Paying for Itself: How the Affordable Connectivity Program Delivers More Than It Costs

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Executive Summary

The Affordable Connectivity Program (ACP) played a critical role in addressing broadband affordability in the United States over the past several years. Offering monthly service subsidies and a one-time discount for a device, the ACP made high-speed internet affordable for low-income households, directly benefiting nearly 23.3 million recipients by April 2024. Compared to the modest annual cost of $7.3 billion, the total quantified benefits studied in this paper alone are significantly larger. **The overall healthcare savings alone are *quadruple* the annual funding and can more than offset the costs of the entire ACP.** At the subscriber level, **Medicaid cost savings** generated by switching one physical medical visit for a Medicaid recipient to **one telehealth visit,** would generate sufficient savings **to pay for 3.5 years of ACP support** for a Medicaid recipient.

Current estimates show that more than 28 million households in the United States lack access to high-speed broadband. Among them, over 18 million households—representing more than 47 million people—remain unconnected not due to the absence of broadband infrastructure, but because they cannot afford it. The ACP was an important solution to broadband subscription challenges by making broadband more affordable. Despite its demonstrated success, the program ended in May 2024 due to funding constraints, leaving millions disconnected from broadband and forfeiting substantial economic benefits. We conservatively estimate that as a result of discontinuing the ACP, there were **5 million broadband disconnects**, with a majority of these in the wireless segment.

In this paper, we show that the program generates benefits that far exceed its cost, and the annual return on investment for the ACP exceeds the expense of the program. For healthcare costs alone, we estimate **annual savings of $28.9–$29.5 billion** if the ACP is restored. Thus, the overall **healthcare savings** alone are **quadruple the annual funding** and can more than offset the costs of the program. We also find that a sizable portion of the costs of the ACP could be offset from scorable **telehealth savings ($6 billion)** under Medicaid if there was legislation restoring the ACP funding. Additionally, we show that the program would generate **$3.7 billion in increased annual earnings for students**, and **$2.1–$4.3 billion in annual wage gains** from expanded labor force participation. Thus, compared to the modest **annual cost of $7.3 billion**, the total quantified benefits studied in this paper alone are **significantly larger**. Reinstating the ACP is a fiscally sound policy decision with significant, positive economic and social implications.

I.   Introduction

Broadband is critical for tasks such as telehealth, remote learning, job market participation and remote working, in addition to access to information and connection   to family and community. Americans who cannot access broadband are at a significant disadvantage compared to their peers. The most significant factor in getting and keeping Americans connected is cost.[1] The Affordable Connectivity Program (ACP) was instrumental in making broadband affordable for low-   income and disadvantaged   households that have not had consistent affordable internet access before. The ACP was designed to assist low-income households in covering broadband costs offering monthly subsidies of $30 and, $75 for residents of Tribal lands. A one-time discount of up to $100 was available to assist with the purchase of a connected device, such as a laptop, tablet or a desktop computer.[2] Although the pandemic highlighted Americans' need for affordable broadband connectivity, ACP became a more enduring solution after Congress allocated $14.2 billion to it through the Infrastructure Investment and Jobs Act.[3] For many households without monthly high-speed broadband access, the ACP discount enabled affordable monthly broadband subscription for some of the most disadvantaged segments of the American population.

By April 2024, there were 23.3 million households enrolled, representing approximately half of all eligible households.[4] Of these enrollments, approximately 13 million were wireless

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[1]   *See,* Anna Read, "How Can the United States Address Broadband Affordability? Pew, April 29, 2022, https://www.pewtrusts.org/en/research-and-analysis/articles/2022/04/29/how-can-the-united-states-address-broadband-affordability#:~:text=Research%20has%20found%20that%20cost,cost%20as%20their%20primary%20reason. *See also*, John B. Horrigan, Maeve Duggan, "Barriers to Broadband Adoption: Cost is Now a Substantial Challenge for Many Non-Users," Pew Research Center, December 21, 2015, https://www.pewresearch.org/internet/2015/12/21/3-barriers-to-broadband-adoption-cost-is-now-a-substantial-challenge-for-many-non-users/.

[2]   The program provided eligible households with a discount of up to $30 per month on internet service, or up to $75 for households on Tribal lands. *See,* Federal Communications Commission, "Affordable Connectivity Program," https://www.fcc.gov/acp, ("Affordable Connectivity Program").

[3]   *See,* Peter A. DeFazio, "H.R.3684 - Infrastructure Investment and Jobs Act," 117th Congress (2021-2022), Public Law No: 117-58, November 15, 2021, https://www.congress.gov/bill/117th-congress/house-bill/3684/text.

[4]   *See,* Universal Service Administrative Company, "ACP Enrollment and Claims Tracker," Affordable Connectivity Program, https://www.usac.org/about/affordable-connectivity-program/acp-enrollment-and-claims-tracker/, ("ACP Enrollment and Claims Tracker").

subscriptions with the remaining 10 million wireline subscriptions.[5] Due to a lack of additional funding from Congress, the ACP ended in May 2024. After June 1, 2024, households stopped receiving an ACP discount.[6] A recent analysis by Blair Levin found that 10% of the wireline subscriptions and 70 to 80% of the wireless subscriptions would be disconnected.[7]

We refine the estimate of disconnects by combining survey results from the Federal Communications Commission (FCC), the Benton Institute's findings, and Blair Levin's estimates.[8] We conservatively estimate that the **total number of broadband disconnects** caused by the discontinuation of the ACP is approximately **5.0 million**.[9] We note two important things about this number. First, this number takes a conservative approach and only counts disconnects and those who permanently lose service. The number of ACP recipients who are vulnerable to intermittent disconnection is significantly greater than this number.   Second, analysts' reports indicate that a majority of these disconnects are from wireless customers.[10]

Current estimates show that more than 28 million households in the United States lack access to high-speed broadband.[11] Among them, over 18 million households—representing more than 47

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[5]   *See*, Universal Service Administrative Co., "Additional ACP Data," February 8, 2024, https://www.usac.org/about/affordable-connectivity-program/acp-enrollment-and-claims-tracker/additional-acp-data/, ("Additional ACP Data"). *See also*, Jericho Casper, "ACP Fallout: Wireline Retains Most, Wireless and Satellite Face Major Losses," Broadband Breakfast, November 20, 2024, https://broadbandbreakfast.com/acp-fallout-wireline-retains-most-wireless-and-satellite-face-major-losses/, ("ACP Fallout: Wireline Retains Most, Wireless and Satellite Face Major Losses").

[6]   *See,* Affordable Connectivity Program.

[7]   *See,* ACP Fallout: Wireline Retains Most, Wireless and Satellite Face Major Losses.

[8]   *See,* John B. Horrigan, "Leaving Money on the Table: The ACP's Expiration Means Billions in Lost Savings," Benton Institute for Broadband & Society, July 24, 2024, https://www.benton.org/sites/default/files/ACP-survey1.pdf, ("Leaving Money on the Table: The ACP's Expiration Means Billions in Lost Savings"). *See also*, ACP Fallout: Wireline Retains Most, Wireless and Satellite Face Major Losses. *See also*, FCC, "Measuring the Impact of the ACP: Survey Results," p. 4, https://www.fcc.gov/sites/default/files/ACP-Survey-Results.pdf, ("Measuring the Impact of the ACP: Survey Results").

[9]   We use the FCC's survey to calculate this number. The survey states that 21.7% of the recipients did not have any internet prior to the ACP as they could not afford it. Calculation = 23.2 million recipients *21.7% = 5.04 million. *See*, Measuring the Impact of the ACP: Survey Results, p. 8.

[10] See, ACP Fallout: Wireline Retains Most, Wireless and Satellite Face Major Losses.

[11] *See,* EducationSuperHighway, "Bridging the Broadband Affordability Gap: A Historic Opportunity to Close Two-Thirds of the Digital Divide," 2021, https://www.educationsuperhighway.org/wp-content/uploads/No-Home-Left-Offline-Report_EducationSuperHighway2021.pdf, ("Bridging the Broadband Affordability Gap: A Historic Opportunity to Close Two-Thirds of the Digital Divide").

million people—remain unconnected not due to the absence of broadband infrastructure but because they cannot afford it.[12] The ACP was an important solution to this adoption issue as it made broadband more affordable, and at least 16 million unconnected and under-connected Americans received high-quality and consistent internet connections through the ACP.[13] With its demise, significant economic benefits were lost. This paper focuses on understanding some of the main economic benefits that will be forgone if the ACP is not reinstated.

To estimate the benefits from restarting the ACP, we measure the effect of the broadband disconnects induced by the ACP discontinuation on healthcare savings, education, and labor market participation rates. In Section II, we discuss the economic literature on the benefits of broadband utilization. In Section III, we estimate the health care costs savings that were generated from the ACP and would be lost if the ACP were not restarted. In Section IV, we discuss the effect of the ACP on educational attainment and earnings, and the benefits that will be foregone if it is not reinstituted. In Section V, we estimate the effect of the ACP on labor force participation and the resulting increases in personal income that would be generated if the program were funded, or, on the flipside, lost if the program was not restarted. And in Section VI, we set forth conclusions.

II. Benefits of Broadband and the ACP's Role in Making Broadband Affordable

A. Benefits of Affordable Broadband

Broadband adoption and utilization play a pivotal role in the economic advancement and social well-being of communities across the globe. The benefits of broadband range from increased productivity and economic growth, job creation, increased labor market participation, increased

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[12] *See,* Raza Panjwani, Sarah Forland, and Jessica Dine, "Broadband Affordability: Removing a Roadblock to Universal Service," New America, November 7, 2024, https://www.newamerica.org/oti/briefs/broadband-affordability-removing-a-roadblock-to-universal-service/, ("Broadband Affordability: Removing a Roadblock to Universal Service").

[13] The FCC survey shows that 68.8% of the recipients either did not have internet or had intermittent service prior to the ACP. Calculation: 23.3 million recipients *68.5% = 16 million. This number includes those recipients who did not have internet prior to the ACP or had intermittent service either due to affordability or other reasons.

investment and entrepreneurship, greater access to information and connectivity to family and community, increased educational attainment, democratization of knowledge, improved healthcare services, and enhanced innovation in all sectors of the economy. We briefly discuss these benefits to set the stage for discussing the benefits that were created due to broadband adoption because of the ACP funding.

Research shows a clear correlation between broadband use and overall economic growth. A study by the FCC demonstrated that broadband expansion leads to an increase in gross domestic product (GDP), especially in rural areas.[14] A 2021 Deloitte study found that a 10% increase in nationwide broadband access in 2014 could lead to a $186 billion increase in output in 2019.[15] In this paper we focus on three segments: healthcare, education, and the labor market.

