CENTER for RETIREMENT RESEARCH at BOSTON COLLEGE

TECHNOLOGY AND DISABILITY: THE RELATIONSHIP BETWEEN BROADBAND ACCESS AND DISABILITY INSURANCE AWARDS

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Abstract

This paper examines the association between Social Security Disability Insurance (DI) awards, disability, and technology access. It uses multiple data sources, regression analyses, and geospatial analysis to document the geographic variation in these relationships. Our initial hypothesis was that any relationship between DI awards, disability, and technology access (e.g., computers, the internet, and broadband) would simply reflect the broadband gap between rural and non-rural, but we find that disparities hold even after taking into account these geographic differences.

The paper found that:

- There is a negative relationship between DI award rates and computer, internet, and broadband access. Counties with a high proportion of DI beneficiaries have less access to computers, internet, and broadband than those with fewer DI beneficiaries, even after controlling for county-level characteristics such as age, race, housing prices, and rural/non-rural status.
- The technology gap is not limited to rural areas. Although people in non-rural areas have greater access to technology (e.g., computers, internet, and broadband) than those in rural areas, both non-rural and rural counties with high DI award rates are less likely than their counterparts with lower DI award rates to be connected.
- Disability rates, which are four times higher than DI award rates, exhibit a similar negative relationship with technology access.

The policy implications of the findings are:

- Considering the dual challenges facing people with disabilities who have low access to technology is important to providing services and programs to people and communities in need.
- Understanding the relationship between DI awards, disability, and technology access could help SSA identify specific areas of the country and specific groups with lower-than-expected DI applications because of limited technology.

Introduction

There is a well-known broadband gap in the United States. In 2021, the Federal Communications Commission (FCC) identified about 14 million Americans, mostly in rural areas, without access to high-speed internet (FCC 2021a). That number, however, has been roundly criticized as a severe undercount, and other estimates suggest that at least 42 million Americans live in areas of the country without minimally acceptable internet speeds (BroadbandNow Research 2021).

The FCC defines broadband as "high-speed internet access that is always on," where high speed is labeled as "25/3" or a minimum of 25 Mbps (megabits per second) for downloads and 3 Mpbs for uploads. The average user doing videoconferencing needs only 10-20 Mbps, but the needs increase with number of users and devices (Bolden 2021). Some observers, including a bipartisan group of senators, have argued that the FCC benchmarks are too low (and out of date), and should be changed to symmetrical speeds of 100 Mbps (i.e., "100/100"), a benchmark they believe would allow "for limited variation when dictated by geography, topography, or unreasonable cost."[1] According to FCC data from 2020, 324 million people have access to three or more providers that offer speeds of 25 Mbps, but nearly 23 million Americans do not have access to any providers offering 100 Mbps.[2] Fast and reliable internet enables people to connect to friends and family, employers, medical providers, banks and finance, shopping, entertainment, and more. Access to the internet is no longer a luxury but is essential in our modern age.

For people with disabilities, a lack of internet access may hamper their ability to obtain services, health care, or benefits. These impacts can be seen in changes in how federal and state governments provide services to people and households. The Social Security Administration (SSA) is one of an increasing number of federal and state government agencies that are encouraging applicants to apply for benefits over the internet (Kauff, Sama-Miller, and Makowsky 2011).[3] Although more than 1.9 million applications for the Social Security Disability Insurance (DI) program were filed via the internet in fiscal year 2021, this number

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[1] See https://cdn.vox-cdn.com/uploads/chorus_asset/file/22344741/2021_0304_Bipartisan_Broadband_Speed_Letter_FINAL__1___1_.pdf

[2] Authors' calculations using the merged data described in the data section.

[3] Other SSA online services include information about programs and services, replacement Social Security and Medicare cards, viewing Social Security earnings, managing benefits, and requesting appointments. See https://www.ssa.gov/pubs/EN-05-10032.pdf

represents only about 6 in 10 applications (59.4 percent) that year (Social Security Administration 2022). This is perhaps not surprising since disabled adults ages 18 and older are about three time more likely than those without a disability to report that they never go online (Anderson and Perrin 2017). Moreover, only 25 percent of disabled adults report having a computer, smartphone, home broadband, and a tablet compared with 42 percent of their counterparts without a disability (ibid). Thus, the reach of the DI program may be limited if disabled adults are disproportionally represented among Americans without broadband access.

In this paper, we examine the relationship between DI award rates and access to technology (e.g., computers, internet, and broadband). We are interested in better understanding how people with disabilities can access DI benefits and how changes in technology—that is, the move towards more online applications and reviews—may impact this vulnerable population. Additionally, in light of challenges experienced by SSA in transitioning from providing services during the pandemic—largely using the phone and online platforms—to bringing in-person staff back to field offices (Rein 2022), this work has the potential to inform ways in which SSA can provide services and application opportunities to their target populations. We are not familiar with all of the ways SSA interacts with applicants and beneficiaries, but this work highlights the potential inequities in access to DI benefits by assuming that everyone has equal access to the internet.

Our hypothesis was that any relationship between DI awards and technology access (e.g., computers, internet, and broadband) was primarily driven by urbanization. That is, given the rural area broadband gap, we suspected our results would simply reflect that gap. While we do indeed find that relationship, we also find that this relationship persists even after accounting for a county's urbanization: counties with high rates of DI receipt are less likely to have high-speed internet whether they live in a rural or non-rural area. This finding and other technology-related county-level attributes described in this paper suggest that people with disabilities are more likely to be cut off from the advantages of technology than other groups. It will be interesting to see whether recent federal investments in broadband will close this gap in the coming years.

Background

Not surprisingly, demand for broadband access has grown with society's use and reliance on the internet. According to a Pew Research Center annual survey, 93 percent of adults in 2021

reported using the internet, up from just 52 percent in 2000 (Pew Research Center 2021). At the same time, internet-based applications have proliferated from basic applications that require relatively little speed and bandwidth, such as email, web search browsers, and e-commerce, to more sophisticated applications that require significantly higher speeds and larger bandwidths, such as online video, online gaming, and more recently videoconferencing, telehealth, and distance learning. The introduction of broadband internet service has made many of these newer internet-based applications possible.

As with internet use, access to broadband at home increased dramatically from 1 percent to 77 percent between 2000 and 2021 (Pew Research Center 2021); however, tens of millions of Americans still do not have access to broadband internet service. High prices and insufficient infrastructure are often barriers to broadband home access and create unequal internet access across the country for many rural and other disadvantaged communities (Anderson and Kumar 2019; Anderson and Perrin 2017; Perrin 2019). The FCC reports slightly higher rates of broadband access,[4] but also shows a marked gap in access across different areas of the country. The FCC reports that nearly 99 percent of people living in urban areas have access to fixed broadband service (at the 25/3 speed), compared with 83 percent of people living in rural areas and 79 percent of people living on Tribal lands (FCC 2021a, Figure 1). As the COVID-19 pandemic revealed, those without broadband can be excluded from educational and business opportunities. Limited broadband access also makes it difficult for people to access healthcare, including messaging through patient portals, remote monitoring devices such as blood pressure monitors, and telehealth video visits, leading some researchers to consider broadband access to be a social determinant of health (Benda et al. 2020). Even before the COVID-19 pandemic, researchers documented the relationship between access to health care, equity, and access to broadband internet access (Bauerly et al 2019; Benda et al. 2020; Dornauer and Bryce 2020; Merschel 2020).

These patterns and the resulting gaps in access have not gone unnoticed by federal and local policymakers, especially since the onset of the pandemic, which increased the need for internet access to support school and work. Two recent federal laws will deliver billions of dollars to communities to expand broadband internet access. In March 2021, Congress passed

[4] The FCC reports that their data may overstate the extent to which satellite broadband access is available, which may be responsible for the slightly higher estimates (FCC 2021b).

the American Rescue Plan Act (ARPA) of 2021,[5] which provided $1.9 trillion in economic stimulus across a variety of programs. Although it did not dedicate any funds to expanding broadband access, it created the "Emergency Connectivity Fund," which provides $7.2 billion to reimburse schools and libraries for providing free broadband access to students and others in their homes. ARPA also provides $220 billion to states, territories, and Tribal areas, and $120 billion to local governments and counties to assist in local economic recovery purposes. Twenty states and numerous localities are using ARPA money to invest in broadband infrastructure and expand high-speed internet access (Benton Institute 2022).

In contrast to the general broadband provisions in the ARPA, the Infrastructure Investment and Jobs Act (IIJA),[6] enacted in November 2021, specifically designated broadband infrastructure needs on par with upgrading the nation's roads, bridges, and water systems. The total $65 billion for broadband improvement in the IIJA comes in two main parts. In the first part, the law provides $42.5 billion to states to map and expand broadband infrastructure needs—prioritizing the country's underserved rural areas—by providing grants to broadband providers. The second part of the law is the $14.3 billion Affordable Connectivity Program, administered by the FCC, to support a $30 monthly internet subsidy for eligible households (e.g., individuals receiving benefits through the Supplemental Security Income, Supplemental Nutrition Assistance Program, Medicaid, or other low-income programs) and a $75 monthly subsidy for households on qualifying Tribal lands (Roark 2022). The remaining funds (about $2.5 billion) will support digital literacy efforts and help schools and libraries provide services for other needy people and communities (Bennet 2021).

Existing research documents the substantial geographic variation in DI receipt (Butrica, Mudrazija, and Schwabish 2021; Coe et al. 2011; Deshpande and Li 2019; Friedman, Lurie, and Mogstad 2017; Gettens, Lei, and Henry 2018; Michaud, Moore, and Wiczer 2019; Ruffing 2015; Schwabish 2017). It is possible that this geographic variation relates to internet and broadband access. Despite the recent growth in internet use and broadband access, the share of DI applications filed through the internet has remained relatively flat since about 2014 (SSA 2022), though there was a dramatic uptick during the COVID-19 pandemic (Figure 1). Between

[5] See https://www.congress.gov/117/plaws/publ2/PLAW-117publ2.pdf
[6] See https://www.congress.gov/117/plaws/publ58/PLAW-117publ58.pdf

January and August 2022, this trend appears to have reversed, with the share of online applications falling from 66 percent (the peak during this period) to 58 percent.

