Focusing on Affordability

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Focusing on Affordability:

What Broadband Adoption Rates in Cities Tell Us About Getting More People Online

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With a proposal to spend $100 billion to ensure that all Americans have affordable and reliable internet service, the Biden Administration has made closing the digital divide a huge priority. Much remains to be done to fill in the specifics of what this means, but two types of policy tools come to mind when thinking about how to address the digital divide.

Top of mind is promoting competition. Fostering competition means investing in new infrastructure, thereby giving consumers more choice for very high-speed service. This competitive alternative would lower prices to consumers and put subscription service within reach of more households. Research shows (https://www.benton.org/sites/default/files/BBA_full_F5_10.30.pdf) that just 55% of U.S. households have two or more wireline service offering for very high-speed internet service, so encouraging development of another network alternative has obvious appeal.

An alternative tool is providing a subsidy. A subsidy tackles affordability more directly by offering cost relief to households who currently lack the means to subscribe to service. Since research shows that affordability of service (https://www.pewresearch.org/internet/2019/06/13/mobile-technology-and-home-broadband-2019/) is the chief reason households do not subscribe to broadband, easing cost pressure through a subsidy is an attractive approach.

Spoiler alert: This article will explore whether the presence of competition helps to explain adoption rates across U.S. cities, as well as other socio-economic factors that may matter. There is a positive correlation between the presence of fiber competitor to cable and home broadband adoption, but it is modest in magnitude. Cities' poverty rates and degree of residential segregation have larger (and negative) correlations with home broadband adoption. This suggest that, as policymakers aim at the goal of affordable and reliable internet for all Americans, they will have to rely on both competition and subsidies as policy levers.

Fiber Networks, Competition, and Adoptions Rates

Developments in the market for home internet service in the past decade offer some clues on how competition may boost home broadband subscribership. Households in a number of cities already experience competition between an incumbent cable provider and a fiber optic service provider (such as Verizon FiOS or Google Fiber). Many other urban areas have only a cable provider; competitive choice is limited to a telephone company's digital subscriber line (DSL) service, whose speeds often do not meet the Federal Communications Commission's (FCC) 25 Megabits per second threshold for broadband service and do not approach the speeds of cable or fiber. Wireless data plans are another option, though monthly data caps can limit their usefulness for some applications, particularly two-way video.

Do adoption rates differ in cities with a cable-fiber market structure compared to those with cable-DSL markets? Data from the American Community Survey (ACS) and BroadbandNow (https://broadbandnow.com/research/fcc-underestimates-unserved-by-50-percent) help in addressing that question. ACS provides information on cities' wireline broadband adoption rates, as well as other city characteristics (e.g., poverty rates, household incomes, racial/ethnic composition, and levels of education attainment). For competition, BroadbandNow has data on the share of households in cities covered by specific broadband technologies (e.g., fiber, cable, DSL).

The table below shows how adoption rates differ, overall and by household income category, when looking at four cable-DSL cities and four cable-fiber cities. Each of the fiber cities have 80% or more households with fiber service available.

WIRELINE BROADBAND – 8 CITIES (2019 1-YEAR AMERICAN COMMUNITY SURVEY DATA)						
Cable-DSL	ALL	<$25k	$25k-$50k	$50k-$75K	$75k-$150k	>$150K
Baltimore	58.7%	31.8%	52.3%	59.6%	84.6%	84.8%
Detroit	55.1%	39.8%	53.5%	73.0%	76.6%	83.4%
Columbus	77.4%	51.9%	71.0%	84.0%	90.6%	92.4%
Boston	78.1%	53.2%	72.3%	76.3%	87.5%	93.6%
Average	67.3%	44.2%	62.3%	73.2%	84.8%	88.6%
Cable-Fiber	ALL	<$25k	$25k-$50k	$50k-$75K	$75k-$150k	>$150K
Austin	77.6%	49.7%	70.1%	76.7%	87.2%	92.0%
Kansas City, MO	69.5%	41.8%	64.0%	77.5%	83.8%	91.2%
Newark	58.2%	41.0%	52.9%	76.4%	74.0%	84.9%
Tampa	75.7%	42.9%	74.2%	66.8%	80.3%	91.3%
Average	70.3%	43.9%	65.3%	74.4%	81.3%	89.9%

Cities with a fiber operator competing with cable have higher broadband adoption rates for wireline internet service at home – by about 3 percentage points when looking at a handful of examples. The table also indicates that, for poor households, adoption rates for wireline service are about the same in areas with a robust network alternative compared to the places where DSL is the alternative. This result may not be a surprise. Price is only one possible feature on which providers might compete; rather, a new entrant may drive carriers to compete on network speed or reliability. It is also possible that price competition may not result in price decreases of sufficient magnitude to address affordability for very poor households (or at least very many of them).