Healthcare Telehealth adoption is one of the most significant benefits stemming from affordable broadband, providing increased access to healthcare services. Researchers have found that there are significant healthcare cost savings from telemedicine. Estimates show that telemedicine is 23% less expensive than in-person visits.[16] Telehealth for cancer patients saves between $147 and $186 per visit, and the average cost of a non-urgent virtual care visit is $93 less than an in-person visit.[17] Telehealth visits with medical specialists average $120 less, and virtual urgent-care visits save $141 compared to in-person urgent care clinic visits.[18] Researchers have also found that hospitals with telehealth emergency departments have lower emergency room costs.[19]

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[14] _See,_ Federal Communications Commission, "Connecting America: The National Broadband Plan," March 17, 2010, https://www.fcc.gov/general/national-broadband-plan.

[15] _See,_ Deloitte, "Broadband For All: Charting a Path to Economic Growth," April 2021, https://www2.deloitte.com/content/dam/Deloitte/us/Documents/process-and-operations/us-charting-a-path-to-economic-growth.pdf.

[16] _See_, Mark Melchionna, "Employer-Sponsored Telehealth Cost 23% Less Than In-Person Care," TechTarget, June 9, 2023, https://www.techtarget.com/virtualhealthcare/news/366597026/Employer-Sponsored-Telehealth-Cost-23-Less-Than-In-Person-Care.

[17] _See_, Edward Winstead, "Telehealth Can Save People with Cancer Time, Travel, and Money," National Cancer Institute, NIH, February 16, 2023, https://www.cancer.gov/news-events/cancer-currents-blog/2023/telehealth-cancer-care-saves-time-money.

[18] _See,_ Benton Institute for Broadband & Society, " The Economic Benefit of ACP to the Health Care System," Digital Beat, June 5, 2024, https://www.benton.org/blog/ten-things-about-acp-ted-cruz-cares-about-2-economic-benefit-acp-health-care-system, ("Economic Benefit of ACP to the Health Care System").

[19] _See_, Dunc Williams Jr. et al., "Do Hospitals Providing Telehealth in Emergency Departments Have Lower Emergency Department Costs?" Telemedicine and E-Health, Vol. 27(9), September 2021, https://acrobat.adobe.com/id/urn:aaid:sc:us:acc9c6b3-cf6f-4bea-b6c0-37e668007252.

Additionally, a 2023 Department of Veterans Affairs (VA) study found that veterans using a new tele-emergency service were nearly 50% less likely to visit an emergency department in person, thus reducing short-term emergency visits outside the VA system.[20] Another study finds that the average annual savings for each patient that participated in telehealth was $6,500.[21] These studies underscore the importance of broadband for improving healthcare efficiency, affordability, and outcomes.

Education and Academic Achievement Researchers have found that broadband access was associated with a GPA increase of 0.4 to 0.7 points, particularly in English and Social Studies.[22] Increased educational attainment has been linked to increased lifetime earnings. Researchers find that a standard deviation improvement in 8th grade math achievement was associated with an 8%   rise in income, as well as improved educational attainment.[23] Thus, broadband access not only boosts individual academic performance and increases lifetime earnings potential, but also contributes to a more educated workforce which is essential for economic growth.

Labor Market Participation and Employment Broadband access has a positive impact on employment. [24] Researchers have found that universal access to reliable broadband would raise

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[20]   _See,_ The Economic Benefit of ACP to the Health Care System.

[21]   _See_, American Hospital Association, "Telehealth: Helping Hospitals Deliver Cost-Effective Care," last accessed January 7, 2024, https://www.aha.org/system/files/content/16/16telehealthissuebrief.pdf.

[22]   _See_, Keith N. Hampton, Gabriel E. Hales, and Johannes M. Bauer, "Broadband and Student Performance Gaps," Quello Center at Michigan State University, 2023, p. 9, https://quello.msu.edu/wp-content/uploads/2023/08/Broadband-and-Student-Performance-Gaps-After-the-COVID-19-Pandemic.pdf, ("Broadband and Student Performance Gaps After the COVID-19 Pandemic"). Note, this study is a follow up to, _see_, Keith N. Hampton, Laleah Fernandez, Craig T. Robertson, and Johannes M. Bauer, "Broadband and Student Performance Gaps," Quello Center at Michigan State University, 2020, https://quello.msu.edu/wp-content/uploads/2020/03/Broadband_Gap_Quello_Report_MSU.pdf, ("Broadband and Student Performance Gaps").

[23]   _See_, Thomas J. Kane, Elena Doty, Tyler Patterson and Douglas O. Staiger, "What Do Changes in State Test Scores Imply for Later Life Outcomes? Cambridge, MA: Center for Education Policy Research, Harvard University, October, 2022, https://educationrecoveryscorecard.org/wp-content/uploads/2022/11/Long-Term-Outcomes_11.18.pdf.

[24]   See, Raul L. Katz, "The Impact of the Broadband Internet on Employment," in Digitized Labor, first online May 5, 2018, pp. 95–108, https://link.springer.com/chapter/10.1007/978-3-319-78420-5_6. See also, Raul L. Katz, "Estimating the Economic Impact of the Broadband Stimulus Plan," February 2009, https://www.researchgate.net/profile/Raul-Katz/publication/237285765_ESTIMATING_THE_ECONOMIC_IMPACT_OF_THE_BROADBAND_STIMULUS_PLAN/links/56a2105008ae984c449baae0/ESTIMATING-THE-ECONOMIC-IMPACT-OF-THE-BROADBAND-STIMULUS-PLAN.pdf.

U.S. labor productivity by 1.1%, or GDP gains of $160 billion per year.[25] A study by the Brookings Institute finds that regions with higher broadband availability saw greater labor market engagement due to remote job availability and access to online job postings.[26] Research shows that compared to those without internet, individuals with broadband access were better positioned to find job opportunities.[27] The FCC's National Broadband Plan highlights that broadband reduces information asymmetries, allowing workers to identify better job matches and employers to access a broader talent pool.[28] Broadband also facilitates remote work, which allows individuals to join the workforce without geographic constraints.[29] Furthermore, broadband supports entrepreneurship by providing tools for self-employment and e-commerce, which further increases labor force participation in regions where traditional employment opportunities might be limited.[30]

B. ACP and Access to Affordable Broadband

With the large benefits of broadband access discussed above, adoption in the U.S. is still lacking, even though some form of broadband is available almost nationwide.[31] A primary reason is that

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[25] *See,* Jose Maria Barrero, Nicholas Bloom, and Steven J. Davis, "Internet Access and its Implications for Productivity, Inequality, and Resilience," NBER Working Paper #29102, September 2021, https://www.nber.org/system/files/working_papers/w29102/w29102.pdf, p. 24.

[26] *See,* Nicol Turner Lee, Jack Malamud, "Workforce Development is a Crucial Part of Digital Equity," Brookings, May 18, 2023, https://www.brookings.edu/articles/workforce-development-is-a-crucial-part-of-digital-equity.

[27] *See,* Paul DiMaggio and Eszter Hargittai, "From the 'Digital Divide' to 'Digital Inequality': Studying Internet Use as Penetration Increases," Princeton University, https://ideas.repec.org/p/pri/cpanda/15.html.

[28] *See*, FCC, "Connecting America: The National Broadband Plan," March 17, 2010, press release available at https://www.fcc.gov/general/national-broadband-plan, plan available at https://transition.fcc.gov/national-broadband-plan/national-broadband-plan.pdf.

[29] *See,* Nicol Turner Lee, James Seddon, Brooke Tanner, and Samantha Lai, "Why the Federal Government Needs to Step up Efforts to Close the Rural Broadband Divide," Brookings, October 4, 2022, https://www.brookings.edu/articles/why-the-federal-government-needs-to-step-up-their-efforts-to-close-the-rural-broadband-divide/.

[30] *See,* Darrell M. West, "Broadband: A Catalyst for Small Business Growth," Brookings, February 15, 2012, https://www.brookings.edu/articles/broadband-a-catalyst-for-small-business-growth/.

[31] *See,* EducationSuperhighway, "Bridging the Broadband Affordability Gap: A Historic Opportunity to Close Two-Thirds of the Digital Divide," 2021, https://www.educationsuperhighway.org/wp-content/uploads/No-Home-Left-Offline-Report_EducationSuperHighway2021.pdf. *See also,* Broadband Affordability: Removing a Roadblock to Universal Service.

adopting service can be costly. In the U.S., lower-income individuals spend a higher percentage of their income on internet services.[32] As shown in the figure below, based on 2021-2023 data, there is a clear correlation between income and the percentage of income spent on internet services, with higher income earners paying a lower percentage of their income on accessing the internet.

FIGURE 1: BROADBAND EXPENSES AS A PERCENTAGE OF INCOME AFTER TAX
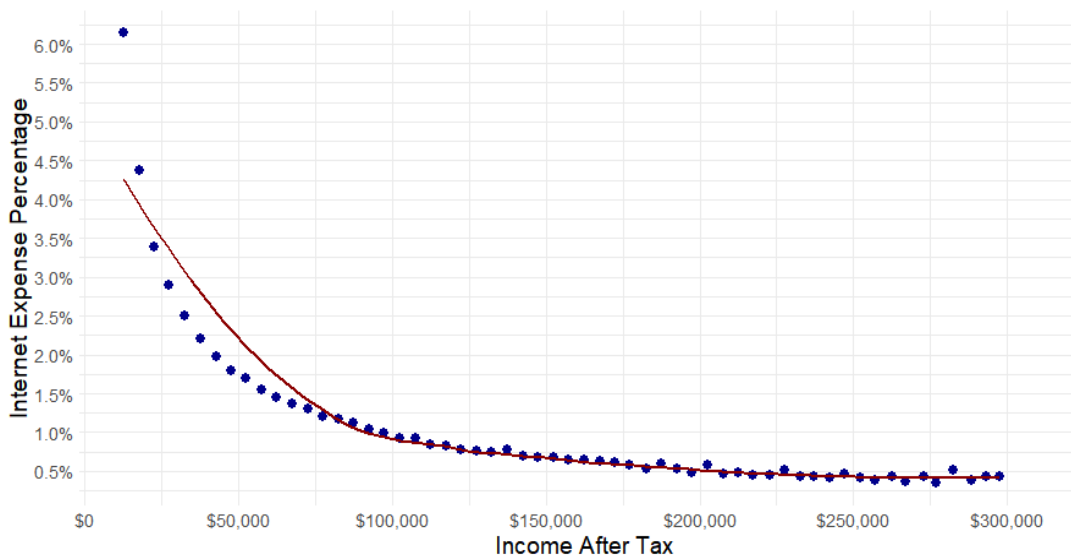
Sources and Notes:
Brattle Analysis and the United States Bureau of Labor Statistics

The ACP was instituted to solve this affordability problem, and data shows that it did. Utilizing ACP claims data at the zip code level and demographic information from the American Community Survey, we analyze which areas of the U.S. have received the most ACP funding, to demonstrate the efficacy of the program in targeting the affordability issue.[33] The discussion above underscores the multifaceted economic impacts of broadband. With the demise of the program, some of these benefits were reversed as many recipients disconnected their service

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[32] *See*, Office of Policy Development and Research, "Digital Inequality and Low-Income Households," U.S. Department of Housing and Urban Development, Fall 2016, https://www.huduser.gov/portal/periodicals/em/fall16/highlight2.html#:~:text=Research%20on%20digital%20 inequality%20has,37%20percent%20cited%20device%20costs.

