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Broadband Subscription, Computer Access, and Labor Market Attachment Across U.S. Metros

Alvaro Sanchez, Analyst, Economic Growth & Mobility Project, Federal Reserve Bank of Philadelphia[1]
Adam Scavette, Senior Economic Analyst, Economic Research, Federal Reserve Bank of Philadelphia

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Introduction

The COVID-19 pandemic has demonstrated how crucial access to broadband is for Americans' social and economic outcomes. As a result of social distancing, households have experienced an increased reliance on high-speed internet to complete essential activities, from distance learning to remote work to job searches amid the pandemic-induced economic fallout.[2] Broadband has become a critical linking mechanism, distinguishing itself as more than an amenity but rather an essential piece of our national infrastructure and economy.

In this report, we attempt to answer the following question: Is there a correlation between regional labor market attachment and access to a broadband-enabled computer? We use labor force participation rates for U.S. metropolitan statistical areas (MSAs) as indicators of labor market attachment. Our measure of access to a broadband-enabled computer is twofold. First, a household must subscribe to a fixed wireline high-speed internet service[3] through cable, fiber optic to the premises, or DSL service.[4] Second, because an at-home computer is a reliable tool that expands the social, economic, and educational opportunities provided by high-speed internet to community members, a household must also report owning at least one desktop or laptop, which we refer to generically as a computer, or other computer equipment for use at home. If a household has access to a fixed-wireline broadband connection and a computer, then we define the population of those households as having a broadband-enabled device.

The data we use to define and analyze the indicators included in our study are derived from the U.S. Census Bureau's American Community Survey (ACS) 2015–2019 5-year estimates and its Public Use Microdata Sample (PUMS) counterpart. Therefore, owing to the range of years included in the data set, our findings are not representative of labor market trends during the COVID-19 pandemic. However, our analysis provides a framework for broadly understanding the regional relationship between labor force participation and access to a broadband-enabled device, and we make several contributions to the relevant literature. First, we consider labor market outcomes based on whether households have access to both an at-home computer and a broadband subscription. Previous research on this topic emphasizes the availability of broadband infrastructure and household broadband subscription rates, and both elements' effect on labor market outcomes. However, these discussions largely leave out an analysis of how broadband-enabled devices play a part in connecting workers to regional economic opportunities. Second, we are the first to produce estimates of labor force participation for residents with and without a broadband-enabled computer for all MSAs in the United States. Third, we complete an analysis of this topic with more recent publicly available microdata than has previously been published.

The analysis initially focuses on interregional (MSA-level) patterns in household broadband subscription, computer access, and economic insecurity. We show that broadband subscription, computer access, and economic insecurity are parts of a co-occurring pattern across regions, while also showing that there are geographic concentrations of household computer access and broadband subscription. In the second section of the report, we compare labor market participation rates for those who do and do not have a broadband-enabled computer. We find consistent and large disparities associated with labor force participation and whether an individual has an at-home broadband-enabled computer. Our analysis cannot causally link home access to

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[2] Emily A. Vogels, Andrew Perrin, Lee Rainie, and Monica Anderson, *53% of Americans Say the Internet Has Been Essential During the COVID-19 Outbreak, Washington, D.C.*: Pew Research Center, April 30, 2020, available at www.pewresearch.org/internet/2020/04/30/53-of-americans-say-the-internet-has-been-essential-during-the-covid-19-outbreak/.

[3] Whereas this analysis is concerned with understanding regional patterns of broadband subscription rates, previous research has also investigated how neighborhood proximity to this infrastructure affects subscription levels. For an example, see Alvaro Sanchez, "Toward Digital Inclusion: Broadband Access in the Third Federal Reserve District," Federal Reserve Bank of Philadelphia *Cascade Focus*, March 2020, available at www.philadelphiafed.org/-/media/frbp/assets/community-development/reports/toward-digital-inclusion-broadband-access-in-the-third-federal-reserve-district.pdf.

[4] Research indicates that many people who do not subscribe to a fixed-wireline connection at home tend to subscribe to a wireless internet connection through a smartphone. While this is a notable alternative to home broadband that is often used by lower-income households, wireless internet use presents data processing and bandwidth constraints, along with data caps that limit usage. With that in mind, we focus our analysis on access to fixed wireline technologies. See Monica Anderson, *Mobile Technology and Home Broadband 2019*, Washington, D.C.: Pew Research Center, June 13, 2019, available at www.pewresearch.org/internet/2019/06/13/mobile-technology-and-home-broadband-2019/.

a broadband-enabled computer with better labor market outcomes. For some households, persistent unemployment and poverty could be the cause of a lack of broadband access at home, while for others, digital exclusion could be contributing to poor labor market outcomes. Identifying the mechanism that links the two lies outside the scope of this paper. However, by highlighting the association between labor market attachment and access to a broadband-enabled computer, we set the stage for more rigorous analyses of this connection at the regional level. In light of prior research suggesting greater labor force attachment for those with broadband access, our analysis could also identify opportunities for policies and programs to improve outcomes for individual workers.

The key findings of this report include:

- Between 2015 and 2019, across MSAs, household broadband subscription rates and computer access shared a strong positive correlation (Pearson's r = 0.87) with one another, while regional poverty rates had a moderately negative relationship with both broadband subscription rates (Pearson's r = -0.62) and computer access (Pearson's r = -0.63).
- MSAs with low household broadband subscription and computer access were primarily located in the Southeast and Southwest, while high-connectivity regions were concentrated in the Northeast and West Coast.
- Across U.S. metros, we find that prime-age workers (people 25–54) with a broadband-enabled computer participate in the labor force at a much higher rate than prime-age workers without access.
- Using an empirical estimate from the literature, we explore how an "Access Policy" that provides a broadband-enabled computer to unserved metro populations could affect prime-age labor force participation rates. While the effect on prime-age labor force participation rates would be negligible, the net number of labor force participants added to the labor force across metro areas as a result of the policy would be close to 400,000.