It is also worth noting recent reports about the challenges SSA faced to provide services to its target populations during the COVID-19 pandemic. According to Romig (2022a), about 1,400 SSA staff left the agency in 2021 with another 4,500 front-line employees expected to leave in 2022. SSA staffing is at its lowest level in 25 years while the number of Social Security beneficiaries continues to increase, with more than 700,000 initial disability claims pending at the end of fiscal year 2021 (Romig 2022b; SSA Office of the Inspector General 2021). Unsurprisingly, SSA turned to the internet during the pandemic to process applications and conduct online video hearings. According to the SSA Office of the Inspector General, SSA held more than 40,000 online video hearings since the beginning of the pandemic (SSA Office of the Inspector General 2022).[7] This number might have been higher were it not for gaps in internet and broadband access. Between April 2020 and March 20221, the average processing time for a hearing was 333 days, lower than in 2011 but still far above the agency's goal of 270 days (SSA Office of the Inspector General 2022).

We also note that the density and location of in-person SSA offices varies dramatically across the country. Using public data sets with the address and business hours of SSA field offices and resident stations,[8] we find significant variation in the county-level number of field offices and resident stations (Figure 2). Across the United States, 1,887 counties have no in-person centers (neither field offices nor resident stations), 1,032 counties have only one center, 214 counties have 2 to 10 centers, and three counties have more than 10 SSA in-person centers (Wayne County, MI with 12; Cook County, IL with 16; and Los Angeles County with 30). Four states (Arizona, Florida, Nevada, and Utah) have fewer than three SSA in-person centers per 1 million residents while six states (Kentucky, Mississippi, Montana, South Dakota, West Virginia, and Wyoming) have more than 10 field officers per 1 million residents. Of course, what may be most important is not the *number* of offices or even the *per capita* number of offices, but the

[7] There is somewhat of a discrepancy between the 2022 OIG report, and a 2021 OIG report that cites a 16,000 number between the beginning of the pandemic and November 2021. The estimates reported in the 2022 report would suggest about 25,000 hearings over that same time period.

[8] See https://www.ssa.gov/open/data/FO-RS-Address-Open-Close-Time-App-Devs.html. This file includes the addresses of SSA field offices and resident stations. We used a crosswalk to identify the county for each zip code. In cases where zip codes cross county lines, we assign the SSA office or resident station to all the counties for that zip code.

average *distance* potential DI applicants must travel to visit a field office (a calculation that is beyond the scope of this paper but one that Manasi and Li (2017) have explored).

This paper examines the relationship between DI award rates and access to high-speed internet. It provides insights into what areas of the country are at most risk for low online access to SSA services and thus an opportunity for SSA to better accommodate those individuals and households in better and different ways.

Data

Our main data source is the *American Community Survey* (ACS), the premier source of US population and housing data. The ACS includes information on age, race/ethnicity, education, sex, employment status, income, poverty, and other personal characteristics. Importantly for this paper, the ACS also includes information on disabilities and internet and broadband access. Since 2013, the ACS has asked households whether their residence has access to the internet (Figure 3). For those who report they have internet access, the ACS asks them to identify what they use to access the internet. Respondents can reply that they use a cellular data plan, high-speed internet service also known as broadband (including cable, fiber optic, or DSL), satellite internet, dial-up internet, or another service. We use the 2016-2020 ACS 5-year county-level estimates.[9] For simplicity, we describe these estimates as being for 2020.

We supplement the ACS with 2020 county-level data on DI awards from SSA,[10] internet speed and monthly costs from BroadbandNow,[11] number of internet providers from the FCC Form 477 files,[12] and urbanization from the National Center for Health Statistics (NCHS) database.[13] Together, these data provide a complete picture of broadband access and DI awards and disability around the country.

[9] Available here: https://www.census.gov/data/developers/data-sets/acs-5year.html
[10] Available here: https://www.ssa.gov/policy/docs/statcomps/ssi_sc/
[11] BroadbandNow is a data aggregation company that provides data and research about internet prices and speeds. They combine FCC data with data from more than 2,000 internet service providers (ISPs). Available here: https://raw.githubusercontent.com/BroadbandNow/Open-Data/master/broadband_data_opendatachallenge.csv
[12] Available here: https://opendata.fcc.gov/Wireline/Area-Table-December-2020/ymd4-xaiz
[13] We use the NCHS 2013 urban-rural classification scheme, which distinguishes between metropolitan, micropolitan, and non-core areas. We designate counties as rural if their NCHS classification code is non-core. Available here: https://www.cdc.gov/nchs/data/data_acces_files/NCHSURCodes2013.xlsx

Methods

We begin by describing how average computer, internet, and broadband access rates compare for counties with high and lower rates of DI recipients and disabled adults. We then show these same results separately for rural and non-rural areas. We supplement our descriptive results with findings from simple regressions that we estimate separately using each of our technology variables as the dependent variable and DI receipt or disability as our key independent variable. We estimate these regressions first without and then with additional controls for county-level characteristics[14] to test whether the relationships we observe between our technology, DI receipt, and disability measures still hold after controlling for other county-level characteristics that are likely correlated with technology and disability. Our reported findings are descriptive and should not be interpreted causally.

We then map all the counties in the US and highlight the intersection of technology and disability. Throughout the paper, we describe counties whose DI receipt or disability rates are in the top quartile of the distribution of all counties as having "high" DI receipt or disability rates. We describe all other counties as having "lower" DI receipt or disability rates. We use the phrases DI receipt and DI awards interchangeably.

Results

As documented in the literature, we find large geographic variation in county-level DI award rates with the highest rates in the Appalachia region in southern West Virginia and eastern Kentucky and somewhat high rates in parts of Maine, Michigan, and New Mexico (Figure 4). Many of these same areas also have below average internet and broadband access. Counties with low rates of internet access are located in parts of Appalachia, the south, and New Mexico (Figure 5). There are also clusters of counties with extremely limited internet access in Arizona, Alaska, and South Dakota. While most Americans have internet access, many fewer have broadband access—as evidenced by the large swaths of light blue, light tan, and dark tan counties across the US in Figure 6. In addition to the areas mentioned above, most of Mississippi, southeast Oklahoma, and southern Virginia have extremely low rates of broadband access.

[14] Covariates include median age, sex, educational attainment, race and ethnicity, homeownership rates, median home values, poverty rates, unemployment rates, rural status, and total population.

Table 1 presents summary statistics of computer, internet, and broadband access in 2020 for counties with and without high rates of DI receipt or disability. In general, we find lower rates of computer, internet, and broadband access in counties with high DI and disability rates than in those with lower DI and disability rates. In counties with high DI receipt, for example, 16.8 percent of residents do not have a computer and 13.5 percent have only smartphones for their computing devices. In lower disability counties, in contrast, 11.1 percent of residents do not have a computer and only 9.6 percent only have smartphones for their computing devices. Compared with lower DI receipt counties, counties with high DI receipt rates are 8 percentage points less likely to have internet access, 0.7 percentage points more likely to have satellite internet access, and 3.2 percentage points more likely to have only a cellular data plan to access the internet. Moreover, fewer than half of high DI receipt counties (48.3 percent) have broadband access compared with 60.5 percent of lower DI receipt counties, a difference of 12.5 percentage points. Additionally, using speed test data from BroadbandNow shows that the average internet download speed is 10.2 Mbps slower in high DI receipt counties (35.6 Mbps) than in lower DI receipt counties (45.7 Mbps). There is, however, no economically significant difference in the average cost of internet plans. Finally, according to FCC data, high DI receipt counties also have fewer providers offering internet speeds of 25 Mbps and 100 Mbps than lower DI receipt counties. For example, 85.8 percent of residents in high DI receipt counties have three or more providers that offer speeds of 25 Mbps compared with 92.4 percent of residents in lower DI receipt counties. Moreover, 31.8 percent of residents in high DI receipt counties have no providers offering speeds of 100 Mbps, compared with only 21.3 percent of residents in lower DI receipt counties. In general, the patterns are similar when we compare counties with high and lower rates of disability.

Importantly, many of the computer, internet, and broadband access differences between counties with high DI receipt or disability rates and those with lower rates are statistically significant even after we control for other county-level characteristics using simple regressions (Table 2). The magnitude of the association declines as we control for additional characteristics, but the gap persists and remains statistically significant in most cases. Broadband access rates, for example, average 2.1 percentage points lower in counties with high rates of DI receipt than those with lower rates. High DI receipt counties are also still 2.5 percentage points less likely to have three or more providers offering plans with internet speeds of 25 Mbps, and they are 2.4

percentage points more likely to have no providers offering plans with speeds of 100 Mbps. Finally, differences in several outcomes, including satellite internet access, average internet speed, the availability of at least one provider offering 25 Mbps, and the availability of at least one provider offering 100 Mbps are no longer statistically significant. Again, the patterns are similar when we compare counties with high and lower rates of disability. One noteworthy difference is that high disability counties are 5.8 percentage points more likely than lower disability counties to have no providers offering internet plans with speeds of 100 Mbps, even when other county-level characteristics are held constant.

These same patterns generally hold even accounting for differences in the urbanization of counties (Table 3). As expected, residents in rural counties are more likely than those in non-rural counties to lack a computer and have only smartphones to access the internet. And residents in rural counties are less likely than those in non-rural counties to have internet or broadband access. However, differences in broadband access rates between counties with high and lower DI receipt rates are larger in non-rural counties (11.8 percentage points) than in rural counties (9.3 percentage points). Also, average internet speed is lower in rural counties than in non-rural counties; however, the difference between high and lower DI receipt counties is again larger for non-rural than for rural counties. Among rural counties, those with high DI receipt rates have average internet speeds of only 41.2 Mbps while those with lower disability rates have average internet speeds of 54.5 Mbps—a difference of 13.3 Mbps. Rural counties are also less likely than non-rural counties to have three or more providers offering internet plans at 25 Mbps and more likely than non-rural counties to have no provider offering internet plans at 100 Mbps.