[33] U.S. Census Bureau, "American Communities Survey," last accessed February 3, 2025, https://www.census.gov/programs-surveys/acs.

when the government eliminated the monetary support. In the next sections we explore the impact on healthcare costs, educational attainment and income, and labor market participation and wage increase that can be generated if the ACP is reinstated. Or, alternatively, what economic benefits would be lost if the ACP was not reinstated.

III. Economic Benefits from Increased Telehealth Use Attributable to the ACP

Research published in recent years demonstrates significant improvements in health outcomes due to increased telehealth uptake rates which gives people increased access to various specialties and a wide range of healthcare services.[34] Broadband availability and adoption are key to increased telehealth uptake rates. Testimony presented at a recent congressional hearing asserted that

> Congress should focus on facilitating improved access to high-quality, integrated telehealth services by strengthening broadband access for disadvantaged and rural populations, establishing digital health literacy programs, conducting research to demonstrate the value of telehealth services (particularly hybrid telehealth modalities), and promoting payment models that increase adoption of well-integrated telehealth services focused on chronic disease management, longitudinal care, and service for disadvantaged populations.[35]

Over time, telehealth has gained popularity as a medium for remotely meeting and consulting with healthcare providers. Despite a decline in the number of visits after its Covid-19 peak, usage of telehealth has surged dramatically in relation to the previous status quo—rising from 0.1% in

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[34] *See,* The Economic Benefit of ACP to the Health Care System.

[35] *See,* Lee Schwamm, "Testimony Prepared by Dr. Lee Schwamm, MD, Associate Dean, Digital Strategy & Transformation, Yale School of Medicine, Senior Vice President and Chief Digital Health Officer, Yale New Haven Health System," Submitted to the House Committee on Energy and Commerce, Subcommittee on Health, April 10, 2024, https://democrats-energycommerce.house.gov/sites/evo-subsites/democrats-energycommerce.house.gov/files/evo-media-document/Lee%20Schwamm_Witness%20Testimony_04.10.2024.pdf.

2019 to approximately 17% of all patient visits in 2023.[36] Increased telehealth uptake rates have significant consumer and public health benefits. Telehealth offers advantages over traditional in-person healthcare visits for both providers and patients. For patients, the benefits include, among other things, the convenience of meeting with providers from home, reduced risk of contagious diseases, and better management of chronic conditions due to improved access and better communications with providers.[37] For providers, telehealth advantages include cost savings, improved healthcare access in underserved areas, reduced burnout rates, and more.[38] Financial support for the ACP has direct benefits for healthcare because it helps make telehealth services more accessible and affordable and thus used more frequently, leading to savings from cost-efficiency and better health outcomes.

Estimating a full set of these effects is beyond the scope of our analysis. We focus on a subset of the benefits (healthcare cost savings) arising from increased broadband connectivity and induced telehealth uptake rates. We analyze the impact that internet affordability, through the ACP, has on healthcare costs for both the patient and the provider through better access to telehealth services.

A. The Role of Telehealth in Reducing Healthcare Costs

Telehealth can significantly reduce the financial burden on healthcare systems and consumers. Cost savings are also achieved by reducing overhead expenses, as less physical clinic space and administrative staff are required to operate.[39] Telemedicine also increases the likelihood of early detection and disease treatment. Early detection reduces the likelihood that a disease will worsen and helps prevent increased costs of treating more serious diseases.[40] When considering

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[36] *See,* Healthcare Dive, "Trends in Telehealth: The Future of Virtual Care," March 11, 2024, Healthcare Dive, https://www.healthcaredive.com/spons/trends-in-telehealth-the-future-of-virtual-care/709544/, ("Trends in Telehealth: The Future of Virtual Care").

[37] *See,* Trends in Telehealth: The Future of Virtual Care.

[38] *See,* Trends in Telehealth: The Future of Virtual Care.

[39] *See,* Smart Clinix, "How Does Telemedicine Reduce Costs," November 23, 2023, https://smartclinix.net/how-does-telemedicine-reduce-costs/, ("Smart Clinix: How Does Telemedicine Reduce Costs").

[40] *See,* Smart Clinix: How Does Telemedicine Reduce Costs.

widening coverage gaps in programs like Medicaid, the cost savings from early preventative care become even more pronounced.[41] Additionally, remote patient monitoring has been shown to reduce hospital readmissions by up to 50%, reduce the number of emergency department visits, and reduce healthcare costs by up to 20%.[42] Furthermore, for mental health patients, broadband access increases the accessibility of telemedicine by helping patients avoid stigma and get treatment from the privacy of their homes and improves mental health outcomes, including reducing the risk of suicide.[43]

Below, we summarize the various quantitative estimates of telehealth-induced healthcare cost savings from existing studies.

TABLE 1: TELEHEALTH-INDUCED HEALTHCARE COST SAVINGS

Source		Savings
Travel-related costs	[1]	$33,540,244 during the first two years of the COVID-19 pandemic
Savings for the Veterans Health Administration	[2]	$6,500 per patient; Nearly $1 billion in savings for the VHA in 2012
Indirect cost savings for nonelderly patients with cancer	[3]	Approx. $147.4 to $186.1 per visit.
Diversion of members to telehealth who would have otherwise visited an emergency department	[4]	$242 per episode
Decrease in monthly healthcare expenses during COVID-19 (January 2020 to February 2021)	[5]	61% reduction in monthly expenses (from $1,099 to $425)
Savings from travel, lost wages, and hospital costs	[6]	$5,718 annually per medical facility for travel, $3,431 annually per medical facility for lost wages, $20,841 annually per medical facility for hospital costs

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[41]   *See,* Center on Budget and Policy Priorities, "The Medicaid Coverage Gap: State Fact Sheets," April 3, 2024, December 17, 2024, https://www.cbpp.org/research/health/the-medicaid-coverage-gap.

[42]   *See,* A3 Logics, "Why Remote Patient Monitoring is The Key to the Future of Home Health Care in the USA?," June 20, 2024, https://www.a3logics.com/blog/key-to-the-future-of-home-health-care/.

[43]   *See,* Md Yeason Arafat, Sanjana Zaman, and Mohammad Delwer Hossain Hawlader, "Telemedicine improves mental health in COVID-19 pandemic," J Glob Health, March 7, 2021, https://pmc.ncbi.nlm.nih.gov/articles/PMC8294826/. *See also*, "Telehealth Can Help Prevent Suicide in Those at High Risk," U.S. News, November 13, 2024, https://www.usnews.com/news/health-news/articles/2024-11-13/telehealth-can-help-prevent-suicide-in-those-at-high-risk.

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[1]: Nadine A Yehya, "Telehealth cuts health care's carbon footprint and patient's costs during pandemic," UC Davis Health, January 10, 2023.

[2]: "Telehealth: Helping Hospitals Deliver Cost-Effective Care," American Hospital Association, last accessed December 2, 2024, https://www.aha.org/system/files/content/16/16telehealthissuebrief.pdf.

[3]: Krupal B. Patel, Kea Turner, Amir Alishahi Tabriz et al., "Estimated Indirect Cost Savings of Using Telehealth Among Nonelderly Patients With Cancer," JAMA Network, January 2023, https://pmc.ncbi.nlm.nih.gov/articles/PMC9856804/.

[4]: "Findings and Recommendations: Telehealth Effect on Total Cost of Care," NCQA, https://www.ncqa.org/programs/data-and-information-technology/telehealth/taskforce-on-telehealth-policy/taskforce-on-telehealth-policy-findings-and-recommendations-telehealth-effect-on-total-cost-of-care/.

[5]: Charlie Katebi and Arielle Kane, "Telehealth Saves Money and Lives: Lessons From the COVID-19 Pandemic," Americans for Prosperity, https://americansforprosperity.org/wp-content/uploads/2021/11/AFP-PPI-telehealth-report-Telehealth-saves-money-and-lives-lessons-from-the-COVID-19-pandemic.pdf/ "Impact of ACP Funds on Telehealth Visits.

[6]: Rick Schadelbauer, "Anticipating Economic Returns of Rural Telehealth," NTCA, March 2017, https://acrobat.adobe.com/id/urn:aaid:sc:us:8d67261e-8f17-4d8b-9b87-fbd940cc4758.

B.   An Economic Framework for Assessing the Cost-Benefit of ACP and Healthcare Costs

An analysis of the ACP's direct monetary value in terms of reducing healthcare costs must weigh direct program costs against multiple layers of benefits that emerge through improved telehealth access. On the cost side, we consider ACP's funded dollars that went towards monthly internet subsidies and one-time device purchases. These costs are relatively straightforward to quantify and can be directly obtained from the Universal Service Administrative Company (USAC).[44] The benefit side, however, is more complicated as it requires the consideration of how internet access enables telehealth utilization and its subsequent effects on healthcare costs and outcomes.

The benefits accrue in the following broad categories:

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[44]   *See,* ACP Enrollment and Claims Tracker.

Direct

- Patients (*i.e.,* ACP subsidy recipients), in the form of reduced transportation costs and avoided lost wages from taking time off work for medical appointments.[45] In 2023, we estimate this to be $174–$219 per visit.[46]

- Providers (*i.e.,* hospitals and health care providers), in the form of reduced emergency department utilization, lower no-show rates, and more efficient use of healthcare resources through remote monitoring and consultations.[47] In 2023, we estimate this to be $2,211 per visit.[48]

- This means that if a hospital or facility can replace 100 in-person visits with a telehealth alternative annually, that would lead to savings of approximately $237,000-$241,000 per year.