Background on Broadband and the Labor Market

The digital divide presents serious barriers to economic opportunity for job seekers and workers. In a 2015 survey conducted by the Pew Research Center, over half (52 percent) of Americans reported that living without a broadband connection at home would be a major disadvantage for finding jobs and gaining skills. Moreover, broadband nonadopters reported that it would be difficult for them to create a resume, contact potential employers, fill out online job applications, and find online lists of job openings in their region.[5] Another study found that broadband use at home or in a public place, such as a library, reduces the probability that an unemployed person will stop their job search by as much as 50 percent, relative to people who are unemployed and do not have access to the internet.[6] Several studies have shown that gaining access to a broadband connection is associated with employment growth,[7] improvements in reemployment after periods of job loss,[8] and more stable employment relationships following periods of unemployment.[9] Broadband access could also affect regional economic outcomes by influencing the matching efficiency of employees with employers, improving the delivery of labor services via telecommuting, and decreasing the interdependence on immediate geography via reduced communications costs for both local businesses and local labor markets.[10] With these elements in combination, firms can find workers from

[5] Aaron Smith, "Lack of Broadband Can Be a Key Obstacle, Especially for Job Seekers," Pew Research Center, *FactTank* (blog), December 28, 2015, www.pewresearch.org/fact-tank/2015/12/28/lack-of-broadband-can-be-a-key-obstacle-especially-for-job-seekers/.

[6] Randolph T. Beard, George S. Ford, Richard P. Saba, and Richard A. Seals, "Internet Use and Job Search," *Telecommunications Policy* 36:4 (2012), pp. 260–73, available at www.sciencedirect.com/science/article/abs/pii/S0308596111002217.

[7] Jed Kolko, "Broadband and Local Growth," *Journal of Urban Economics* 71:1 (2012), pp. 100–13, available at www.isto.bwl.uni-muenchen.de/download/forschung/ictcm/2012/session_v/kolko.pdf.

[8] Nicole Gürtzgen, André Diegmann, Laura Pohlan, and Gerard J. van den Berg, "Do Digital Information Technologies Help Unemployed Job Seekers Find a Job? Evidence from the Broadband Internet Expansion in Germany," *European Economic Review* 132 (February 2021), 103657, available at www.sciencedirect.com/science/article/pii/S0014292121000106?via%3Dihub.

[9] Manudeep Bhuller, Andreas Ravndal Kostol, and Trond Christian Vigtel, "How Broadband Internet Affects Labor Market Matching," IZA Discussion Paper No. 12895, Institute of Labor Economics (IZA), 2020, available at www.iza.org/publications/dp/12895/how-broadband-internet-affects-labor-market-matching.

[10] David, H. Autor, "Wiring the Labor Market," *Journal of Economic Perspectives* 15:1 (2001), pp. 25–40, available at www.aeaweb.org/articles?id=10.1257/jep.15.1.25.

places outside of their immediate geographic region, and workers can identify remote work opportunities from beyond a physical commuting distance.

There is a limited but encouraging body of literature that attempts to identify how residential broadband technology has affected both regional and individual labor market outcomes. In studying the expansion of broadband internet access at the county level from 1999 to 2007, Atasoy (2013) found that gaining access to broadband is associated with a 1.8 percentage point increase in the employment rate. The author also found that much of the employment gains were the result of growth in the labor force.[11] Using Current Population Survey data and an instrumental variable that controls for supply-side constraints to residential broadband access, Dettling (2017) found that high-speed Internet use leads to a 4.1 percentage point increase in labor force participation for married women.[12] These studies suggest a potential causal link between residential broadband access and improved labor market outcomes. Motivated by this body of research, we highlight disparate labor market outcomes between workers who do and do not have access to a broadband-enabled device at home and consider how expanding access could affect labor force participation.

The Metros Most Affected by the Digital Divide

Regional levels of broadband subscription, computer access, and poverty are highly correlated. Unsurprisingly, metro areas with a higher rate of at-home computer access also tend to have a higher broadband subscription rate, likely because at the household level, the former is a prerequisite for the latter. We also find that these highly correlated phenomena are lower in more impoverished metro areas (see **Figure 1**). Household computer access ranges widely from 55 percent to 92 percent, with a population-weighted average of 79 percent of MSA households owning a computer. The household broadband subscription rate across MSAs also varies widely from 35 percent to 83 percent, with a population-weighted average of 71 percent of MSA households subscribing to fixed-wireline broadband service. The poverty rate for each MSA is indicated by the sizing and shading of the dots and ranges from 6 percent to 30 percent, with a population-weighted average poverty rate of 13 percent across all MSAs.[13]

Affordability is often cited by households as a major barrier to subscribing to broadband. The literature affirms that low-income households are more likely to lack a household subscription and to cite cost constraints as an impediment to broadband adoption.[14] Particularly in households experiencing acute economic insecurity or living below the poverty line, other expenses may be prioritized over a home computer and a broadband subscription.[15] To better understand the associations presented in Figure 1 between MSA broadband subscription rates, computer access, and poverty rates, we estimate their correlation coefficients. We find that the share of households with computer access at home and regional household broadband subscription rates have a strong positive association (Pearson's r = 0.87). Moreover, regional poverty rates carry a moderately negative relationship with both regional broadband subscription rates (Pearson's r = -0.62) and computer access at home (Pearson's r = -0.63).

These findings are simply correlations and do not indicate a causal relationship between poverty and a lack of broadband at home, or vice versa. However, the associations we find support the research of other scholars: Households in more impoverished regions are less likely to both subscribe to

[11] Hilal Atasoy, "The Effects of Broadband Internet Expansion on Labor Market Outcomes," *ILR Review* 66:2 (2013), pp. 315–45, available at journals.sagepub.com/doi/pdf/10.1177/001979391306600202.

[12] Lisa J. Dettling, "Broadband in the Labor Market: The Impact of Residential High-Speed Internet on Married Women's Labor Force Participation," *ILR Review* 70:2 (2017), pp. 451–82, available at journals.sagepub.com/doi/pdf/10.1177/0019793916644721.

[13] The Appendix includes estimates for all MSAs.

[14] Economics and Statistics Administration and National Telecommunications and Information Administration, *Exploring the Digital Nation: Computer and Internet Use at Home*, Washington, D.C.: U.S. Department of Commerce, 2011, available at www.ntia.doc.gov/report/2011/exploring-digital-nation-computer-and-internet-use-home.