The results for a small sample of cities are only suggestive. More persuasive evidence requires a larger sample and for that I assembled data on the 105 largest cities in the United States. I modeled wireline adoption as a function of whether a city had more than 80% household coverage with a high-speed (i.e., fiber) option, as well as poverty rates, share of households in various categories of educational attainment, the share of the population that is white and African American, and the share of population over the age of 65. Statistical analysis showed that cities with a high-speed network alternative to cable service had home wireline adoption rates that were ***2.5% percentage*** points higher than they otherwise would be – while controlling for other factors noted. This difference, while significant statistically, is not that great.

Poverty and Residential Segregation Help Explain Adoption Differences Across Cities

Two other factors stand out both for their significance and how their link to adoption rates. One is poverty. Across the 105 cities used for analysis, the average poverty rate for 2019 was 15.6%. Among cities whose poverty rates exceed 20%, the wireline broadband subscription rate was 63% while the figure for all other cities was 74%.

The other element is residential segregation for African Americans. Measures of residential segregation comes from the Diversity and Disparities (https://s4.ad.brown.edu/projects/diversity/segregation2010/Default.aspx) project at Brown University. A residential segregation figure of 50 (comparing Black and white households) means that 50% of Black households in a city would have to move in order for the racial composition of all city neighborhoods to reflect the racial composition of the entire city. A score of 60 or above is considered a sign of very severe residential segregation and, for those cities, broadband adoption is 67.1%. For all other cities, the figure is 74.1%.

Both factors – poverty and residential segregation – loom large in having strong correlations with the level of household broadband adoption in cities. In fact, they are stronger than the correlation between the presence of competition and broadband adoption. You'll win more bets on predicting a city's broadband adoption rate if you know its poverty rate than if you know only whether it has a fiber network competing with cable.

"Wireless-Only" Adoption Ticks Down in the Presence of Fiber Networks

The adoption data show another interesting pattern. Places with a competitive high-speed alternative have a *lower* incidence of households relying only on wireless data for internet access. For cities with fiber competition, 10.9% of households using wireless only to go online without any other sort of subscription compared with 12.4% for all other cities. In conjunction with the boost in wireline adoption that is associated with competition, this suggests that another high-speed network lures some wireless-only subscribers to wireline service. That may result in a more robust online experience for this new wireline subscriber. But, as the data in the table with eight cities suggests, few of these new wireline subscribers are likely to be low-income households.

What's the Right Policy Mix?

The preceding analysis suggests policymakers should think carefully about the mix of policy tools and the problems different tools might address. Promoting competition, as this analysis indicates, has a modest association with overall adoption rates. That does not mean that additional competition is not worthwhile. Drops in prices will be beneficial to all broadband consumers. Competition that sparks improvement in network speeds or reliability will similarly benefit a wide range of subscribers.

Yet changes in the market due to competition may not be enough to spark adoption among households with the lowest incomes. Entry-level broadband prices are about $65 per month; even a 20% price drop may still leave broadband out of reach for low-income households. For that reason, making service more affordable for low-income households may be a better approach. Discount internet offers have demonstrated their viability (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3431346) in increasing broadband adoption among low-income households, with some service plans charging $10 per month. Those programs are not universally available and are not the same as subsidy programs. The government's subsidy program for phone service, Lifeline, has to date attracted few broadband subscribers, which underscores the importance of program design in contemplating a subsidy program. Solving those problems and scaling new initiatives to cover all low-income communities would not be easy, but there are models to build upon.

A final issue is time horizon. The time between today's $100 billion broadband proposal and new networks serving households is four years or more. In the meantime, many low-income households will remain unconnected because they cannot afford service. If policymakers want to get more Americans online with high-speed internet connections at home, then relying on competition alone may prove insufficient. Programs that more directly address affordability offer help in the near-term for those in need.

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