Indirect

- Long-term externalities in the form of population health improvements through better chronic disease management, more consistent preventive care, and earlier intervention

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[45] *See,* Edward Winstead, "Telehealth Can Save People with Cancer Time, Travel, and Money," Cancer Currents Blog, February 16, 2023, https://www.cancer.gov/news-events/cancer-currents-blog/2023/telehealth-cancer-care-saves-time-money#:~:text=According%20to%20the%20cost%20models,11%2C600%20participants%20in%20the%20study.

[46] *See*, Krupal B. Patel, Kea Turner, Amir Alishahi Tabriz et al., "Estimated Indirect Cost Savings of Using Telehealth Among Nonelderly Patients With Cancer," January 2023, https://pmc.ncbi.nlm.nih.gov/articles/PMC9856804/. We first take the lower bound and upper bound of $147.4 and $186.1 as of 2021. We then estimate an annual average inflation rate of 2.6% which is the average inflation rate from 2012-2023 and adjust for this inflation.

[47] *See,* Paige Minemyer, "Cigna study: Virtual care can reduce unnecessary ER, urgent care visits by 19%," Fierce Healthcare, January 21, 2022, https://www.fiercehealthcare.com/payer/cigna-study-virtual-care-can-reduce-unnecessary-er-urgent-care-visits-by-19. *See also,* Claire Bevan, "No-Show Rates Are Changing. Here's How to Address Them in 2022," Cedar Blog, March 4, 2022, https://www.cedar.com/blog/no-show-rates-changing-2022/#:~:text=With%20the%20rise%20in%20telehealth,%2Dshow%20rate%20was%2029.8%25.

[48] The VHA estimated in 2012 that Telehealth Generated $6,500 of cost savings per patient per year. On average in the U.S. has 4 physician consultations in all settings per year. Hence, we calculate the per visit provider side cost savings to be $6,500/4 as of 2012 adjusted for estimated inflation of 2.6%. *See*, "Telehealth: Helping Hospitals Deliver Cost-Effective Care," American Hospital Association, https://www.aha.org/system/files/content/16/16telehealthissuebrief.pdf. *See also*, Commonwealth Fund, "U.S. Health Care from a Global Perspective, 2022: Accelerating Spending, Worsening Outcomes," January 31, 2023, https://www.commonwealthfund.org/publications/issue-briefs/2023/jan/us-health-care-global-perspective-2022.

in developing health issues.[49] These benefits compound over time and likely generate additional positive externalities beyond direct healthcare savings—such as improved workforce productivity and reduced caregiver burden.

In our analysis of the cost savings from ACP below, we consider the direct cost savings realized through travel cost savings, lost wages, and provider savings (hospital costs, emergency room visits, etc.). We do not consider indirect benefits such as improved overall health and productivity and a decrease in sick days because of better care of chronic diseases. This makes our assessment of ACP benefits in healthcare very conservative. The true magnitude of the total benefits arising from ACP in the healthcare space is likely significantly larger.

The accounting for our cost-benefit analysis becomes an analysis to evaluate the following inequality:

$$
\begin{aligned}
& ACP\ Amount\ Funded\ per\ Recipient\ per\ year \\
& < (Estimated\ number\ of\ telehealth\ visits\ from\ people\ connected\ wholly\ due\ to\ ACP) \\
& * (Direct\ telehealth\ induced\ cost\ savings\ for\ a\ Patient\ and\ Provider\ per\ year)
\end{aligned}
$$

If this inequality holds, then it is likely that ACP has generated more benefits for recipients than how much it costs the U.S. government, even just considering the subset of healthcare costs. To compute the lost benefits, we first focus on the number of telehealth visits for ACP recipients who are estimated to lose broadband because of the ACP support discontinuation.

To estimate the lost telehealth visits, we note that for individuals who would not have broadband without the ACP, their ability to engage in telehealth visits without the ACP would be limited. Additionally, these ACP-induced broadband connections support other members of the household since this is the household's primary internet connection. Based on the estimated disconnects, we estimate that 12.8 million people would lose broadband support.[50] From the Benton survey of ACP recipients, we know that 60% of the households had at least 1 visit in the

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[49] *See,* Claire Bevan, "No-Show Rates Are Changing. Here's How to Address Them in 2022," Cedar Blog, March 4, 2022, https://www.cedar.com/blog/no-show-rates-changing-2022/#.

[50] Average household size is 2.53 persons in 2024. *See*, ESRI, "2024/2029 Esri Updated Demographics," November 12, 2024, https://storymaps.arcgis.com/stories/d7ec793294314461a9b61f2fc511d49e. Calculation: 5.05 million *2.53 = 12.8 million.

3 months before the ACP support stoppage.[51] Using the Benton survey data we estimate that approximately 3 million telehealth visits were supported by ACP in a 3-month period, and will be lost due to the discontinuation of the program. We then convert this 3-month number to an annualized number and estimate that the number of telehealth visits lost in 1 year due to the demise of the ACP, is approximately **12.1 million**. In the table below we summarize our estimation of the benefits side of the equation noted above.

We estimate that ACP has created approximately **$28.9 to $29.5 billion in cost savings** through increased telehealth visits. Comparing this amount to the 2023 disbursed ACP fund amount of $7.3 billion, we find that these healthcare cost savings alone far exceed the cost of the ACP in 2023.[52] In other words, the estimated healthcare annual savings from the ACP more than pay for the ACP. Not all of these savings translate to savings in the federal healthcare budget. Below, we discuss what part of these savings would impact the federal healthcare budget.

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[51] *See*, John B. Horrigan, "Leaving Money on the Table: The ACP's Expiration Means Billions in Lost Savings," Benton Institute for Broadband & Society, July 24, 2024, https://www.benton.org/publications/acp-expiration-means-billions-lost-savings, ("Leaving Money on the Table: The ACP's Expiration Means Billions in Lost Savings").

[52] USAC, "ACP Enrollment and Claims Tracker," last accessed January 21, 2025, https://www.usac.org/about/affordable-connectivity-program/acp-enrollment-and-claims-tracker/#ebbp-acp-funding-summary. Note: sum up January - December 2023 disbursements for the total 2023 disbursement dollars.

TABLE 2: LOST ACP-INDUCED HEALTHCARE COST SAVINGS DUE TO ACP DISCONTINUATION

		[A]	[B]
Estimated Broadband Disconnects	[1]	5,049,492	
Percentage of ACP Households with a Telehealth Appointment in Prior 3 Months	[2]	60%	
No. of Telehealth Appointments for Disconnected Household Members in 3 Months	[3]	3,029,695	
Total Estimated Telehealth Visits Lost Per Year Due to ACP Discontinuation	[4]	**12,118,782**	
Estimated Savings		*Lower Range Cost Savings*	*Higher Range Cost Savings*
Patient Savings $/visit	[5]	$174	$219
Provider Savings $/visit	[6]	$2,211	$2,211
Combined Savings	[7]	**$2,385**	**$2,430**
Total Savings	[8]	**$28,900,186,844**	**$29,452,469,849**

Sources and Notes:

[1]: Estimated Disconnection

[2]: John B. Horrigan, "Leaving Money on the Table: The ACP's Expiration Means Billions in Lost Savings," Benton Institute for Broadband & Society, July 24, 2024, https://www.benton.org/publications/acp-expiration-means-billions-lost-savings, ("Leaving Money on the Table: The ACP's Expiration Means Billions in Lost Savings").

[3]: [1]*[2].

[4]: [3]*4

[5]: We first take the lower bound and upper bound of $147.4 and $186.1 as of 2021. We then estimate an annual average inflation rate of 5.6% which is the average inflation rate from 2021 to 2023 and adjust for this inflation. Patel et al., "Estimated Indirect Cost Savings of Using Telehealth Among Nonelderly Patients With Cancer," January 2023, https://pmc.ncbi.nlm.nih.gov/articles/PMC9856804/. For inflation rates, see, Statista, "Annual inflation rate in the United States from 1990 to 2023," August 21, 2024, https://www.statista.com/statistics/191077/inflation-rate-in-the-usa-since-1990/.
(Lower or Higher Range)*((1+0.056)^(2024-2021)).

[6]: $6,500/4 as of 2012 adjusted for estimated inflation of 2.6%, using the average inflation from 2012 to 2023. "Telehealth: Helping Hospitals Deliver Cost-Effective Care," American Hospital Association, https://www.aha.org/system/files/content/16/16telehealthissuebrief.pdf; Commonwealth Fund, "U.S. Health Care from a Global Perspective, 2022: Accelerating Spending, Worsening Outcomes," https://www.commonwealthfund.org/publications/issue-briefs/2023/jan/us-health-care-global-perspective-2022. For inflation rates, *see*, Statista, "Annual inflation rate in the United States from 1990 to 2023," August 21, 2024, https://www.statista.com/statistics/191077/inflation-rate-in-the-usa-since-1990/.

[7]:[5]+[6].

[8]: [4]*[7].

C. Scoring the Telehealth Savings

The Congressional Budget Office (CBO) and the Joint Tax Committee produce budget estimates for federal legislation, known as "scores."[53] The "score" focuses solely on a policy's impact on the federal budget and does not assess its economic or societal value.[54] Scoring is purely a budget estimate and not a cost-benefit nor cost-effectiveness analysis. At the start of each year, the CBO produces a baseline budget outlook.[55] The key aspect of the budget baseline, against which any proposed legislative change is scored, is what is *expected* under *current law*.[56] It serves as a reference point to measure the fiscal impact of any counterfactual proposed policy changes on the federal government's budget. Once the baseline is developed, the CBO can score proposed legislation against it. How policy is embodied in a specific piece of legislation can vary, impacting the federal budget implications. As a consequence, the CBO typically only scores specific pieces of proposed legislation, not policy proposals. Current law does not include any federal spending that is appropriated (at least beyond the current fiscal year or current discretionary authorization—currently just the next few months.) Spending authorized by permanent law (referred to as "mandatory spending") is scorable so long as the proposed legislation changes current expectations about the amount the federal government will spend.

We investigated three medical programs (Medicaid, Medicare, and Veterans Affairs) and determined that given the nature of the funding, **the ACP healthcare cost savings may be scorable under the federal portion of Medicaid funding.**[57] Medicaid is the public health

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[53] For the current analysis, CBO would be the relevant scorer of non-tax health care and telecommunications related legislative proposals. *See*, CBO, "CBO Explains Budgetary Scorekeeping Guidelines," last accessed January 3, 2025, https://www.cbo.gov/system/files/2021-01/56507-Scorekeeping.pdf, ("CBO Explains Budgetary Scorekeeping Guidelines"). *See also*, "What is the Congressional Budget Office?" last accessed January 3, 2025, https://indivisible.org/resource/what-congressional-budget-office.

