470,465	50,779,207	50,742,406	51,751,572	49,774,236	48,637,073	N/A
All Wired Telecom Capex - Census Bureau	49,336,930	55,829,760	53,830,560	56,295,800	57,568,320	56,726,960	55,037,840	47613420	N/A
All Wireless Telecom Capex - Census Bureau	37,232,370	38,124,800	38,901,060	33,187,000	33,823,440	39,107,640	38,189,840	40750470	N/A
All Other Telecom and Sat. Capex - Census Bureau	5,003,640	3,754,240	3,428,790	3,465,000	3,279,960	4,305,720	5,569,200	3459250	N/A
Total Telecom Industry Capex - Census Bureau	91,572,940	97,708,800	96,160,410	92,947,800	94,671,720	100,140,320	98,796,880	91823140	N/A

(1) Cable One has made five acquistions of small non-public cable companies since becoming public in 2015. It did not report pro forma results. Thus a portion of its increased capital expenditures during this time are due to these acquisitions.

(2) Liberty Global acquired GCI Liberty in 2020, then later spun itself off into a new company called Liberty Broadband. Results shown are for GCI.

(3) AT&T did not report pro forma w/ DTV. Below we present results that show impact including DTV historical spending.

(4) Windstream exited bankruptcy as a private company. The value shown is trailing-12-months from June 30, 2020.

(5) Accounting standard changes resulted in Sprint substantially revising its values, but only did so historically begining with June 30, 2016 results. Prior Sprint periods are Free Press' revised estimates.

(6) We present these results because of the accounting complications introduced by the DTV merger and subsequent accounting standard changes impacting a portion of Sprint's capex. We caution against drawing broad conclusions from industry aggregate capital investment trends, particularly those that do not include 100 percent of the industry, and this removal of 2 of the 21 firms demonstrates how the industry aggregate value is impacted by accounting and post-merger issues.

Source: Free Press analysis of company SEC filings; U.S. Census Bureau Annual Capital Expenditures Survey; BLS CPI-U. Values are presented in 2020 inflation-adjusted thousands of dollars. Where possible the most-recent or restated values are presented.

Figure 17: Change in U.S. Publicly-Traded ISP Capital Investment: Title II vs. Post-Title II Eras (inflation-adjusted, 2012-2020)

Changes in Capital Expenditures (infl.-adjusted)	2020 vs. 2016	T2 Era vs. Pre-T2 Era (2015-2017 vs 2012-2014)	Post-T2 Era vs. T2 Era (2018-2020 vs. 2015-2017)
Comcast (cable segment)	-19.5%	32.3%	-11.4%
Charter (pro forma)	-9.0%	23.8%	-3.4%
Altice USA (pro forma)	4.1%	-19.7%	5.1%
Mediacom	-11.3%	20.1%	-7.1%
Wide Open West	-24.6%	25.2%	-8.4%
Cable ONE (1)	84.7%	-1.1%	48.9%
GCI (2)	-30.3%	7.6%	-22.8%
AT&T (pro forma w/ ATN & Leap) (3)	-35.2%	-2.2%	-16.6%
Verizon (total company)	-1.3%	0.5%	-4.7%
CenturyLink (pro forma)	-20.0%	6.7%	-21.6%
Frontier	-21.9%	60.4%	-1.7%
Windstream (4)	-11.0%	4.4%	-15.7%
Cincinatti Bell (pro forma)	-46.1%	2.7%	-37.4%
TDS Telecom (Wireline and Cable)	110.1%	11.9%	54.9%
US Cellular	95.1%	-34.5%	40.0%
Consolidated Comm. (pro forma)	-16.8%	-10.7%	-9.6%
Shenandoah Telecom. Co. (pro forma)	-35.6%	36.3%	-3.9%
Alaska Communications System	15.3%	-25.9%	5.0%
Otelco	35.1%	13.9%	30.3%
Sprint (5) T-Mobile	1.8%	46.7%	8.4%
Aggregate Total	-14.3%	11.2%	-6.6%

Notes: See prior table.

Source: Free Press analysis of company SEC filings

Unlike Pai, we do not attribute these investment swings to any policy change. Aggregate data is itself highly misleading, as it is subject to cyclical swings that happen for all individual ISPs including the industry's largest firms. But those swings themselves are what matter most: technology industries with substantial fixed costs go through periods of increased investment as new technology standards are deployed, which are followed by periods of declining investment before the technology evolves again and the cycle repeats. The second Obama presidential term came at a time when wireline investment was on the upswing (due to fiber deployment and cable companies' DOCSIS 3.x upgrades) and wireless was on the downswing (due to wireless carriers' completion of their LTE deployments). The Trump era saw a sharp and steady decline in wired investment, one that will likely continue as the cable sector has ample headroom with its upgraded DOCSIS systems. But now that we're at the dawn of the 5G era, wireless investment has increased and will likely continue to do so.