[15] Colin Rhinesmith, Bianca Residorf, and Madison Bishop, "The Ability to Pay for Broadband," Communication Research and Practice 5:2 (2019), pp. 121–38, available at www.tandfonline.com/doi/abs/10.1080/22041451.2019.1601491?utm_campaign=Newsletters&utmmedium=email&utm_source=sendgrid&journalCode=rcrp20.

FIGURE 1: HOUSEHOLD BROADBAND SUBSCRIPTION, COMPUTER ACCESS, AND ECONOMIC INSECURITY

U.S. Metropolitan Statistical Areas

Source: ACS 5-Year Estimates (2015–2019), Tables S2801 and S1701.

Notes: One dot represents a single metropolitan statistical area. All U.S. MSAs are represented in this figure. Broadband is defined as a fixed wireline connection via DSL, cable, or fiber optic to the home.

broadband[16] and have access to a computer.[17] Digital inclusion efforts may have the greatest impact if they target regions with higher levels of poverty or economic insecurity, where computer access and broadband subscription rates often trail other regions.

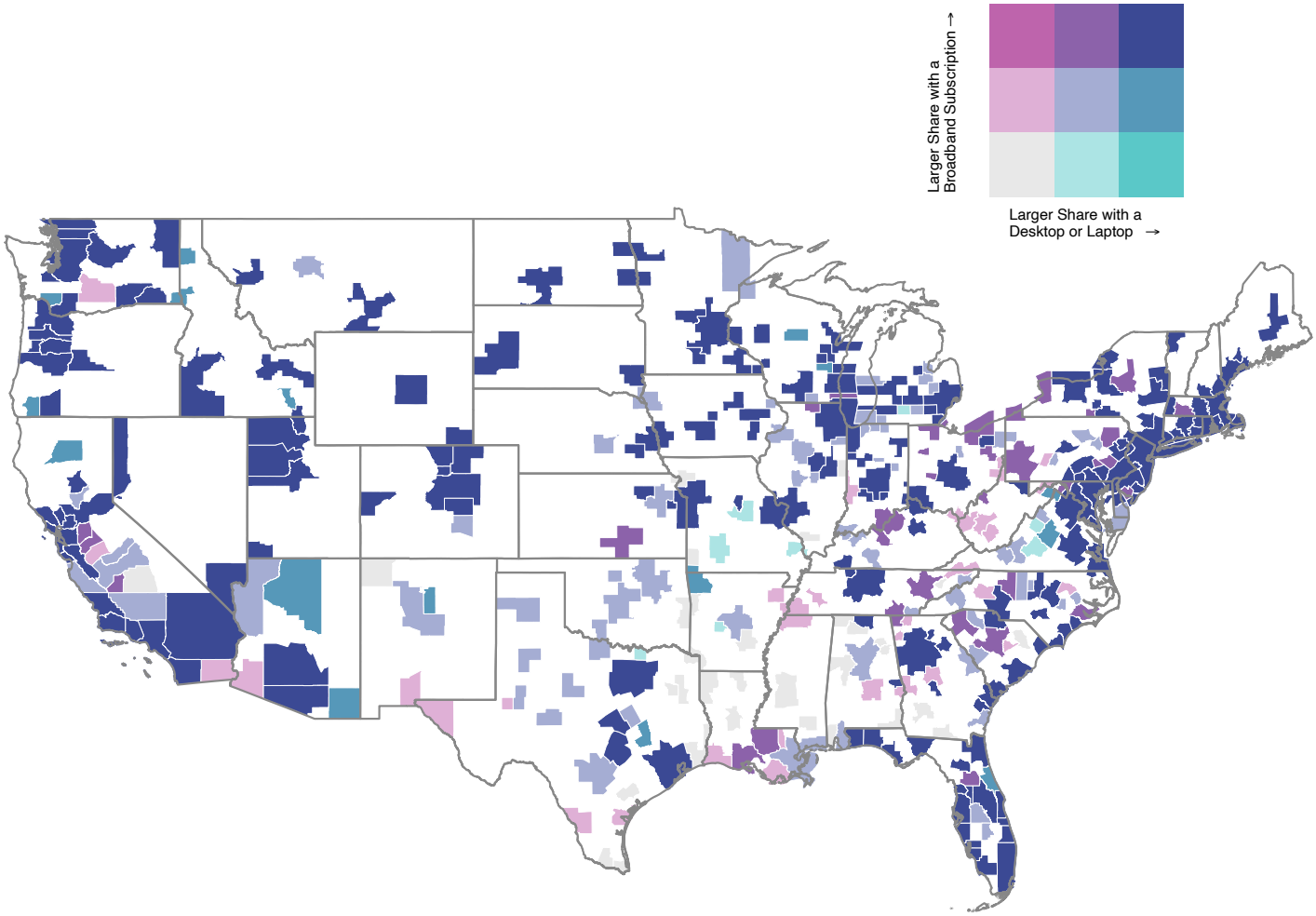
Figure 2 displays a bivariate choropleth map of U.S. MSAs, with the shading of the legend representing the covariation between the share of households with a computer and the household broadband subscription rate. The spatial patterns of computer access closely follow the geographic patterns we found for household broadband subscription. These patterns indicate that there is a concentration of low and high connectivity in certain areas of

[16] Adie Tomer, Lara Fishbane, Angela Siefer, and Bill Callahan, *Digital Prosperity: How Broadband Can Deliver Health and Equity to All Communities*, Washington, D.C.: Metropolitan Policy Program at Brookings (2020), available at: www.brookings.edu/research/digital-prosperity-how-broadband-can-deliver-health-and-equity-to-all-communities/.

[17] Monica Anderson and Madhumitha Kumar, "Digital Divide Persists Even as Lower-Income Americans Make Gains in Tech Adoption," Pew Research Center, *FactTank* (blog), May 7, 2019, www.pewresearch.org/fact-tank/2019/05/07/digital-divide-persists-even-as-lower-income-americans-make-gains-in-tech-adoption/.