[54] *See*, Jackson Hammond, "CBO Scoring of Preventive Health Measures – Important Considerations," May 31, 2023, https://www.americanactionforum.org/insight/cbo-scoring-of-preventive-health-measures-important-considerations/, ("CBO Scoring of Preventive Health Measures – Important Considerations").

[55] *See*, CBO Explains Budgetary Scorekeeping Guidelines, p. 2.

[56] *See*, CBO Explains Budgetary Scorekeeping Guidelines, p. 2.

[57] We look at Medicaid, Medicare and Veterans Affairs. Telehealth savings is primarily scorable under Medicaid as Both Medicaid and the ACP target the lower income population. Some parts of Medicare could be scorable. However, there is likely a large overlap between Medicaid and Medicare recipients who are also ACP recipients. Therefore, capturing the Medicaid savings will largely encompass the Medicare savings. *See*, U.S. Department

insurance program for low-income Americans and covers over 90 million people.[58] Medicaid falls under "Mandatory Programs" for the Health and Human Services budget, and there is minimal discretionary spending directly tied to Medicaid operations in the FY 2024 Budget.[59] It is funded through a federal-state partnership, where the federal government pays a fixed percentage of each state's Medicaid costs.[60] Changes to the federal portion of Medicaid support would likely be scorable as they would change expectations about what would be spent in the future on Medicaid compared to current law. What such a score would be, however, will be determined by the CBO if new legislation proposes such a change. Here we provide a high-level estimate of the medical cost savings amount due to the ACP that we expect could be scored if embodied in the right legislation.

In Table 3 below, we provide an estimate of a potential score from the total telehealth savings from reinstituting the ACP. We start with the total estimated telehealth visits lost per year because of the discontinuation of the ACP from Table 2. We then estimate the ACP–Medicaid population overlap since we have to focus only on the savings to the Medicaid program. From USAC data and analyst reports, we know that 37% of ACP applicants participate in Medicaid.[61] We use this percentage to estimate that **4.5 million** telehealth visits are lost per year for the Medicaid–ACP overlap recipients. We then multiply these lost telehealth visits with the per-visit provider cost savings (from telehealth) to obtain the lost savings from Medicaid–ACP overlap recipients, who cannot access telehealth visits after losing their broad connection.[62] We estimate these lost savings to be **$9.9 billion**.

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of Health and Human Services, "Fiscal Year 2024: Budget in Brief," last accessed January 3, 2025, https://www.hhs.gov/sites/default/files/fy-2024-budget-in-brief.pdf, ("HHS Fiscal Year 2024: Budget in Brief").

[58] *See*, Robin Rudowitz, Alice Burns, Elizabeth Hinton, and Maiss Mohamed, "10 Things to Know About Medicaid," KFF, June 30, 2023, https://www.kff.org/medicaid/issue-brief/10-things-to-know-about-medicaid/.

[59] See, HHS Fiscal Year 2024: Budget in Brief, p. 15.

[60] *See*, Justin Theal and Riley Judd, "States' Share of Medicaid Costs Remains Low but Is Set to Increase," Pew, September 12, 2024, https://www.pewtrusts.org/en/research-and-analysis/articles/2024/09/12/states-share-of-medicaid-costs-remains-low-but-is-set-to-increase, ("States' Share of Medicaid Costs Remains Low but Is Set to Increase").

[61] *See*, Kevin Taglang and Drew Garner, "Who is About to Lose their ACP Discount?" Benton Institute, February 7, 2024, https://www.benton.org/blog/who-about-lose-their-acp-discount. When applying for the ACP in the National Verifier, applicants were told to select all applicable categories that would qualify the household.

[62] We assume that these telehealth visits will be replaced by physical visits.

TABLE 3: SCORING THE ACP-INDUCED HEALTHCARE COST SAVINGS

Total Estimated Telehealth Visits Lost Per Year Due to ACP Discontinuation	[1]	12,118,782
Medicaid and ACP Recipient Overlap	[2]	37%
Total Estimated Telehealth Visits Lost Per Year for Medicaid-ACP Overlap Recipients	[3]	**4,483,949**
Provider Savings $/visit	[4]	2,211
Lost Savings from Medicaid- ACP Overlap Recipients	[5]	**$9,914,763,949**
Federal Support (60%-85%)	[6]	75%
Federal Portion of the Savings	[7]	$7,436,072,962
Medicaid Reimbursement Adjustment	[8]	80%
Total Scorable Medicaid Dollars	[9]	**$5,948,858,370**

Sources and Notes:

[1]: *See*, Table 2, Row [4].

[2]: Kevin Taglang and Drew Garner, "Who is About to Lose their ACP Discount?" Benton Institute, February 7, 2024, https://www.benton.org/blog/who-about-lose-their-acp-discount.

[3]: [1]*[2].

[4]: *See*, Table 2, Row [6].

[5]: [3]*[4].

[6]: We use the average percentage of federal support used to cover Medicaid costs to adjust the savings. *See*, Justin Theal and Riley Judd, "States' Share of Medicaid Costs Remains Low but Is Set to Increase," Pew, September 12, 2024, https://www.pewtrusts.org/en/research-and-analysis/articles/2024/09/12/states-share-of-medicaid-costs-remains-low-but-is-set-to-increase.

[7]: [5]*[6].

[8]: Medicaid costs 22% less for adults than private insurance, or stated alternatively, reimbursement to providers is at most 78% of that of private insurance. We round up to use 80%. Hannah Katch, Jesse Cross-Call and Matt Broaddus, "Frequently Asked Questions About Medicaid," Center on Budget and Policy Priorities, November 22, 2019, https://www.cbpp.org/research/correcting-seven-myths-about-medicaid.

[9]:[7]*[8].

Two further adjustments are needed to complete the estimated score. First, only the federal portion of Medicaid support is relevant to the federal budget. Federal support varies by state and is between 61% and 85% of the funds.[63] We use the approximate average percentage of federal

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[63] *See*, States' Share of Medicaid Costs Remains Low but Is Set to Increase.

support (75%) in our estimate.[64] Second, we adjust for the lower reimbursement that Medicaid pays providers compared to private insurers. In general, Medicaid reimbursements are at most 80% of that of private insurance.[65] After factoring in these adjustments, we find that the scorable cost of healthcare savings in Medicaid would likely be around **$6 billion**. Thus, a significant portion of the costs of the ACP could be offset from just telehealth-induced savings under Medicaid if there was legislation restoring the ACP funding.

IV. Impact of the ACP on Educational Attainment and Income

A. Broadband Access, Educational Outcomes, and Income

Economic literature suggests that broadband adoption significantly influences education by enhancing access to resources, enabling remote learning, fostering personalized learning experiences, and developing essential skills.[66] Given the importance of remote learning during the Covid-19 pandemic, there has been a greater emphasis on understanding the effect of broadband access and adoption on educational outcomes.

Two of the most comprehensive studies to date on this topic were conducted by researchers at the Quello Center at Michigan State University, and these show that broadband access improved

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[64] See, States' Share of Medicaid Costs Remains Low but Is Set to Increase.

[65] *See*, Hannah Katch, Jesse Cross-Call and Matt Broaddus, "Frequently Asked Questions About Medicaid," Center on Budget and Policy Priorities, November 22, 2019, https://www.cbpp.org/research/correcting-seven-myths-about-medicaid.

[66] In terms of non-market outcomes, Heckman shows that education reduces the likelihood of smoking and improves health outcomes, whilst also increasing lifetime earnings. He finds that graduates of high school are substantially less likely to smoke, obtain higher earnings, and have higher measurable values of health. *See*, James J. Heckman, John Eric Humphries, and Gregory Veramendi, "Returns to Education: The Causal Effects of Education on Earnings, Health, and Smoking," Journal of Political Economy 126(51), 2018, ("Returns to Education: The Causal Effects of Education, Health, and Smoking").

academic performances in K-12 students.[67] Through studies done before and after the Covid-19 pandemic, researchers have found that students without broadband access scored significantly lower on standardized tests than peers with broadband access.[68] The study finds that a student with broadband Internet access, has, on average, a GPA that is 0.7 higher in English and Social Studies, 0.4 higher in Math and Science, and 0.6 higher overall (on a 4.0 scale) than a student without.[69] Other studies have also found a strong correlation between internet skills and SAT scores, with students with internet skills scoring 4.57 percentiles higher on standardized tests.[70]

Economic research has shown that such increased academic performance and educational attainment has been tied to higher lifetime earnings, in addition to positive spillover effects on non-market outcomes like health and cognitive skills.[71] Graduates with high school degrees typically earn more than non-graduates, and individuals with college degrees earn more than those with a high school degree alone.[72] Investments in early childhood education also have an indisputable effect on lifetime earnings and outcomes.[73] In this section, we first explore the link between education and income, then provide an overview of the ways in which ACP–induced broadband access positively affects education and, consequently, earnings potential. Much of this will be lost for children in impacted households if the ACP is not reinstated.

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[67] *See,* Keith N. Hampton, Laleah Fernandez, Craig T. Robertson, and Johannes M. Bauer, "Broadband and Student Performance Gaps," Quello Center at Michigan State University, 2020, https://quello.msu.edu/broadbandgap2020/, ("Broadband and Student Performance Gaps"). *See also*, Keith N. Hampton, Gabriel E. Hales, Johannes M. Bauer, "Broadband and Student Performance Gaps After the COVID-19 Pandemic," Quello Center at Michigan State University, 2023, https://quello.msu.edu/broadbandgap2023/, ("Broadband and Student Performance Gaps After the COVID-19 Pandemic").

[68] *See*, Broadband and Student Performance Gaps, pp. 24, 42. The researchers primarily relied on hierarchical or multilevel modeling to isolate demographic factors, for instance, lower socioeconomic students have a higher likelihood of gaps in economic performance.

[69] *See,* Broadband and Student Performance Gaps After the COVID-19 Pandemic, p. 9. Note that the researchers study broadband access at home.

[70] *See,* Keith N. Hampton, Craig T Roberson, Laleah Fernandez, Inyoung Shin, and Johannes M. Bauer, "How variation in internet access, digital skills, and media use are related to rural student outcomes: GPA, SAT, and educational aspirations," Telematics and Informatics 63 (2021): p. 7.

[71] *See,* Returns to Education: The Causal Effects of Education, Health, and Smoking. *See also,* Gary S Becker, "Investment in Human Capital: A Theoretical Analysis," The Journal of Political Economy 70 (1962): 9-49, https://www.econlib.org/library/Enc1/HumanCapital.html, ("Human Capital").