Table 4 presents the statistical significance of the differences between high and lower disability counties for each outcome of interest. Even after controlling for other county-level characteristics, high DI receipt counties are less likely than lower DI receipt counties to have broadband access. The difference is 2.2 percentage points for rural counties and highly statistically significant, and 1.2 percentage points for non-rural counties and only marginally statistically significant. In addition, high DI receipt counties are less likely to have three or more providers offering internet plans with 25 Mbps. The differences are 1.6 percentage points in non-rural counties and 3.4 percentage points in rural counties. Moreover, high DI receipt counties in rural areas are 5.6 percentage points less likely than those with lower DI receipt to

have no providers offering plans with speeds of 100 Mbps. This difference is not statistically significant in non-rural areas.

Next, we provide visual depictions of the results presented above, in particular combining our preferred measure of broadband access and counties that have higher or lower rates of DI awards. Nationwide, we find that about one in five rural counties have high DI award rates *and* low rates of access to broadband. By comparison, only about 7 percent of non-rural counties have high DI award rates and low rates of access to broadband (Figure 7). At the other end of the spectrum, 49 percent of rural counties have lower DI award rates *and* higher rates of broadband access compared with 73 percent of non-rural counties.

We next pull our measures of internet/broadband access together with DI receipt into single "bivariate choropleth" maps. These maps show counties that fall into each of the four cells shown in Figure 7 for each county. The pink-shaded counties are what might be considered the most *in-need* counties—those that have high rates of DI awards *and* low rates of computer, internet, or broadband access. The first map shows patterns in internet access and DI awards (Figure 8). Many of the in-need counties stretch along the southern areas of the country and into Appalachia. Another cluster of in-need counties can be seen in New Mexico, where 14 of 33 counties (including Tribal areas) have high disability rates and low rates of internet access. We find similar patterns with internet speed (Figure 9). There are in-need counties scattered throughout the country, but they tend to be clustered in Appalachia and areas of the south, especially in the Missouri-Oklahoma-Arkansas-Mississippi-Alabama region, and in areas of Michigan, Nevada, eastern Oregon, and Idaho. We still see several counties in New Mexico that fall into the in-need category, but fewer than the overall internet access measure shown above. Finally, and not surprisingly, the relationship between broadband access and DI award rates reflects the patterns seen in the two previous maps (Figure 10). Here, we see in-need communities again clustered in the Missouri-Oklahoma-Arkansas-Mississippi-Alabama area of the country, some counties in Michigan and New Mexico, and others scattered about the country. Because our thresholds are based on the individual distributions of internet access and broadband access, some Appalachian counties are considered in-need based on their internet but not their broadband access.

Discussion

Understanding the relationship between technology access and DI award rates could help SSA identify specific areas of the country and specific groups with lower-than-expected DI applications because of limited broadband access. In our analysis using multiple data sources, we find a negative relationship between DI award rates and computer, internet, and broadband access—that is, counties with a high proportion of DI beneficiaries have less access to computers, the internet, and broadband than those with fewer DI beneficiaries. Importantly, these relationships are statistically significant even after controlling for other county-level characteristics, including rural/non-rural status. Moreover, this technology gap is not limited to rural areas. Although non-rural areas may have more access to technology (e.g., computers, internet, and broadband) than rural areas, both non-rural and rural counties with high DI award rates are less likely than their counterparts with lower DI award rates to be connected.

While these findings could help SSA better target the DI program and services to improve the effectiveness of DI benefits in boosting economic and physical well-being, it is important to note that our findings likely understate the problem. First, our findings have emphasized DI beneficiaries. However, there are many Americans with disabilities who either do not file for or are ineligible for DI benefits. Across all counties in 2020, the average DI rate was only 3.9 percent while the average disability rate was 16.0 percent (not shown).[15] Many of those with disabilities have similar needs and face similar barriers as DI beneficiaries. Importantly, we find similar relationships between disability rates and computer, internet, and broadband access as those we describe and show for DI award rates. Second, while the push for increasing broadband minimum speeds to improve Americans' ability to learn, work, and connect with the world is laudable, a large percentage of counties currently have no providers offering internet plans of 100 Mbps. Not surprisingly, these counties tend to be the same ones that we identified as at risk of being left out of technology.

There are three main caveats of our approach. First, we do not know how each DI recipient *applied* for benefits, at the individual or county level. SSA publishes data on the total number and share of DI applications filed via the internet, but the data are not publicly available at detailed geographic levels. The share of people who applied for DI via the internet rose from about 40 percent in 2012 to around 50 percent in 2015 when it fluctuated between 50 percent and

[15] Authors' calculations using the merged data described in the data section.

60 percent. Unsurprisingly, the share of online applications shot up at the beginning of the COVD-19 pandemic—reaching 60 percent—and has remained at those higher levels since. Second, many law firms and other organizations assist people in applying for and receiving DI benefits. We do not know if SSA tracks this kind of support or whether such applications are recorded differently in SSA records. That kind of assistance would impact the individual in-person/online application process and potentially the decision to apply for benefits. Finally, because we are measuring data at the county level, we cannot evaluate whether and how individual distances to SSA offices might impact DI application decisions. Conceptually, such an analysis would be possible by combining SSA administrative beneficiary address data with SSA office data, along with data on transportation access and routes.

Conclusion

We have explored the relationship between county-level DI award rates and access to the internet. Closing the existing "broadband gap" can be one way to help close access and equity gaps between different parts of the country, particularly rural and urban areas. Providing high-speed internet to millions of additional people has the possibility of unleashing greater flexibility, worker productivity, and financial freedom, in addition to greater access to health care and government programs and services, including the DI program. Our results provide some evidence of where these gaps exist in the country, which we hope are useful to SSA and other government agencies in their efforts to provide better and more efficient programs and services to people and communities in need.

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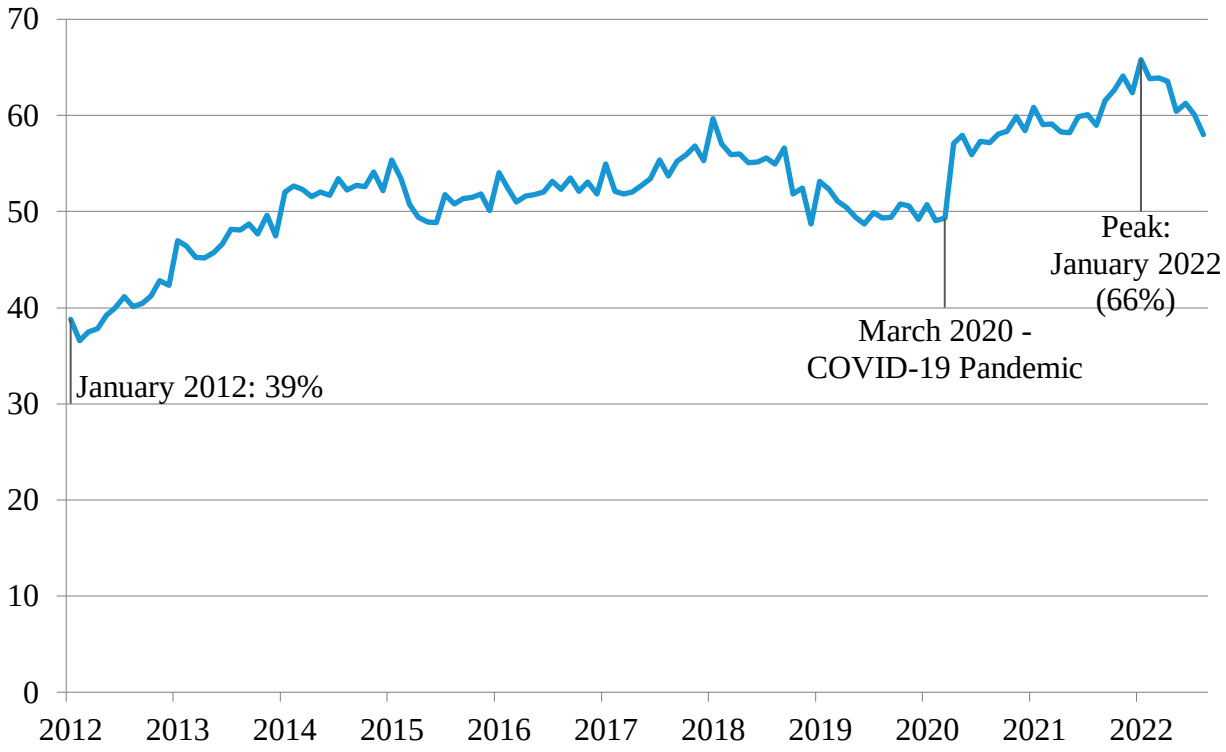
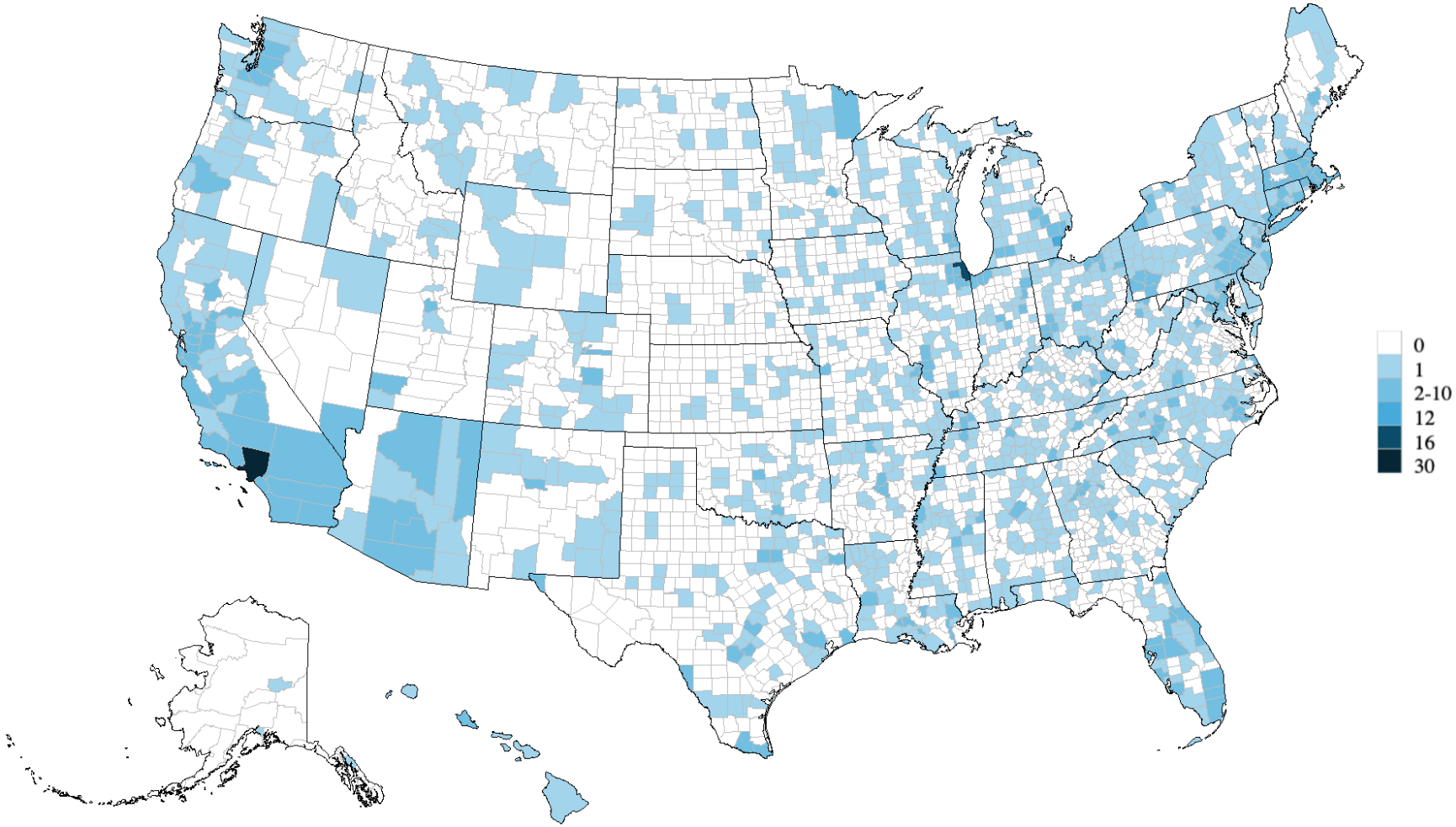
Figure 1. *Percentage of DI Awards Filed via the Internet, 2012-2022*