FIGURE 2: GEOGRAPHIC CONCENTRATION OF HOUSEHOLD BROADBAND SUBSCRIPTION AND COMPUTER ACCESS

U.S. Metropolitan Statistical Areas



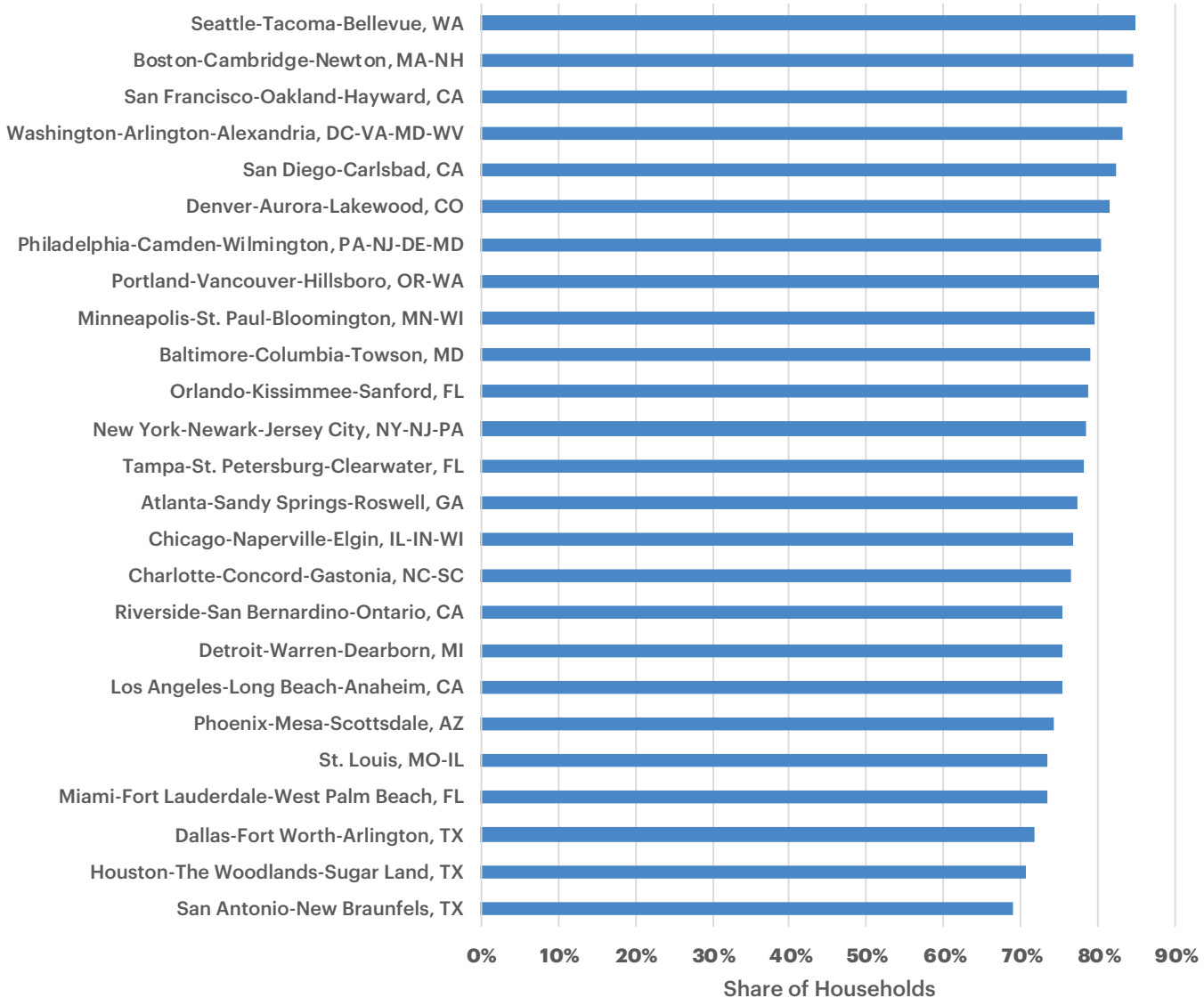
Source: ACS 5-Year Estimates (2015–2019), Table S2801.

Notes: The legend represents each variable broken into quantiles at the 33rd and 66th percentiles. Breaks for the share of households with a desktop or a laptop are 73 percent and 79 percent (the minimum and maximum are 55 percent and 92 percent). The breaks for the share of households with a broadband subscription are 64 percent and 72 percent (the minimum and maximum are 35 percent and 83 percent). Subscription rates are based on a connection to a fixed wireline broadband service, defined as an internet connection via DSL, cable, or fiber optic to the home. Alaska and Hawaii are excluded for display purposes.

the country. Metros with a lower subscription and computer access rate are primarily located throughout the Southeast of the U.S., notably in certain states such as Arkansas, Alabama, Kentucky, Louisiana, Missouri, Tennessee, and West Virginia. Additionally, the Southwest U.S. is also home to a number of MSAs with a low subscription rate and at-home computer access, specifically in states like Arizona, New Mexico, and Texas. In addition to the West Coast, the Northeast consists of a concentrated grouping of MSAs that have a relatively higher subscription rate, particularly in states like Connecticut, Massachusetts, New Jersey, New York, and Pennsylvania. Additionally, places where there are higher rates of both indicators tend to be situated in or directly adjacent to densely