We note these investment trends in the context of a discussion of prices for a very important reason: quality-adjusted prices should be expected to fall, particularly if the providers' capital costs in absolute and relative terms (relative to revenues) are stable or declining. And indeed, the data shows ISPs' relative costs declining over time, as revenue growth far outpaces any change in network capital expenses.

When assessing whether or not the market has the optimal level of competition that produces the most efficient outcome, it is important to investigate how actual prices are changing relative to investment and profits. Investment reflects a number of factors, largely technology cycles (and the cost-efficiencies and market opportunities these advances bring) as well as competitive pressures. Companies invest to maintain and increase revenues and profits. So another important metric to focus on is "capital intensity," or the ratio of capital investments to revenues, expressed as a percentage. Figure 18 shows this for the publicly-traded ISPs. This data largely reflects the market reality that broadband revenues are continuing to increase at a faster rate than investment is, which is to be expected in a market with suboptimal competition. Indeed, some companies are seeing record low levels of this "reinvestment" metric. During 2020, Comcast's cable capital investments were 11 percent of its cable revenues, having peaked at 15.2 percent in 2016. And during the first quarter of 2021, Comcast's cable segment capital intensity dropped to 8.7 percent. This large gap between investment and revenues comes at a time when Comcast and other ISPs face record levels of bandwidth demand, illustrating how efficient (and profitable) their network operations are.

Figure 19 contains capital intensity data through 2019 based on Census Data. This too indicates the telecom industry's capital intensity was stable but slightly declining in most recent years, but then saw a sharp drop in 2019 (and we expect this will continue when 2020 Census data is published). Despite their own costs declining, ISPs continued to raise prices, and did so during a global pandemic that produced historic job losses.

Figure 18: U.S. Publicly-Traded ISP Capital Investment as a Percent of Revenues
(inflation-adjusted, 2012-2020)