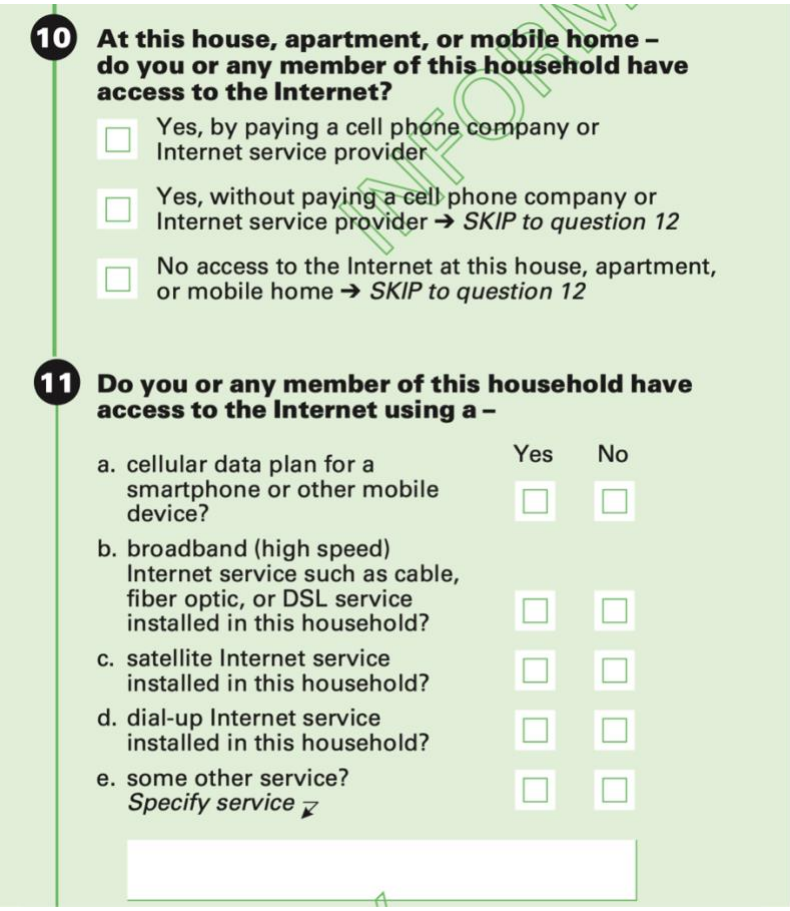
Source: Social Security Administration (2022).

Figure 2. *County-Level Distribution of the Number of SSA Offices, 2022*



Notes: This file includes the addresses of SSA field offices and resident stations. We used a crosswalk to identify the county for each zip code. In cases where zip codes cross county lines, we assign the SSA office or resident station to all the counties for that zip code.
Source: Social Security Administration. 2022. "Data for Field Office & Resident Station Information for Application Developers." Available here: https://www.ssa.gov/open/data/FO-RS-Address-Open-Close-Time-App-Devs.html.

Figure 3. *Questions on Internet and Broadband Access from the American Community Survey*



10 **At this house, apartment, or mobile home – do you or any member of this household have access to the Internet?**

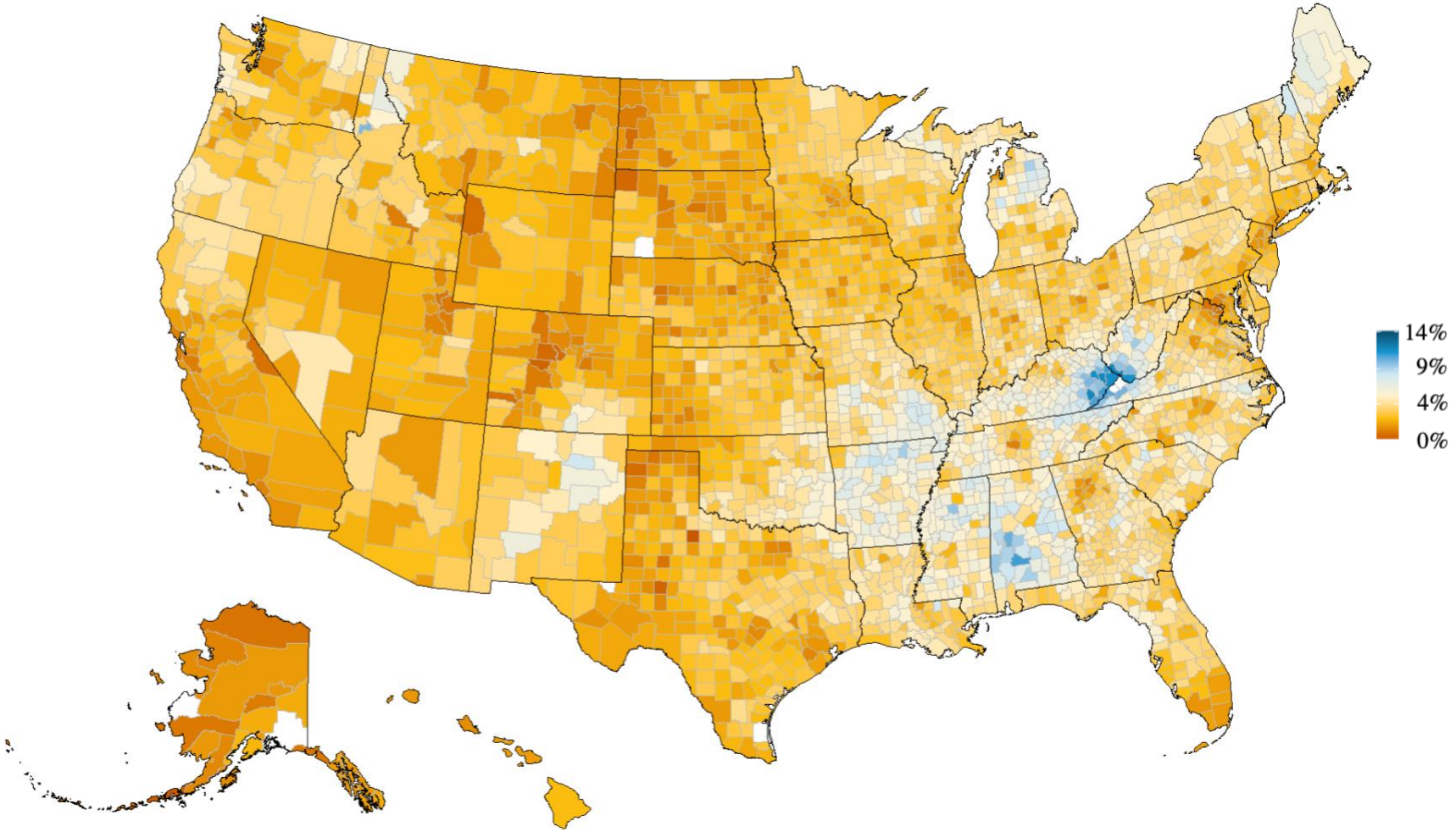
- ☐ Yes, by paying a cell phone company or Internet service provider
- ☐ Yes, without paying a cell phone company or Internet service provider ➔ *SKIP to question 12*
- ☐ No access to the Internet at this house, apartment, or mobile home ➔ *SKIP to question 12*

11 **Do you or any member of this household have access to the Internet using a –**

	Yes	No
a. cellular data plan for a smartphone or other mobile device?	☐	☐
b. broadband (high speed) Internet service such as cable, fiber optic, or DSL service installed in this household?	☐	☐
c. satellite Internet service installed in this household?	☐	☐
d. dial-up Internet service installed in this household?	☐	☐
e. some other service? *Specify service*	☐	☐