FIGURE 3: SHARE OF HOUSEHOLDS WITH A BROADBAND-ENABLED COMPUTER

Largest 25 Metropolitan Statistical Areas



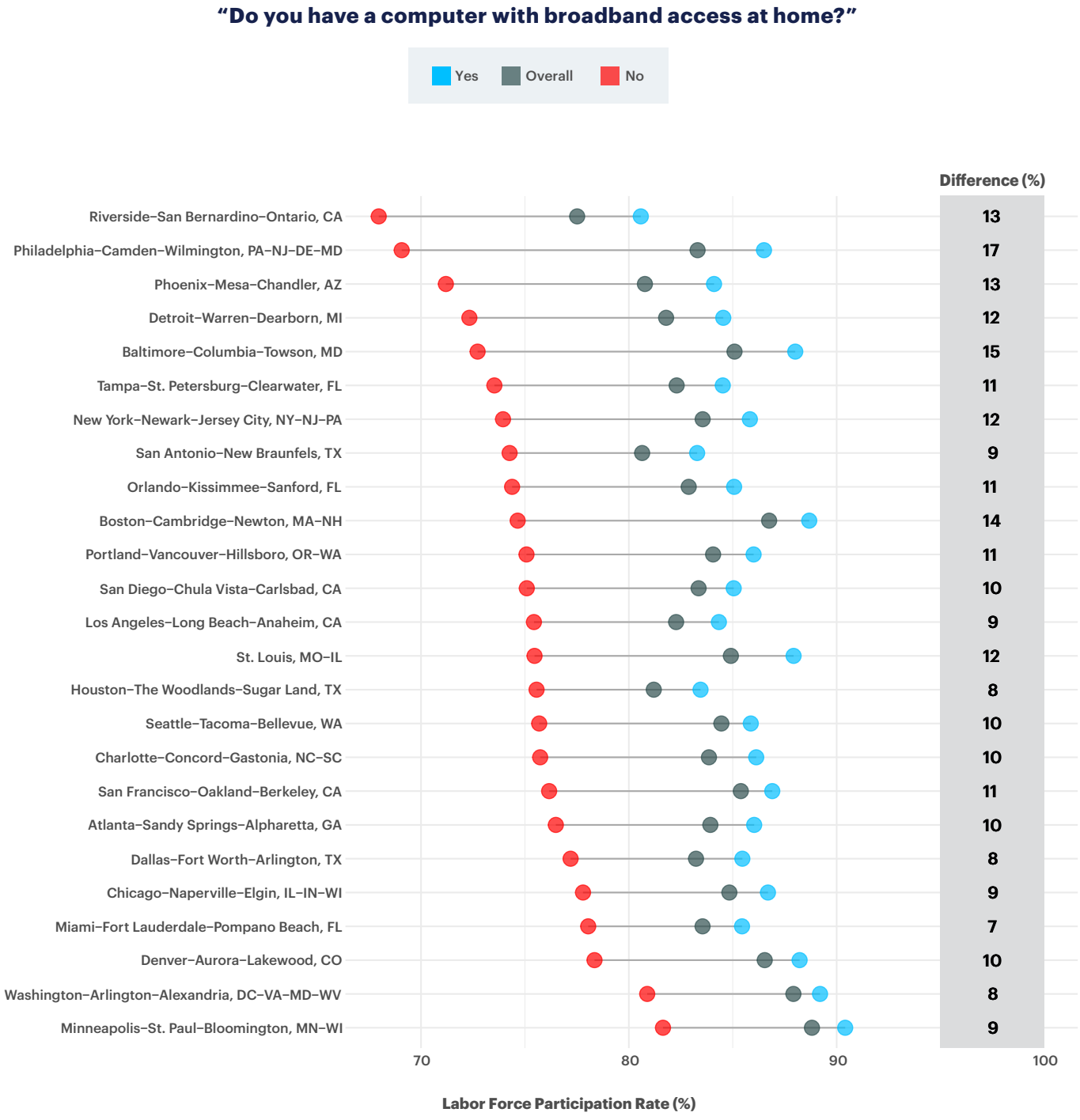
Source: Authors' calculations using ACS Public Use Microdata Sample (PUMS) 5-Year Estimates (2015–2019).

populated metros, for example, near Denver, New York, San Francisco, and Salt Lake City. It is important to note that even within MSAs with relatively high levels of broadband subscription and computer access, there are neighborhoods where households lack access to the necessary infrastructure or subscribe at below-average rates.[18]

[18] In previous research on household broadband subscription at the subregional level, internet uptake varied substantially by neighborhood income, rural and urban status, and racial/ethnic composition. See Alvaro Sanchez, "Toward Digital Inclusion: Broadband Access in the Third Federal Reserve District," Federal Reserve Bank of Philadelphia *Cascade Focus*, March 2020, available at www.philadelphiafed.org/-/media/frbp/assets/community-development/reports/toward-digital-inclusion-broadband-access-in-the-third-federal-reserve-district.pdf.

FIGURE 4: PRIME-AGE (25–54 YEARS OLD) LABOR FORCE PARTICIPATION RATES BY AT-HOME ACCESS TO A BROADBAND-ENABLED COMPUTER

Largest 25 Metropolitan Statistical Areas



Source: Authors' calculations using ACS Public Use Microdata Sample (PUMS) 5-Year Estimates (2015–2019).

Figure 3 shows the share of households in the largest 25 MSAs that have access to a broadband-enabled computer.[19] Each MSA in Figure 3 falls between 69 percent in San Antonio-New Braunfels, TX, and 85 percent in Seattle-Tacoma-Bellevue, WA. Overall, the vast majority of the households in the largest MSAs are connected with an internet-equipped laptop or desktop. Brownsville-Harlingen, TX is the least connected metro, where fewer than half (41 percent) of the region's households report owning a broadband-enabled computer. Although the majority of MSA households own a computer connected to the internet, there is a stark divide in the labor market outcomes of individuals who do not. We discuss interregional disparities in labor market attachment by access to a broadband-enabled computer in the next section of the report.

The Digital Divide and Labor Market Attachment

In an attempt to highlight labor market attachment gaps that coincide with the digital divide, we study how labor force participation is correlated with access to a broadband-enabled computer across U.S. MSAs between 2015 and 2019. The labor force participation rate measures the percentage of the population that is either employed or unemployed but actively seeking employment.

Multiple factors influence labor force participation[20] at both the regional level (e.g., the share of non-working-age population) and at the individual worker level (e.g., disability, care needs for children or elderly family members, a history of incarceration). In order to control for the variation in age distributions across metro areas, we restrict our analysis of labor force participation to MSA prime-age populations (people ages 25–54), as this demographic group largely includes people who have completed their education and are not yet retired.[21] Our analysis excludes older adults, who are more likely both to be living without a broadband-enabled computer[22] and to be out of the labor force.