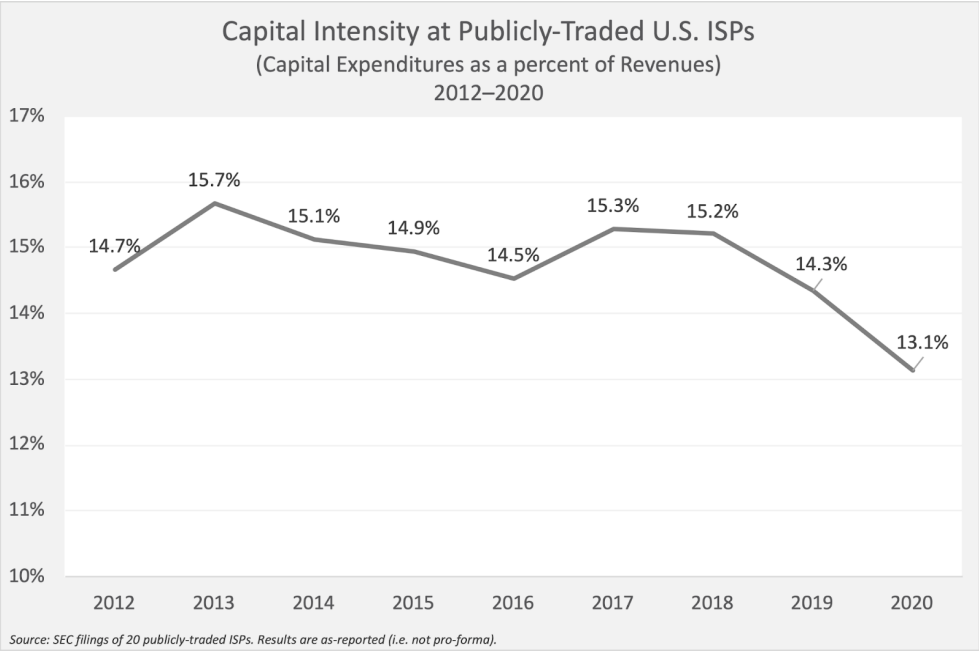
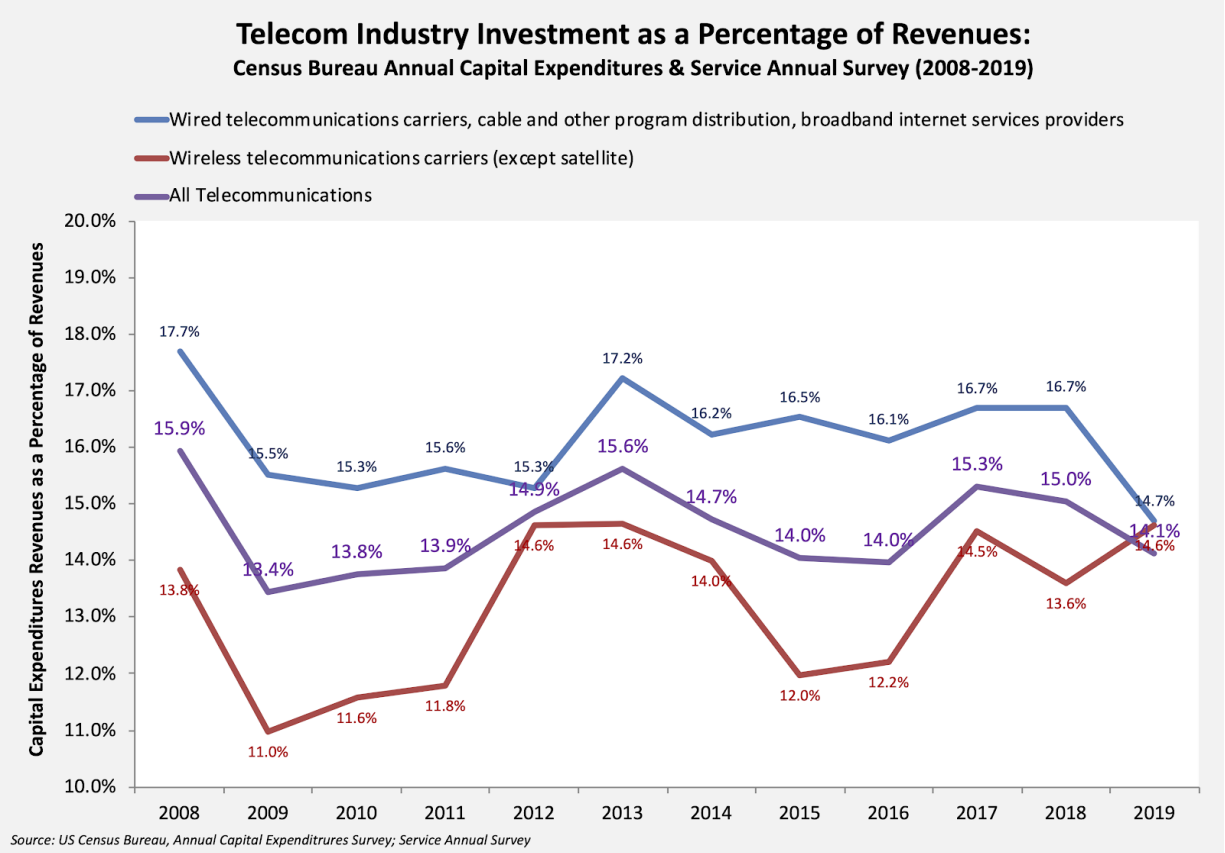


Figure 19: Census Bureau Annual Capital Expenditures Survey
and Services Annual Survey (2008-2019)
Capital Expenditures as a Percent of Revenues



Conclusion: Understanding the Facts About Broadband Pricing is Critical to Closing the Affordability Gap.

Cable and Telecom lobbyists are eager to distract lawmakers from the fact that people are on average paying more out of pocket for internet service. Reading the fine print shows how the industry is spinning a few data points together to tell this misleading tale.

The spin can't mask the facts. And the facts show that the average U.S. household's monthly internet bill has risen and continues to rise far faster than the rate of inflation. U.S. ISPs continue to raise prices and reap higher profits as investments decline. This is the expected outcome in a highly concentrated market completely free of any regulatory oversight. This is ultimately a policy failure. And the impacts of that policy failure fall disproportionately Black, Latinx, and Indigenous families.

The COVID-19 pandemic has laid bare the consequences of years of ignoring the competition and affordability issues that have always existed in the U.S. broadband market. Policymakers must understand the basic facts of broadband pricing and competition as they contemplate how to address the affordability gap.