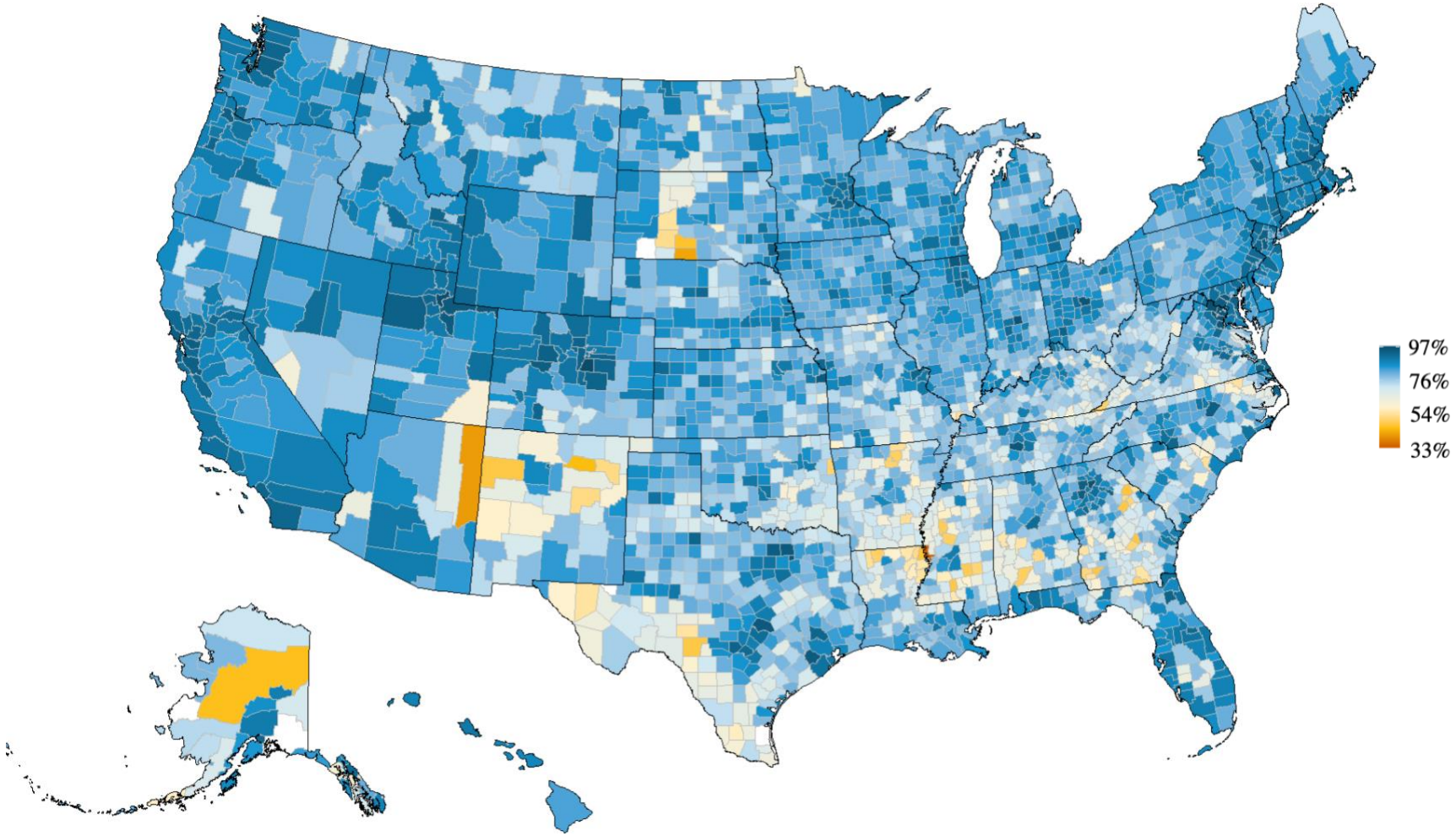
Source: American Community Survey.

Figure 4. *County-Level DI Award Rates, 2020*



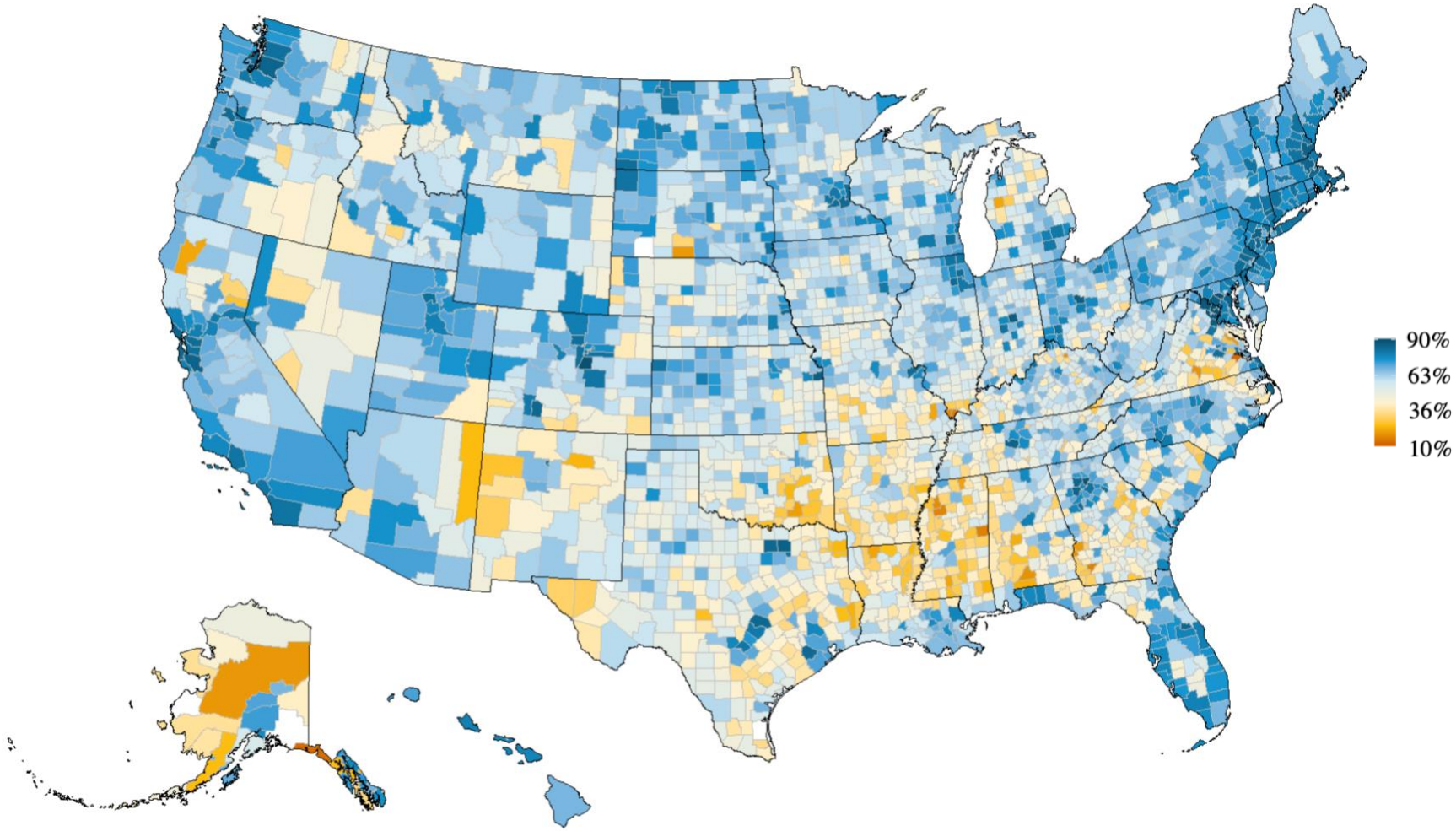
Source: Authors' calculations using merged data.

Figure 5. *County-Level Internet Access Rates, 2020*



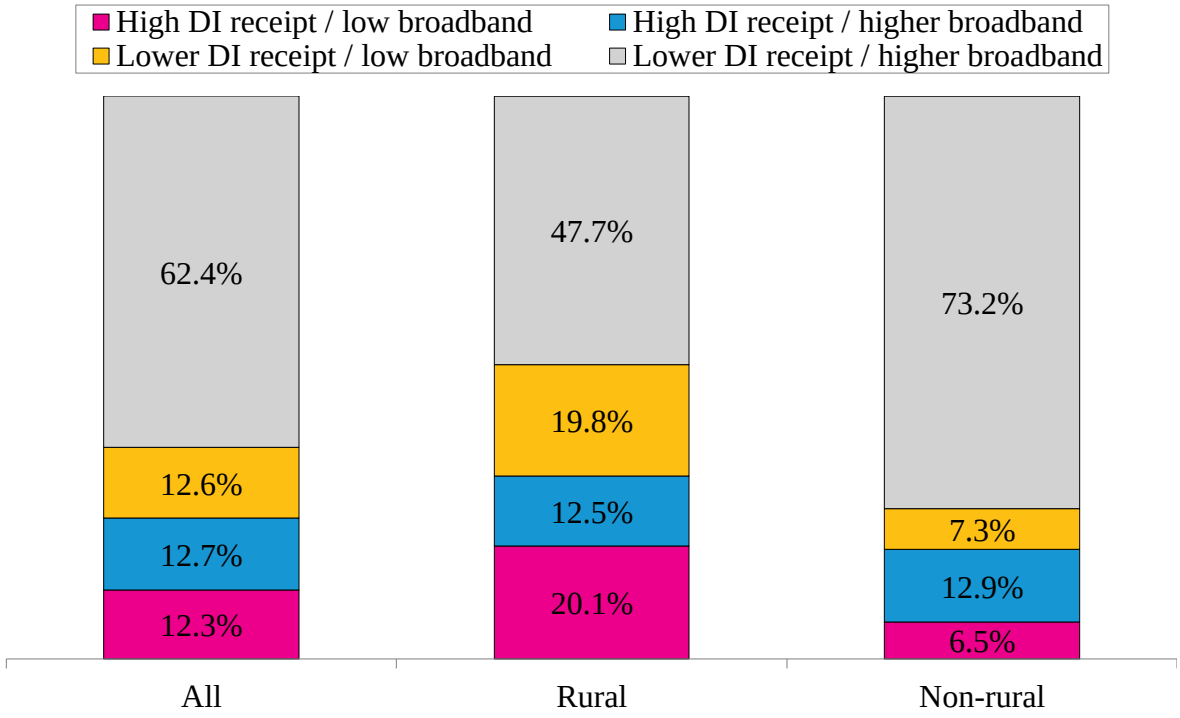
Source: Authors' calculations using merged data.