To better understand how broadband-enabled computer access is correlated with labor market attachment, we estimate the prime-age labor force participation rate for people with (blue dots signifying "yes") and without (red dots signifying "no") a broadband-enabled computer at home in **Figure 4** for the largest 25 MSAs in the United States. Figure 4 also includes the overall prime-age labor force participation rate (gray dot signifying "overall") for each of the listed MSAs and a panel that shows the percentage point difference in labor force participation for those with and without a broadband-enabled computer.[23] In most MSAs, there is a large difference in the prime-age labor force participation rate between individuals who report that they do have a broadband-enabled computer at home relative to those who do not.[24] The prime-age labor force participation gaps shown in Figure 4 range from 7 percentage points in Miami-Fort Lauderdale-Pompano Beach, FL, to 17 percentage points in Philadelphia-Camden-Wilmington, PA-NJ-DE-MD. In most of the largest 25 metros, over 20 percent of prime-age residents without a broadband-enabled computer do not participate in the labor force.

[19] The Appendix includes estimates for all MSAs.

[20] See David Burk and Joshua Montes, *Factors Affecting the Labor Force Participation of People Ages 25 to 54*, Washington, D.C.: Congressional Budget Office, 2018, available at www.cbo.gov/system/files/115th-congress-2017-2018/reports/53452-lfpr.pdf

[21] Prime-age (25–54) people tend to participate in the labor force at higher rates than other age groups in the population. In 2019, the prime-age population held an 83 percent labor force participation rate nationally, compared with 56 percent for people ages 16 to 24 and 40 percent for people 55 and older. See Bureau of Labor Statistics, *Civilian Labor Force Participation Rate by Age, Sex, Race, and Ethnicity*, Washington, D.C.: U.S. Department of Labor, September 1, 2020, table 3.3, available at www.bls.gov/emp/tables/civilian-labor-force-participation-rate.htm.

[22] See Monica Anderson and Andrew Perrin, *Tech Adoption Climbs Among Older Adults*, Washington, D.C.: Pew Research Center, May 17, 2017, available at www.pewresearch.org/internet/2017/05/17/tech-adoption-climbs-among-older-adults/

[23] It is important to note that the overall labor force participation rates in Figure 4 tend to be closer to the "yes" values than the "no" values, since residents without a broadband-enabled computer make up a much smaller segment of the population than those with a broadband-enabled computer (see Figure 3 for population shares with a broadband-enabled computer).

[24] The Appendix includes estimates for all MSAs.

Estimating the Impact of a Broadband "Access Policy"

While we highlight stark disparities in prime-age labor force participation as it relates to access to a broadband-enabled computer, the causal mechanism behind this relationship cannot be identified in this report. Furthermore, the relationship likely runs in two directions, since nonparticipation in the labor force may make access to a broadband-enabled computer unaffordable, while lacking such access may make participation in the labor force more difficult. Nevertheless, Atasoy (2013) suggests that there is a causal relationship between broadband access services and labor force participation at the county level, with an expansion of the former leading to an increase in the latter. As a thought experiment, we use a parameter estimate from the empirical study and apply it to the relationship between residential broadband-enabled computer access and prime-age labor force participation.

Atasoy (2013) finds a 2 percent increase in the labor force for county populations when broadband services are deployed to counties that previously lacked access. Using this estimate, we examine the effect of providing residential broadband-enabled computer access to prime-age residents who lack it, increasing the size of that group's labor force by 2 percent. To be clear, rather than expanding access countywide, as Atasoy (2013) tests, we estimate the effects of expanding access to only the metro area prime-age residents who lack it. We make three major assumptions in using this empirical estimate. First, we assume that Atasoy's (2013) effect will hold in the prime-age population across the nation's MSAs, whereas the author's estimate was for the entire labor force across the nation's counties. Second, we treat individuals who do not have a broadband-enabled computer at home as the unserved population, whereas Atasoy (2013) examined counties gaining broadband access infrastructure. Third, we assume that the increase in the labor force is entirely due to an increased participation rate of existing residents rather than in-migration.[25]

We believe that this will serve as a conservative estimate for the effect of universal residential broadband-enabled computer access on metro prime-age labor force participation. We would characterize the estimate as being conservative for two reasons. First, Atasoy measured infrastructure availability only, whereas we are studying the impact of access to a broadband-enabled computer, which should have a stronger effect on employment outcomes. Second, we would expect labor market outcomes to be more affected by broadband access during our study period (2015–2019) than during Atasoy's (1999–2007), given the growth in the importance of the internet for job finding, skills training, and remote work opportunities between these periods. We refer to the estimates based on this exercise with the term "Access Policy."