[72] *See also*, David Card, "The Causal Effect of Education on Earnings," Handbook of Labor Economics 3 (1999): 1826-1831 ("The Causal Effect of Education on Earnings").

[73] *See*, The Causal Effect of Education on Earnings.

Seminal economic articles have causally shown that access to education and increased educational attainment lead to positive income effects.[74] This literature also explores the effects of education in early childhood, and finds that early childhood education significantly impacts the long-term earnings of individuals through the development of both cognitive and noncognitive skills.[75] Research also shows that those with the most to gain in terms of returns to education are individuals from disadvantaged backgrounds.[76] A study by researchers at the University of Miami found that high school GPA is a positive and statistically significant predictor for post-high school educational attainment and earnings as an adult across genders.[77]

Additionally, policies that lower barriers to education for individuals in lower-income brackets show that this cohort is the most likely to benefit from earnings returns.[78] The heterogeneous effects of education on earnings show that investments in individuals of lower socioeconomic status, such as those eligible for the ACP, would allow for the greatest returns from programs that enable broader access to education. Although we focus only on income in our empirical analysis, note that in addition to future earnings, investments in early childhood education can spillover to socioeconomic outcomes, such as reductions in crime and better health outcomes.[79] The ACP targets the exact population that benefits the most from early investments in education: disadvantaged households and the youth in those households. Enabling access to broadband for young Americans is imperative to ensure their future lifetime success, both in and beyond the classroom.

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[74] *See,* Gary Becker's work includes the estimation of the optimal schooling to understand returns to earnings. *See,* David Card, "Earnings, Schooling, and Ability Revisited," NBER Working Paper #4832, August 1994, ("Earnings, Schooling, and Ability Revisited"). Much of Card's work has adapted the initial estimation model put forth by Becker. This section focuses on the work of Card and Heckman, given their adaptation and citations to Becker's research. *See,* Returns to Education: The Causal Effects of Education, Health, and Smoking. *See also,* Human Capital. *See also,* The Causal Effect of Education on Earnings.

[75] *See,* James Heckman and Stefano Mosso, "The Economics of Human Development and Social Mobility," National Bureau of Economic Research (2014).

[76] *See,* The Causal Effect of Education on Earnings, 1846-1852.

[77] *See,* Michael T. French, Jenny F. Homer, Ioana Popovici, and Philip K. Robins, "What You Do in High School Matters: High School GPA, Educational Attainment, and Labor Market Earnings as a Young Adult," Eastern Economic Journal, 41(3), 370–386, 2015, pp. 370-371, https://www.jstor.org/stable/24693733, ("What You Do in High School Matters: High School GPA, Educational Attainment, and Labor Market Earnings as a Young Adult").

[78] *See,* Earnings, Schooling, and Ability Revisited. Even when controlling for students' ability, Card consistently finds robust evidence that returns to education are highest for disadvantaged groups.

[79] Heckman and Mosso, pp. 13-14.

Given such significant effects of broadband on education, it is important to ensure that students have access to affordable broadband. As an increasing number of poorer families disconnect their broadband with the demise of ACP, the detrimental effect on educational outcomes will be long-lasting. Without better educational attainment, there will be persistent effects on students' competitiveness in the labor force and lower income levels throughout their careers. We quantify the loss of income in the next sub-section.

B. ACP Raises Educational Achievement Which Increases Individual Income

As explored above, ACP funding improves students' ability to access broadband. In turn, broadband access has measurable, positive effects on GPA and standardized test results, which in turn increases personal income. For the effect of broadband access on educational attainment, we use the results from the Quello Center research discussed above, *i.e.,* broadband access is associated with an overall GPA increase of 0.6 points (on a 4-point scale) for students in grades 8 through 11.[80] For the impact of educational attainment (as captured by a GPA increase) on earnings, we use the University of Miami research mentioned earlier that shows a 1-point increase in GPA (on a 4-point scale) in high school improves students' earnings in adulthood (when respondents are approximately 10 years removed from high school) by 13.77% for women and 11.85% for men.[81] Based on these estimates we calculate that the percentage increase in earnings due to broadband access is 8.26% and 7.11% for females and males respectively.[82]

To calculate the aggregate annual income effect, we first estimate the expected income of children in an ACP-disconnected household as proxied by the average income of men and women in an ACP-disconnected household.[83] Given the criteria for ACP eligibility, we assume that the average income of an ACP-eligible household is $1,632, which is the gross monthly income for

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[80] *See*, Broadband and Student Performance Gaps After the COVID-19 Pandemic, pp. 9, 11, 31. Note, students with broadband access at home performed 0.4 GPA points higher in mathematics and science courses, and 0.7 higher in English and social studies courses. We apply these results to both fixed and mobile broadband access.

[81] *See*, What You Do in High School Matters: High School GPA, Educational Attainment, and Labor Market Earnings as a Young Adult, p. 9, 14.

[82] *See*, Table 4.

[83] This is likely an underestimate if children's incomes are greater than those of their parents.

SNAP eligibility for a household with one individual in 2023.[84] To obtain the income of males and females in an ACP-eligible household we assume that males, on average, earn the SNAP threshold income, *i.e.,* $1,632 per month, or $19,584 per year and that women earn 20% less than their male counterparts, *i.e.* female wages are 80% of male wages.[85] Using these estimates we calculate that the average annual increase in earnings for males and females is $1,392 and $1,294 respectively.

TABLE 4: ACP-INDUCED IMPACT ON EDUCATIONAL ATTAINMENT AND EARNINGS

Measure		Men [A]	Women [B]
Increase in GPA Due to Broadband Access	[1]	0.6	0.6
Percent Increase in Earnings (in 10 Years) Due to a 1-Point Increase in High-School GPA	[2]	11.85%	13.77%
Percent Increase in Earnings Due to Broadband Access	[3]	7.11%	8.26%
Individual Income Effect			
Average Yearly Earnings of an ACP Recipient	[4]	$19,584	$15,667
Annual Increase to Earnings Due to Broadband Access	[5]	$1,392	$1,294
Estimate of Broadband Access if ACP is Reinstated			
ACP Primary Broadband Disconnects Get Reconnected	[6]	5,049,492	
Estimate of No. of Students Connected if ACP is Reinstated			
Average Number of Students Per Household	[7]	0.55	
Total Studentswho Get reconnected	[8]	2,777,221	
Proportion of Female and Male Students			
Percentage of Female and Male High School Students (2022)	[9]	51%	49%
Total Male and Femal Students	[10]	1,416,383	1,360,838
Aggregate Annual Income Effect in 10 Years	[11]	$3,733,704,563	

Sources and Notes:
[1][A][B]: Keith N. Hampton, Gabriel E. Hales, Johannes M. Bauer, "Broadband and Student Performance Gaps After the COVID-19 Pandemic," Quello Center, Michigan State University, 2023, https://doi.org/10.25335/r71b-c922, pp. 9, 11, 31.

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[84] *See,* U.S. Department of Agriculture, "SNAP ELIGIBILITY," Oct 1, 2024, https://www.fns.usda.gov/snap/recipient/eligibility.

[85] *See,* Rakesh Kochhar, "The Enduring Grip of the Gender Pay Gap," Pew Research Center, March 1, 2023, https://www.pewresearch.org/social-trends/2023/03/01/the-enduring-grip-of-the-gender-pay-gap/.

[2][A][B]: Michael T. French, Jenny F. Homer, Ioana Popovici and Philip K. Robins, "What You Do in High School Matters: High School GPA, Educational Attainment, and Labor Market Earnings as a Young Adult," Eastern Economic Journal (2015) Vol. 41(3), https://www.jstor.org/stable/24693733, pp. 9, 14.
[3][A]: [1][A]*[2][A].
[3][B]: [1][B]*[2][B].
[4][A][B]: Monthly gross income for SNAP eligibility for a household with 1 individual is $1,632, *see*, U.S. Department of Agriculture Food and Nutrition Service, "SNAP Eligibility," updated December 13, 2024, https://www.fns.usda.gov/snap/recipient/eligibility. We multiply this value by 12 to get yearly earnings. Note, we assume that women's earnings would be 80% of men's, and multiply $19,584 by 80% to show women's yearly earnings. The Bureau of Labor Statistics calculated women's earnings to be 83.6% of men's in 2023. To be conservative, we round this value to 80%. *See*, U.S. Bureau of Labor Statistics, "Women's Earnings were 83.6 percent of Men's in 2023," March 12, 2024, https://www.bls.gov/opub/ted/2024/womens-earnings-were-83-6-percent-of-mens-in-2023.htm.
[5][A]: [3][A]*[4][A]
[5][B]: [3][B]*[4][B].
[6]: *See*, Calculation for disconnections.
[7]: As of 2023, there were 0.55 individuals under the age of 18 in American households on average. *See*, Statista, "Average number of people under the age of 18 per household in the United States from 1960 to 2023," November 2023, https://www.statista.com/statistics/718100/average-under-18-population-per-household-us/.
[8]: [6]*[7].
[9][A][B]: Act for Youth, "U.S. Teen Demographics," https://actforyouth.net/adolescence/demographics/#:~:text=Gender,by%20demographic%20characteristics%20%5B3%5D, last updated September 26, 2024.
[10][A]: [8]*[9][A].
[10][B]: [8]*[9][B].
[11]: ([10][A]*[5][A])+([10][B]*[5][B]).

To calculate the aggregate effect on adult earnings for students that would not have access to broadband, absent the ACP, we assume each household has 0.55 individuals that are under the age of 18.[86] Using our estimate of the disconnects we find an estimated **2.8 million at-risk children** under the age of 18.[87]

Of these children, we assume that 51% are males and 49% are females.[88] Using the total disconnects, the ratio of male and female students, and the individual income effect we estimate that **if the ACP is reinstated** and these children in disconnected households regain broadband

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[86] *See,* Statista, "Average number of people under the age of 18 per household in the United States from 1960 to 2023," July 2024, https://www.statista.com/statistics/718100/average-under-18-population-per-household-us/.

[87] *See*, Leaving Money on the Table: The ACP's Expiration Means Billions in Lost Savings.