Figure 6. *County-Level Broadband Access Rates, 2020*



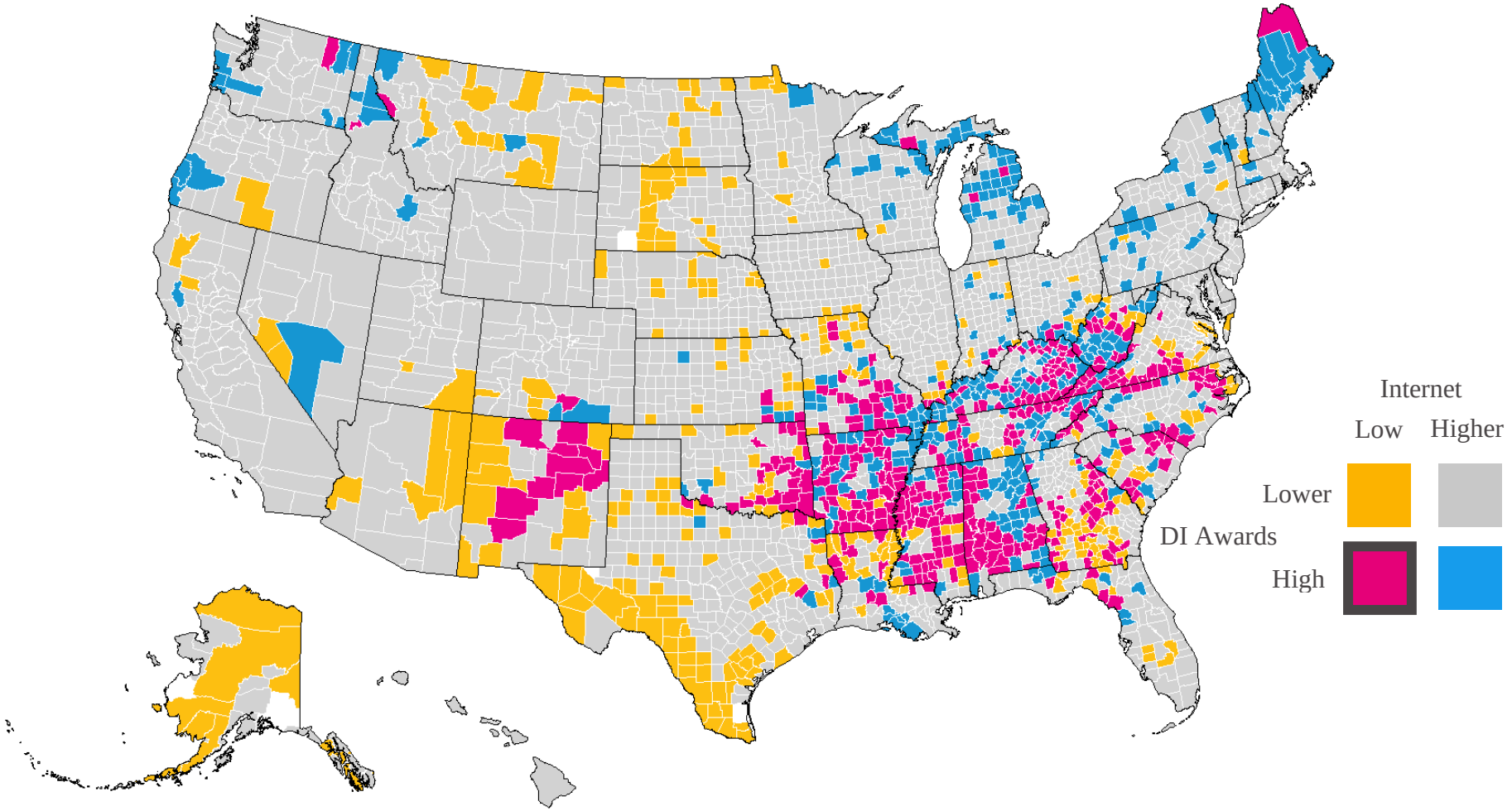
Source: Authors' calculations using merged data.

Figure 7. *Distribution of Counties by DI Receipt and Broadband Access and by Urbanization, 2020*



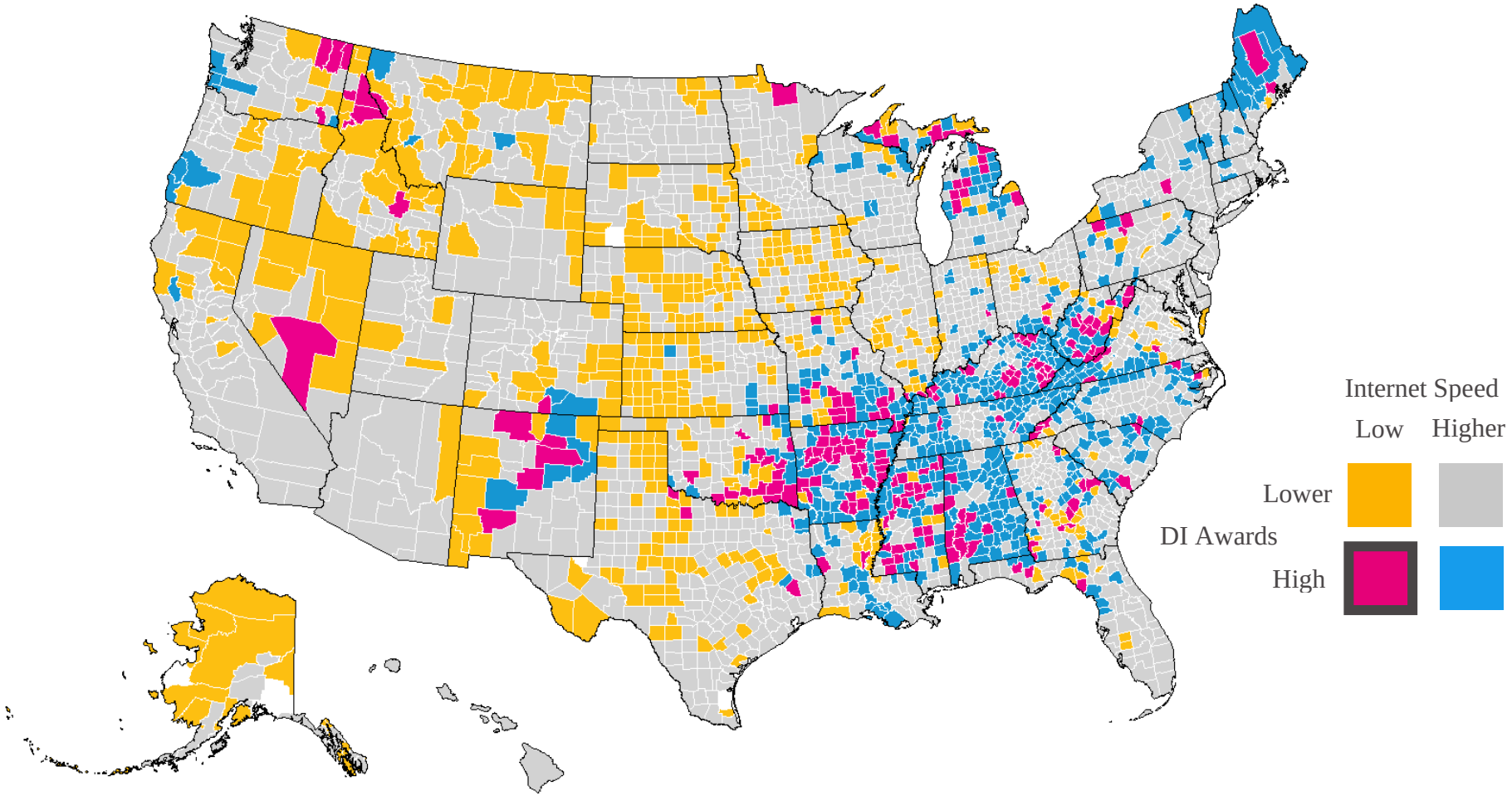
Note: DI awards rates are high if they are in the top quartile of the distribution and lower otherwise. Broadband access rates are low if they are in the bottom quartile of the distribution and higher otherwise.
Source: Authors' calculations using merged data.