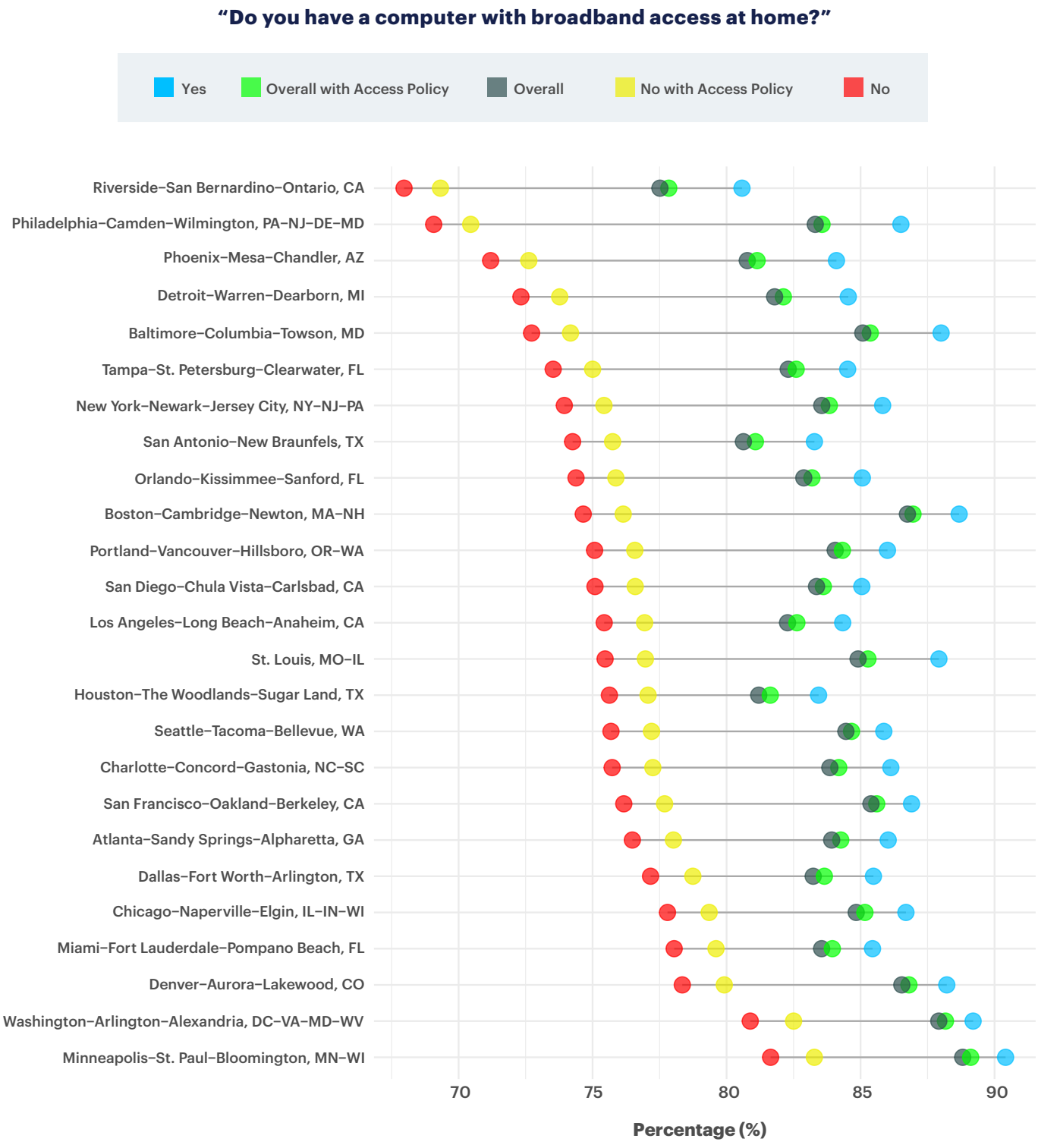
Figure 5 shows the prime-age labor force participation rates included in Figure 4, along with two new series of estimates that capture the effect of regional populations gaining ubiquitous access to an at-home broadband-enabled computer. For the population that reported not having a broadband-enabled computer at home in Figure 4, the updated labor force participation estimates after gaining access to broadband are labeled "No with Access Policy" (yellow dots). The effect of gaining access to a broadband-enabled computer on the overall prime-age labor force participation rate is labeled "Overall with Access Policy" (light green dots).

Figure 5 demonstrates that even if all individuals had access to a broadband-enabled computer at home, the disparities we find in the prime-age labor force participation rate would not be eliminated. The overall prime-age labor force participation rate across metros would increase only marginally if everyone had access to a broadband-enabled computer, shown by the small upward increases from "Overall" to "Overall with Access Policy" in Figure 5. However, the prime age labor force participation rate for the "No" population would see upticks of between 1 and 2 percentage

[25] Atasoy's point estimate on population growth implies that 17.6 percent of the labor force growth could be due to in-migration. However, since the author's point estimate for population change is not statistically significant from zero, we attribute the full 2 percent increase in the labor force to an increase in the participation rate of existing residents.

FIGURE 5: PRIME-AGE (25–54 YEARS OLD) LABOR FORCE PARTICIPATION RATES BY AT-HOME BROADBAND-ENABLED COMPUTER ACCESS WITH ACCESS POLICY

Largest 25 Metropolitan Statistical Areas



Source: Authors' calculations using ACS Public Use Microdata Sample (PUMS) 5-Year Estimates (2015–2019).

Notes: Access Policy estimates are authors' calculations using the broadband coefficient from model 2 from Table 5 of Atasoy (2013).

points in every MSA. While the increase in labor force participation rate after gaining access to a broadband-enabled computer appears small, the number of people that could be brought into the labor force in larger metros would be sizable.

For understanding this exercise, it is helpful to examine the exact changes in prime-age labor force counts coinciding with the Access Policy. Taking the Philadelphia-Camden-Wilmington, PA-NJ-DE-MD MSA as an example, there were 447,974 prime-age people without a broadband-enabled computer, out of which 309,416 were in the labor force, constituting a "No" prime-age labor force participation rate of

$$\frac{309{,}416}{447{,}974} = 69.1 \text{ percent}$$

By increasing the group's labor force by 2 percent (6,188 people), the "No with Access Policy" prime-age labor force participation rate becomes

$$\frac{309{,}416 + 6{,}188}{447{,}974} = 70.5 \text{ percent}$$

In calculating the "Overall" prime-age labor force participation rate, we must also include prime-age people with a broadband-enabled computer in the calculations, both in the population (1,996,275 people) and in the labor force (1,726,854 people). Therefore, the "Overall" prime-age labor force participation rate is

$$\frac{309{,}416 + 1{,}726{,}854}{447{,}974 + 1.996{,}275} = 83.3 \text{ percent}$$

and the "Overall with Access Policy" rate is

$$\frac{309{,}416 + 1{,}726{,}854 + 6{,}188}{447{,}974 + 1.996{,}275} = 83.6 \text{ percent}$$

The change for the "with Access Policy" for both measures is the result of adding 6,188 prime-age people to the labor force in the Philadelphia MSA.

Figure 6 shows the net number of prime-age labor force participants that would be added across the largest 25 metro areas as a result of the Access Policy. These estimates are largely a function of an MSA's population, the share of the prime-age population lacking access, and the labor force participation rate of those lacking access. For example, although the Boston and Phoenix metro areas have similarly sized prime-age populations, Boston would gain 4,100 labor force participants compared with 7,000 for Phoenix. This discrepancy can be attributed to the difference in their respective shares of prime-age populations lacking access to a broadband-enabled computer: 14 percent in Boston versus 26 percent in Phoenix. As a result, a greater pool of potential workers would be affected by expanding broadband access in the Phoenix MSA. Across the 378 metropolitan areas examined in this report, approximately 400,000 prime-age people would be brought into the labor force with the Access Policy.