[88] *See,* For the ratio of males to females, *see*, Act for Youth, "U.S. Teen Demographics," based upon the U.S. Census Bureau, last updated September 26, 2024, https://actforyouth.net/adolescence/demographics/#:~:text=Gender,by%20demographic%20characteristics%20%0%5B3%5D.

access, the effect on their earnings as adults would be over **$3.7 billion per year**, starting approximately 10 years after high school.[89]

V. Improved Labor Market Outcomes Through the ACP

Broadband access plays a critical role in enhancing labor force participation by enabling greater connectivity, flexibility, and access to opportunities.[90] Recent research evaluates the impact of the ACP on labor market outcomes.[91] One of the key findings from a University of Southern California paper is that the ACP positively affected women's participation in the labor force and employment opportunities by improving accessibility of remote work through broadband access.[92] Women qualifying for ACP saw a 1.2 percentage point increase in labor force participation rate, or 1.8% above the baseline rate of 68.3% among ACP-eligible women, and a 1.4 percentage point increase in employment rate.[93] ACP enabled women to access remote work

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[89] We discount $1.874 billion by five years, with an assumed discount rate of 2.5% to arrive to arrive at the present value of ACP access on GPA and earnings. We use a discount rate of 2.5% based on a five-year forecast for expected inflation, as of November 2024, from the Cleveland Federal Reserve. Note, the Fed estimates an inflation rate of 2.3%, we round this to 2.5% to be conservative. *See*, Federal Reserve Bank of Cleveland, "Inflation Expectations," Nov 13, 2024, https://www.clevelandfed.org/indicators-and-data/inflation-expectations.

[90] *See,* Alvaro Sanchez and Adam Scavette, "Broadband Subscription, Computer Access, and Labor Market Attachment Across U.S. Metros," Federal Reserve Bank of Philadelphia, June 2021, broadband-subscription-computer-access-and-labor-market-attachment-across-us-metros.pdf

[91] *See,* John B. Horrigan, Brian Whitacre, and Hernan Galperin, "Understanding the Affordable Connectivity Program Enrollment: Drivers of Uptake," TPRC 2024, August 2, 2023, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4527856, ("Understanding the Affordable Connectivity Program Enrollment: Drivers of Uptake"); DongWook Jeong et al., "Predicting the rate of adoption of the Affordable Connectivity Program (ACP) among eligible households: A diffusion model with panel data," TPRC 2024, August 2, 2024, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4913527, ("Predicting the rate of adoption of the Affordable Connectivity Program (ACP) among eligible households: A diffusion model with panel data"); A Preliminary Review of the ACP Program.

[92] *See,* Predicting the rate of adoption of the Affordable Connectivity Program (ACP) among eligible households: A diffusion model with panel data, p. 2. At the end of 2023, of the 51.6 million eligible households, 23.3 million were enrolled in the program (around 44%).

[93] *See,* Hernan Galperin, Francois Bar, Angel Chavez Penate, "A Preliminary Evaluation of the ACP Program," TPRC 2024, August 5, 2024, p. 12, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4913528, ("A Preliminary Evaluation of the ACP Program"), p. 8. "For women, the increase in LFP is 1.2 percentage points, or 1.8% above the baseline rate of 68.3% among ACP-eligible women. Similarly, employment levels increased among female

opportunities, such as administrative, customer service, or online retail roles.[94] While the increased participation itself is important, in this paper, we quantify the monetary value of this participation, *i.e.*, the impact on annual average wages.

To assess the link between ACP-induced labor market participation and wages, we turn to economic research that finds that a "10% increase in female labor force participation in U.S. metro areas is associated with an increase in real wages of about 5% for both male and female workers."[95] To understand this average effect, and why increased labor force participation by women would increase both male and female wages, the study explores various segments of worker education levels and industries in an attempt to isolate the factors that create this wage impact. Three important findings relevant to our analysis are: (i) the average effect masks the difference between the effect on the female labor force participation on male and female wages– and these need to be assessed separately; (ii) the impact of increased female labor force participation on wage growth is more pronounced among less-educated men and women; (iii) there are diminishing marginal returns to female labor force participation. The table below presents these findings, and Appendix A describes our calculations in more detail.

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but not male workers. The effect is slightly larger at 1.4 percentage points, or 2.1% above the employment baseline of 64%."

[94] The growth of remote work post-pandemic is regarded as one of the greatest changes to work patterns in decades. The effect of ACP on remote work is more pronounced for women than men, with female workers "who received ACP 2.4 percentage points more likely to engage in remote work" or around 17.3% more likely than the baseline of individuals who also received ACP. This is a significant finding as in general, ACP recipients are less likely to participate in remote work (around 11%), due to differences in educational attainment and other factors. The increased female participation implies that the women participating have a higher than average educational attainment compared to the average ACP recipient. *See*, A Preliminary Evaluation of the ACP Program, pp. 10-11. Note that in general, jobs that allow remote work require a higher educational level compared to the more manual jobs at the lower end of the wage scale. Thus, one can infer that the women who participate in the labor force through remote work once they receive broadband access have better educational attainment than their male counterparts. This is turn implies an increase in the average wages for the female workforce, both in terms of rising average wages and the total wage bill. In theory, for the male workers the effect of increased female workforce participation is ambiguous, and we turn to empirical evidence to understand the effect of ACP on wages through female workforce participation.

[95] *See,* A Preliminary Evaluation of the ACP Program, p. 12. The estimation data is between 1980 and 2010.

TABLE 5: ACP-INDUCED IMPACT ON LABOR MARKET OUTCOMES AND WAGES

Measure		All Labor [A]	Male [B]	Female [C]
Impact of ACP on Female Labor Force Participation Rate (LFPR) *Original*				
Increase in Female LFPR Due to ACP	[1]	1.20%		
Adjustment: 2022 to 2024 % Americans Working Fully Remotely				
Incremental Increase in Female LFPR if ACP is Reinstated	[2]	1.18%		
Impact of Female LFPR on Wages				
Original (1980 - 2000) 10% Increase in Female LFPR				
Increased Median Wages By	[3]	4.76%	2.43%	4.63%
Increased Non-College Educated Average Wages By	[4]	3.49%	3.03%	3.95%
Adjustments				
Diminishing Marginal Effect: 10% Increase in Female LFPR				
1990: Increased Average Wages By	[5]	1.84%		
2000: Increased Average Wages By	[6]	2.13%		
2024: Increased Average Wages By	[7]	1.99%		
Target Labor Force: 10% Increase in Female LFPR				
2024: Increase in Non-College Educated Median Wages By	[8]		1.72%	2.25%
Non-College Educated Wages				
% Increase in Wages if ACP is Reinstated	[9]		0.20%	0.26%
Median Weekly Wages (2024)	[10]		$911.43	$768.57
Median Annual Wages (2024)	[11]		$47,395	$39,965
$ Increase in Annual Median Wage (2024)	[12]		$96	$106
Effect of Reinstating the ACP on Wages				
US Non-College Educated Labor Force	[13]		24,326,206	18,570,794
Annual Aggregate Wage Effect (2024)	[14]		$2,333,598,411	$1,962,840,786
Total Increase ($)	[15]		**$4,296,439,196**	
Sensitivity Analyses				
Diminishing Marginal Effect: 10% Increase in Female LFPR				
2024: Increased Average Wages By	[16]	0.99%		
Target Labor Force: 10% Increase in Female LFPR				
2024: Increase in Non-College Educated Median Wages By	[17]		0.86%	1.12%
Non-College Educated Wages				
% Increase in Wages if ACP is Reinstated	[18]		0.10%	0.13%
$ Increase in Annual Median Wage (2024)	[19]		$47.96	$52.85
Effect of Reinstating the ACP on Wages				
Annual Aggregate Wage Effect (2024)	[20]		$1,166,799,205	$981,420,393
Total Increase ($)	[21]		**$2,148,219,598**	

Sources and Notes:

[1]: Hernan Galperin, Francois Bar, Angel Chavez Penate, "A Preliminary Evaluation of the ACP Program," TPRC 2024, August 5, 2024, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4913528, p. 8.

[2]: The original effect of ACP on female labor force participation was driven primarily by remote work. Post-covid if the opportunities for remote work declines, then the effect of female labor force participation may decline. We consider the trends in remote work from Q2 2022 through Q2 2024 and find that there is a small average decline of 2%. We use this to adjust the female labor-force participation. We look at the trend in remote work, *see,* Statista, "Share of Workers Working Onsite Versus Hybrid or Remote in the United States from 2019 to Second Quarter 2024," Gallup: Vox Media, July 2024, https://www.statista.com/statistics/1356325/hybrid-vs-remote-work-us/.

[3][A]: Note average is from the original estimation, and not the average from [B] and [C]. *See,* Amanda Weinstein, "Working Women In the City and Urban Wage Growth in the United States," Journal of Regional Sciences (2017) Vol. 57(3), https://www.researchgate.net/publication/315953837_Working_women_in_the_city_and_urban_wage_growth_in_the_United_States_WEINSTEIN, ("Working Women in the City"), Table 6.

[3]-[4]: *See,* Working Women in the City, Table 6.

[5]-[6]: *See,* Working Women in the City, Table 5.

[7]: Assume average of 1990 and 2000, ([5] and [6]).

[8][B]: ([4][B] *[7])/[4][A].

[8][C]: ([4][C] *[7])/[4][A].

[9]: ([2] *[8])/0.1.

[10]: *See,* Bureau of Labor Statistics U.S. Department of Labor, "Usual Weekly Earnings of Wage and Salary Workers Third Quarter 2024," October 17, 2024, https://www.bls.gov/news.release/pdf/wkyeng.pdf, pp. 1-2. The median weekly earnings for individuals with no high school is $734. For high school graduates, this value is $946. The average of these values is $840. We use this as our measure of the average wage of non-college educated workers. We understand that the female to male income ratio across race and ethnicity is 84.325 (or (82.7+94.7+74.3+85.6)/4). To calculate the female and male median weekly wages for individuals without a high school degree, we apply the female to male income ratio to the average median wages, $840. Assuming a fifty-fifty split between female and male labor force participation rate, this gives us a weekly male wage for non-college individuals of $911.4 and $768.6 for females.

[11]: [10]*52.

[12]: [9]*[11].

[13]: To calculate the number of non college educated members of the labor force, we apply the ratio of women to men with no college education to the total number of individuals employed. As we do not have available measures for the number of non college educated members of the workforce broken out by women and men, we adjust the total number of labor force individuals based upon the members of the labor force with no high school education (8,456,000) and high school education (34,441,000), or a total number of workers without college education as 42,897,000. We understand that the percentage of women with no college education in the labor force is 24.2, and for men this percentage is 31.7. This gives a ratio of 0.76 females per male in the labor force. Applying this to the total number of non high school educated members of the workforce, we find there are 24,326,206 male individuals in the workforce, and 18,570,794 females. *See,* U.S. Bureau of Labor Statistics, "Table A-4. Employment Status of the Civilian Population 25 Years and Over by Educational Attainment," https://www.bls.gov/news.release/empsit.t04.htm; Federal Reserve Bank of St. Louis, "Women Are the Majority of the College-Educated Workforce," April 25, 2024, https://fredblog.stlouisfed.org/2024/04/women-are-the-majority-of-the-college-educated-workforce/.