Figure 8. *County-Level Internet Access Rates by DI Award Rates, 2020*



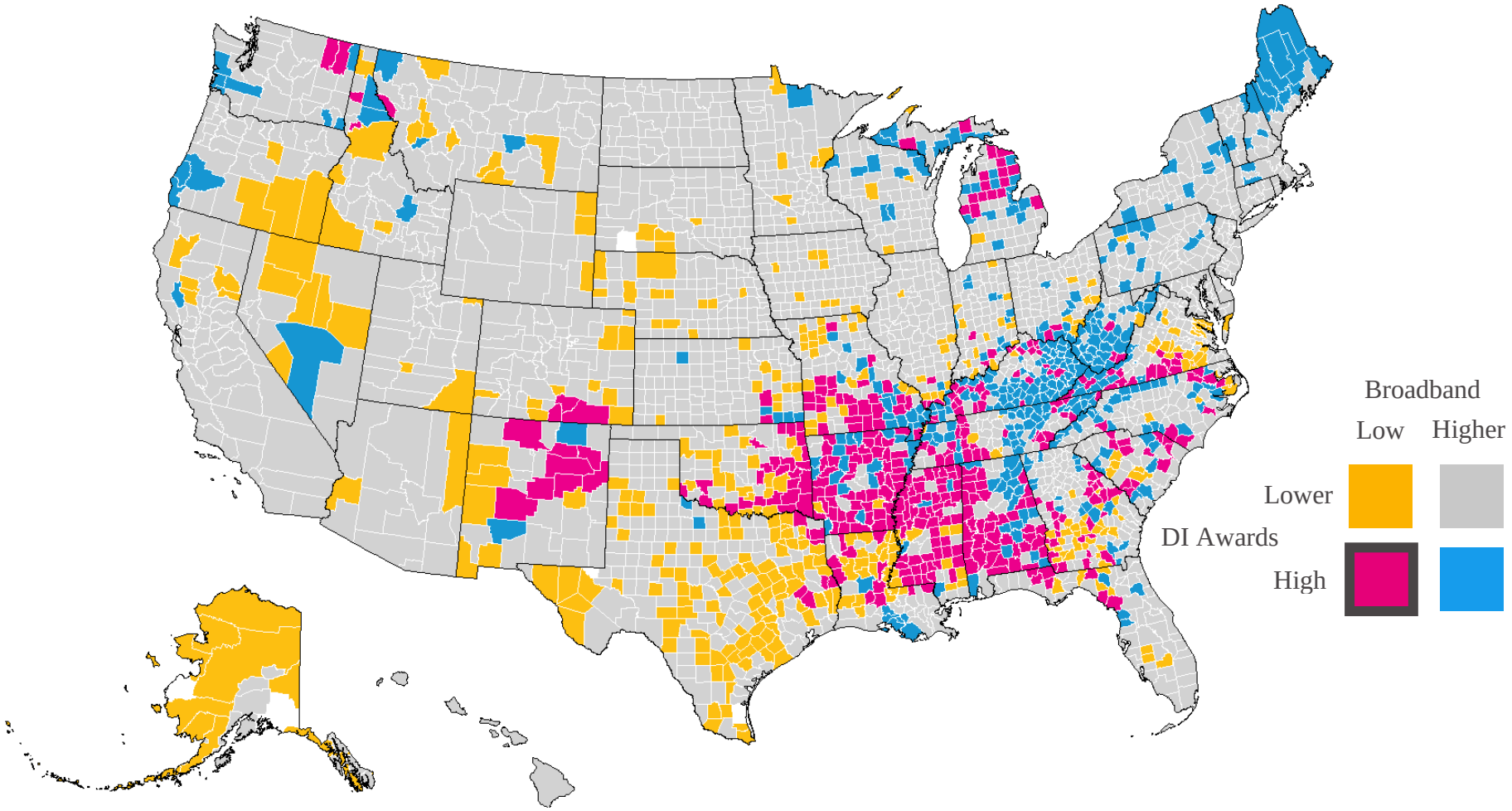
Note: DI award rates are high if they are in the top quartile of the distribution and lower otherwise. Internet access rates are low if they are in the bottom quartile of the distribution and higher otherwise.
Source: Authors' calculations using merged data.

Figure 9. *County-Level Average Internet Speeds by DI Award Rates, 2020*



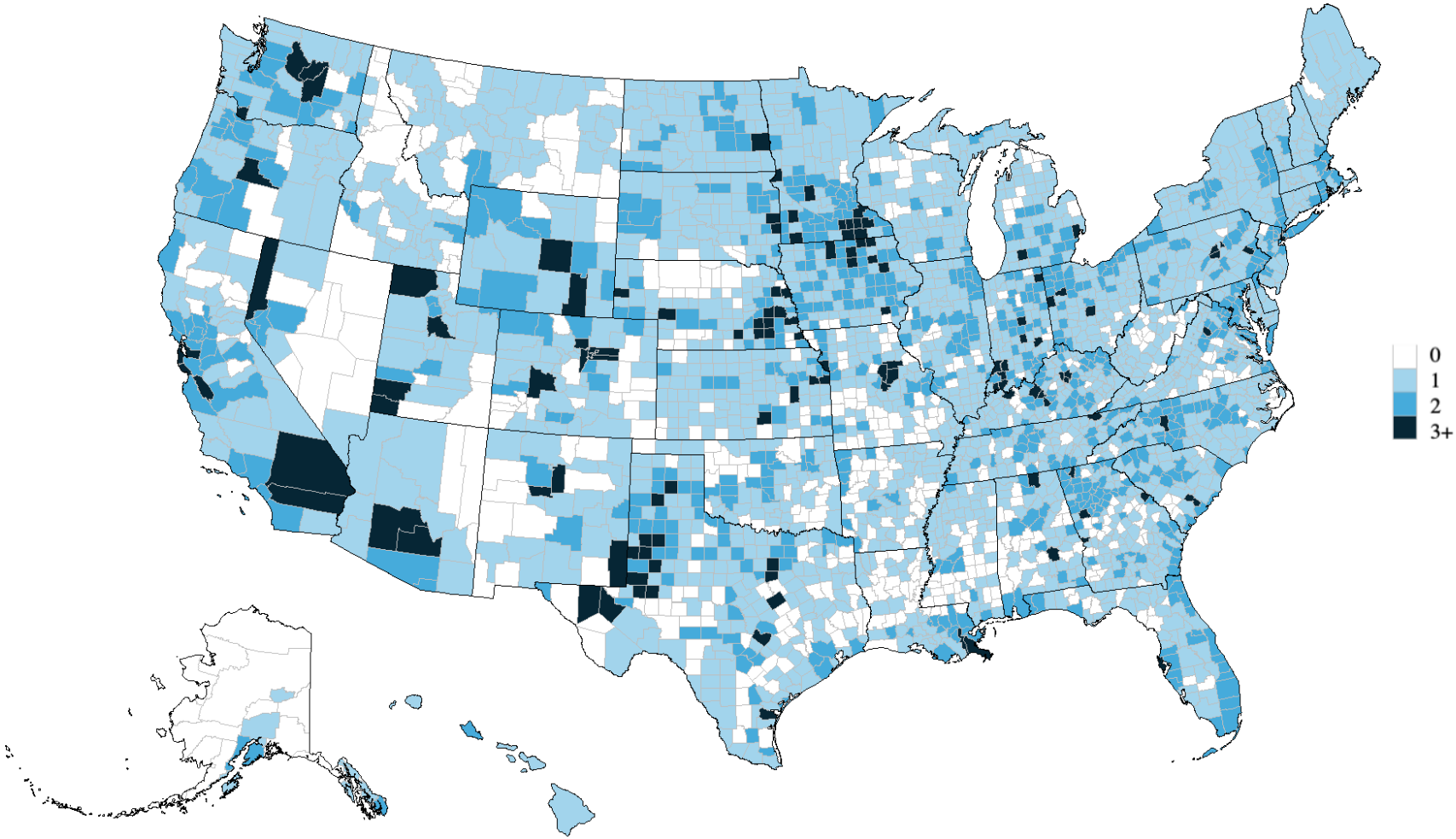
Note: DI award rates are high if they are in the top quartile of the distribution and lower otherwise. Internet speeds are low if they are in the bottom quartile of the distribution and higher otherwise.
Source: Authors' calculations using merged data.

Figure 10. *County-Level Broadband Access Rates by DI Award Rates, 2020*



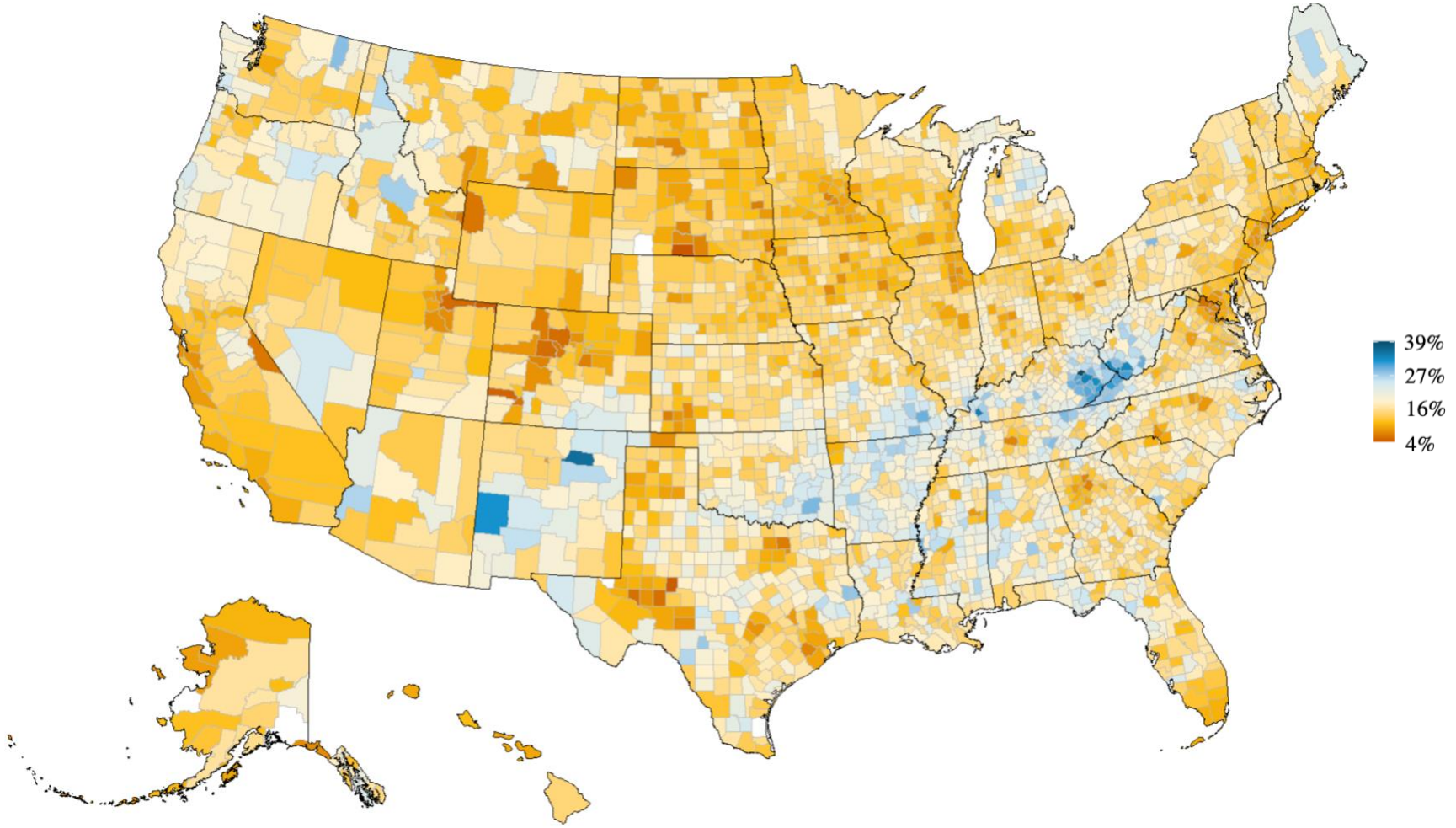
Note: DI award rates are high if they are in the top quartile of the distribution and lower otherwise. Broadband access rates are low if they are in the bottom quartile of the distribution and higher otherwise.
Source: Authors' calculations using merged data.