Implications and Takeaways

The results presented in this report affirm that, at the MSA level, there is a strong relationship between household broadband subscription, computer access, and regional poverty levels. Our findings also indicate that there is a geographic concentration of households in MSAs where computer access and fixed-wireline broadband subscription coincide with one another. Moreover, by analyzing prime-age labor force participation segmented by access to a broadband-enabled computer, we find consistent disparities in labor market attachment across U.S. metros.

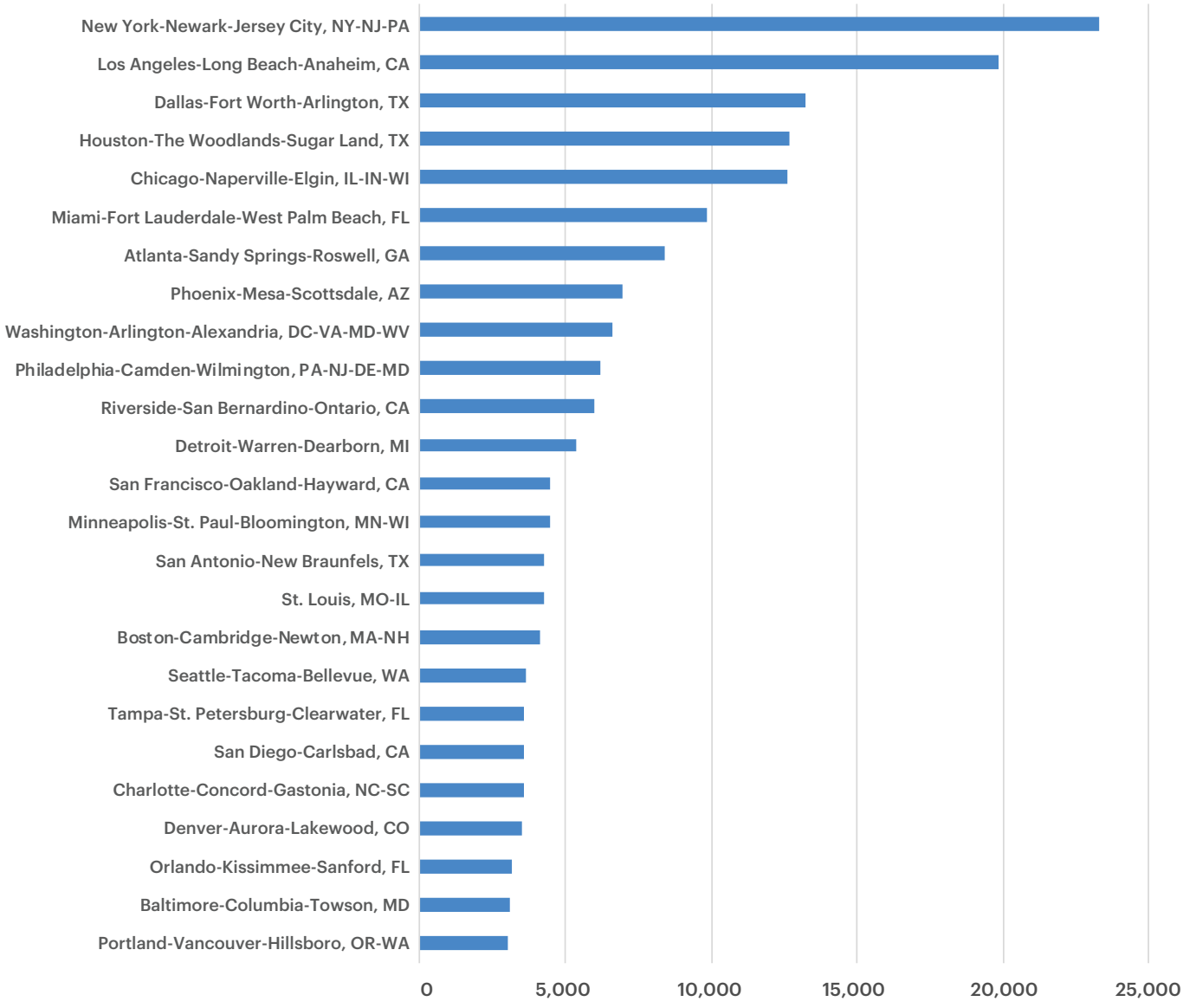
By using an empirical estimate from the literature, we find that expanding access to a broadband-enabled computer for prime-age workers who currently lack access could bring nearly 400,000 additional residents into the labor force. It is important to stipulate that this research does not establish a causal relationship between access to a broadband-enabled computer and labor force participation. Nonparticipation in the labor force may make access to a broadband-enabled computer unaffordable, or lacking such access may make participation in the labor force that much more difficult. Nevertheless, our results highlight the strong relationship between these phenomena and hint at the scale of the impact that could follow an expansion of broadband-enabled computer access.

Digital equity conversations at the national, state, and local levels need timely data and research to meet the needs of regional economies. Ongoing analysis of subscription data and more frequent supplemental surveys to understand why households

do not adopt broadband technology can be insightful for increasing uptake. Moreover, future studies should also attempt to understand how local broadband infrastructure buildouts and network upgrades affect subscription rates, digital skills development, and, ultimately, labor market outcomes. In addition to research, fostering cross-sector partnerships between internet service providers, state and local governments, nonprofits, community organizations, and researchers will be integral to developing unique, innovative solutions that fit the needs of each region. ■

FIGURE 6: PEOPLE ENTERING THE LABOR FORCE AS A RESULT OF THE ACCESS POLICY

Largest 25 Metropolitan Statistical Areas



Source: Authors' calculations using ACS Public Use Microdata Sample (PUMS) 5-Year Estimates (2015–2019).

Notes: Access Policy estimates are authors' calculations using the broadband coefficient from model 2 from Table 5 of Atasoy (2013).

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