[14]: [12]*[13].

[15]: [14][C] +[14][B].

[16]: [7]/2.
[17][B]: ([4][B]*[16])/[4][A].
[17][C]: ([4][C]*[16])/[4][A].
[18]: ([2]*[17])/0.1.
[19]: [11]*[18].
[20]: [13]*[19].
[21]: [20][B] +[20][C].

We find that if the ACP is not reinstated the American economy would lose between $2.1–$4.3 billion dollars. In other words, reinstating the ACP would **increase aggregate wages by $2.1–$4.3 billion dollars.** This will happen through the disconnected enrollees reconnecting to broadband, which will increase female labor force participation by 2.25% and lead to an annual rise in median wages of $96 for male workers and $106 for female workers. This corresponds to an aggregate annual wage impact of $4.3 billion.[96] As a sensitivity analysis, we assume a scenario where the female labor force participation impact on wages is cut in half, i.e. in 2024, average wages increase by 0.99% instead of 1.99%. Based on this, we estimate that the aggregate annual wage impact would be approximately $2.1 billion.

VI. Conclusion

The ACP plays a critical role in addressing broadband affordability in the United States. Offering monthly service subsidies and a one-time discount for devices, the ACP facilitated broadband adoption for more than 23 million low-income households. Despite its demonstrated success, the program ended in May 2024 leaving millions vulnerable to disconnection and forfeiting substantial economic benefits.

Current estimates show that more than 28 million households in the United States lack access to broadband. Among them, over 18 million low-income households – representing more than 47 million people– remain unconnected because they cannot afford the monthly cost of broadband. The ACP was an important solution as it helped make broadband more affordable. With the end of the ACP, we estimate that over **5 million low-income households lost their broadband connection**. This loss of connectivity will negatively impact not only individual outcomes but also lead to significant lost benefits for the American economy. This paper focuses on understanding

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[96] This assumes a labor force of 42.9 million non-college-educated individuals. *See*, Table 5, including Sources and Notes, this value is the sum of [13][B] and [13][C].

some of the main economic benefits that will be lost if the ACP is not reinstated. To estimate the benefits of restarting the ACP, we measured the benefits arising from the ACP on healthcare savings, educational attainment and earnings, and labor market participation.

Healthcare Savings: The healthcare cost savings from the ACP in our model comes from the increased use of telehealth in place of in-person hospital and doctor visits. We find that the ACP facilitated approximately **12.1 million** additional telehealth visits annually, reducing costs for patients ($174–$219 per visit in transportation and lost wages) and providers ($2,211 per visit in operational efficiencies and reduced emergency care usage). These savings totaled **$28.9–$29.4 billion annually**, which was **quadruple** the program's annual cost of $7.3 billion. These savings would be lost if the ACP was not reinstated. We also find that a significant portion of the costs of the ACP could be offset by telehealth savings (**$6 billion**) under Medicaid if there was legislation restoring the ACP funding.

Medicaid cost savings generated by switching one physical medical visit for a Medicaid recipient to **one telehealth visit** will generate sufficient savings **to pay for 3.5 years of ACP support** for a Medicaid recipient.

FIGURE 2: SAVINGS FROM 1 ACP-INDUCED TELEHEALTH VISIT WILL PAY FOR 3.5 YEARS OF ACP SUPPORT FOR 1 MEDICAID RECIPIENT
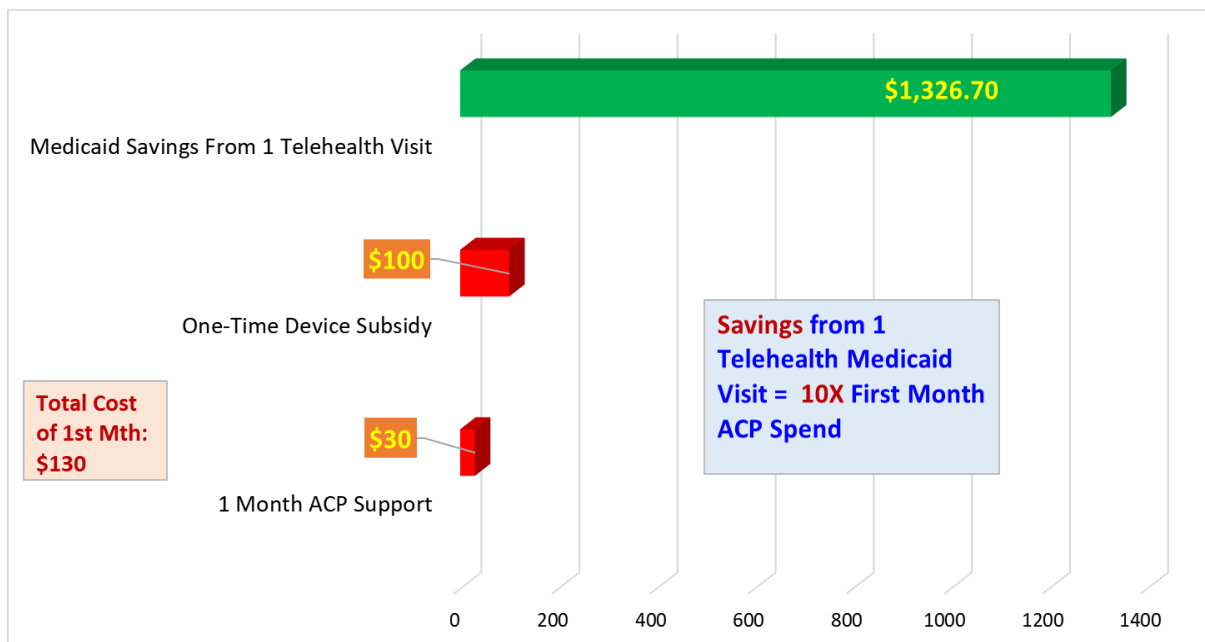
Increased Income Through Better Educational Outcomes: By enabling broadband access, the ACP improved students' academic performance. Evidence shows that affordable access to broadband produces a GPA increase of 0.6 points (on a 4.0 scale) for students in grades 8–11. This improvement translates into an 8.26% increase in lifetime earnings for females and 7.11% for males, with estimated additional earnings of over **$3.7 billion annually** for students in households reconnected to broadband if the ACP is reinstated.

Increased Labor Force Participation and Wage Gains: Empirical research on the effect of the ACP on labor market participation has found that the ACP increased female labor force participation by 1.8% and employment rates by 1.4%, with significant gains for women engaging in remote work. Using previous economic research that documents a 5% increase in both male and female wages when there is a 10% increase in female workforce participation, particularly among less-educated workers, we estimate the effect of the ACP on annual wages. We find that reinstating the ACP could generate **$2.1–$4.3 billion in annual wage gains**, driven by increased workforce participation and improved job accessibility for underserved populations.

The ACP delivers exceptional returns on investment. For the reasons stated in this paper, reinstating the program would yield substantial economic and social benefits far outweighing its fiscal cost. In addition, it will help overcome critical affordability barriers to broadband access. ACP's reinstatement is not just a fiscal necessity to save taxpayer dollars but a strategic investment in America's economic competitiveness. Without the ACP, the country would lose billions of dollars in cost savings and economic gains.

Appendix A: Explaining the Labor Force Participation Effects Table

In Section V, we estimate the labor market and wage impact if the ACP is reinstated. That is the incremental impact on wages, if the 5.1 million ACP Primary broadband recipients who were disconnected after the ACP ended were to regain access to broadband. To understand the impact of reinstating the ACP on labor market outcomes there are a few things to consider. First, note that the driver of the increased female labor force participation was remote work. As the U.S. economy moves to a more hybrid working environment, there will be fewer fully remote positions than in the years immediately following the Covid-19 pandemic. Thus, the percentage increase in female labor force participation may be lower than estimated by the Covid-19 pandemic era research. Second, it is unlikely that the wage gains made from the ACP era will be immediately or fully reversed if a subsection of the ACP enrollees disconnect their broadband. Third, as discussed above, the incremental income effect of broadband access for all the households that disconnected after the demise of the ACP should be primarily seen in the wages of lower educated men and women, and not the entire U.S. labor force. Fourth, as discussed in this paper earlier, research had documented that there are diminishing marginal returns from the increase in female labor force participation, with a 10% increase in female labor force participation leading to an 8.2% increase in average wages in 1980 compared to a 2.1% increase in average wages in 2000.[97] We consider all these factors when estimating the impact of reinstating the ACP on labor market outcomes.

- To estimate the impact of reinstating the ACP we assume that the increase in female labor market participation rate will be two percentage points lower than the original estimate as the availability of remote jobs declines.[98]

- Recall that the increase in female labor force participation was primarily driven by remote work. From Weinstein's work, we then consider the effect of a 10% increase in female labor

[97] *See,* Amanda Weinstein, "Working Women in the City and Urban Wage Growth in the United States," Journal of Regional Science, March 2017, https://www.researchgate.net/publication/315953837, p. 24 and Table 5.

[98] *See,* Statista, "Share of Workers Working Onsite Versus Hybrid or Remote in the United States from 2019 to Second Quarter 2024," Gallup: Vox Media, July 2024, https://www.statista.com/statistics/1356325/hybrid-vs-remote-work-us/. Between the second quarters of 2022 and 2024, the percentage of workers ages 18 and older working fully remote declined from 29% to 27%. Given this, we include a 2% adjustment for the share of female workers engaged in fully remote work.

force participation on wages of non-college-educated workers which is 3.03% for males [column 4B] and 3.95% for females [column 4C].

- We then layer on the effect of diminishing marginal returns by considering the difference in average wage increases between 1980 and 2000. We estimate that in 2020, a 10% increase in female labor force participation will increase wages by 1.99% [column 7A] instead of the 2.13% in 2000 [column 6A].[99]

- We then calculate the percent increase in wages for non-college-educated female and male workers in 2020 [columns 8B and 8C] by adjusting the original male and female wage effects by the 2020 average wage effect.

- Next, we calculate the percent increase in wages if the ACP was reinstated [columns 9B and 9C] and convert these to dollar values using the number of non-college-educated males and females in the full-time workforce [columns 13B and 13C] and the 2024 annual median income [columns 11B and 11C].

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[99] This is calculated as the average of the 1990 and 2000 wage increases. Calculation: (1.84%+2.13%)/2 = 1.99%.