Figure 11. *County-Level Maximum Number of Broadband Providers Offering Plans of 100 Mbps, 2020*



Source: Authors' calculations using merged data.

Figure 12. *County-Level Disability Rates, 2020*



Source: Authors' calculations using merged data.

Table 1. *County-Level Computer, Internet, and Broadband Characteristics in 2020, by Areas with High and Lower Rates of DI Receipt and Disability*

	High DI Receipt Counties	Lower DI Receipt Counties	Diff	High Disability Counties	Lower Disability Counties	Diff
Type of Computer (%)						
No computer	16.8	11.1	5.8	16.4	11.2	5.2
Smartphone only	13.5	9.6	3.8	13.1	9.7	3.4
Internet Access (%)	73.0	81.0	-8.0	73.4	80.9	-7.6
Type of Internet Subscription (%)						
Satellite	10.1	9.4	0.7	10.8	9.2	1.7
Cellular data plan only	16.3	13.1	3.2	15.9	13.2	2.7
Broadband	48.3	60.5	-12.2	48.3	60.5	-12.2
Internet Speed and Cost						
Average speed (Mbps)	35.6	45.7	-10.2	34.2	46.2	-12.0
Average monthly cost ($)	58.1	59.0	-0.9	60.1	58.3	1.8
Providers offering 25 Mbps (%)						
Zero	0.0	0.4	-0.4	0.0	0.3	-0.3
One	0.0	0.3	-0.3	0.1	0.2	-0.1
Two	14.2	6.9	7.3	14.8	6.7	8.1
Three+	85.8	92.4	-6.6	85.1	92.7	-7.7
Providers offering 100 Mbps (%)						
Zero	31.8	21.3	10.5	35.3	20.0	15.3
One	51.1	45.6	5.5	48.8	46.4	2.4
Two	15.4	26.3	-10.9	14.2	26.8	-12.5
Three+	1.7	6.8	-5.1	1.7	6.9	-5.2

Note: DI receipt and disability rates are high if they are in the top quartile of the distribution and lower otherwise.
Source: Authors' calculations using merged data.

Table 2. *Regression Coefficients for Indicators of High DI Receipt and High Disability Counties in 2020, by Models with and without Other County-Level Controls*

	Difference Between High and Lower DI Receipt Counties		Difference Between High and Lower Disability Counties	
	No Controls	Controls	No Controls	Controls
Type of Computer (%)				
No computer	0.058***	0.007***	0.052***	0.004*
Smartphone only	0.038***	0.009***	0.034***	0.008***
Internet Access (%)	-0.080***	-0.012***	-0.076***	-0.009***
Type of Internet Subscription (%)				
Satellite	0.007***	-0.002	0.017***	0.008***
Cellular data plan only	0.032***	0.010***	0.027***	0.009***
Broadband	-0.122***	-0.021***	-0.122***	-0.024***
Internet Speed and Cost				
Average speed (Mbps)	-10.172***	0.699	-12.009***	0.837
Average monthly cost ($)	-0.878	-2.244***	1.788**	-1.421
Providers offering 25 Mbps (%)				
Zero	-0.004***	0.004**	-0.003***	0.000
One	-0.003***	0.001	-0.001	0.001
Two	0.073***	0.020***	0.081***	0.026***
Three+	-0.066***	-0.025***	-0.077***	-0.026***
Providers offering 100 Mbps (%)				
Zero	0.105***	0.024*	0.153***	0.058***
One	0.055***	0.018	0.024**	-0.032***
Two	-0.109***	-0.038***	-0.125***	-0.027***
Three+	-0.051***	-0.004	-0.052***	0.001

Source: Authors' estimations using merged data.

Table 3. *County-Level Computer, Internet, and Broadband Characteristics in 2020, by Areas with High and Lower Rates of DI Receipt and Disability and by Urbanization*

	Rural			Non-Rural			Rural			Non-Rural		
	High DI Receipt Counties	Lower DI Receipt Counties	Diff	High DI Receipt Counties	Lower DI Receipt Counties	Diff	High Disability Counties	Lower Disability Counties	Diff	High Disability Counties	Lower Disability Counties	Diff
Type of Computer (%)												
No computer	18.3	13.6	4.6	15.0	9.5	5.6	17.4	13.8	3.7	14.6	9.8	4.8
Smartphone only	13.8	10.6	3.2	13.1	9.0	4.0	13.2	10.7	2.6	12.9	9.2	3.7
Internet Access (%)	71.2	77.2	-6.0	75.2	83.4	-8.1	72.1	77.2	-5.2	75.7	83.0	-7.3
Type of Internet Subscription (%)												
Satellite	11.1	10.7	0.4	8.9	8.6	0.3	11.4	10.5	0.9	9.8	8.4	1.4
Cellular data plan only	16.9	14.0	2.9	15.4	12.5	2.9	16.2	14.2	1.9	15.4	12.6	2.7
Broadband	44.7	54.0	-9.3	52.7	64.5	-11.8	46.1	54.0	-7.9	52.2	64.1	-11.9
Internet Speed and Cost												
Average speed (Mbps)	31.0	31.3	-0.4	41.2	54.5	-13.3	30.1	31.9	-1.9	41.4	53.9	-12.5
Average monthly cost ($)	59.6	64.5	-4.9	56.3	55.7	0.6	61.7	63.6	-1.9	57.3	55.5	1.8
Providers offering 25 Mbps (%)												
Zero	0.0	0.9	-0.9	0.0	0.0	0.0	0.1	1.0	-0.9	0.0	0.0	0.0
One	0.0	0.6	-0.6	0.0	0.1	-0.1	0.2	0.6	-0.3	0.0	0.1	-0.1
Two	17.8	11.1	6.7	9.7	4.3	5.4	17.6	10.7	6.9	9.9	4.5	5.4
Three+	82.2	87.3	-5.1	90.3	95.6	-5.3	82.2	87.8	-5.7	90.1	95.4	-5.3
Providers offering 100 Mbps (%)												
Zero	39.9	33.0	6.9	21.7	14.1	7.7	41.7	31.3	10.4	24.2	13.9	10.4
One	48.0	47.5	0.5	54.9	44.4	10.5	46.2	48.5	-2.3	53.3	45.2	8.1
Two	11.1	16.6	-5.4	20.6	32.3	-11.8	11.1	17.1	-6.0	19.7	32.0	-12.3
Three+	1.0	3.0	-2.0	2.7	9.2	-6.4	1.1	3.1	-2.1	2.8	8.9	-6.1

Note: DI receipt and disability rates are high if they are in the top quartile of the distribution and lower otherwise.
Source: Authors' calculations using merged data.

Table 4. *Regression Coefficients for Indicators of High DI Receipt and High Disability Counties in 2020, by Models Distinguishing Between Urbanization and With and Without Other County-Level Controls*

	Difference Between High and Lower DI Receipt Counties				Difference Between High and Lower Disability Counties			
	No Controls		Controls		No Controls		Controls	
	Rural	Non-Rural	Rural	Non-Rural	Rural	Non-Rural	Rural	Non-Rural
Type of Computer (%)								
No computer	0.046***	0.056***	0.007*	0.008***	0.037***	0.048***	0.004	0.003
Smartphone only	0.032***	0.040***	0.007**	0.008***	0.026***	0.037***	0.007***	0.008***
Internet Access (%)	-0.060***	-0.081***	-0.009*	-0.013***	-0.052***	-0.073***	-0.008**	-0.009**
Type of Internet Subscription (%)								
Satellite	0.004	0.003	-0.000	-0.007***	0.009***	0.014***	0.008**	0.007**
Cellular data plan only	0.029***	0.029***	0.013***	0.004	0.019***	0.027***	0.010**	0.007*
Broadband	-0.093***	-0.118***	-0.022***	-0.012*	-0.079***	-0.119***	-0.023***	-0.024***
Internet Speed and Cost								
Average speed (Mbps)	-0.387	-13.278***	1.010	1.193	-1.870*	-12.535***	-0.651	2.216
Average monthly cost ($)	-4.888***	0.568	-3.057**	-0.907	-1.852	1.767*	-0.768	-1.556
Providers offering 25 Mbps (%)								
Zero	-0.009***	-0.000	0.004	0.000	-0.009***	-0.000	0.001	0.000
One	-0.006***	-0.001	0.000	0.001	-0.003	-0.001	0.003	-0.000
Two	0.067***	0.054***	0.030**	0.014*	0.069***	0.054***	0.036***	0.012
Three+	-0.051***	-0.053***	-0.034***	-0.016*	-0.057***	-0.053***	-0.040***	-0.012
Providers offering 100 Mbps (%)								
Zero	0.069***	0.077***	0.056***	-0.007	0.104***	0.104***	0.085***	0.027*
One	0.005	0.105***	0.004	0.045***	-0.023*	0.081***	-0.034**	-0.019
Two	-0.054***	-0.118***	-0.051***	-0.034**	-0.060***	-0.123***	-0.041***	-0.017
Three+	-0.020***	-0.064***	-0.010**	-0.004	-0.021***	-0.061***	-0.010***	0.009

Source: Authors' estimations using merged data.

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