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Since the advent of the Internet, the concept of the "Digital Divide," has been at the forefront of governmental policy discussions. The current president and his administration have made huge strides in working to help Americans gain access to broadband services. However, the issues of connecting Americans to high-speed Internet go further than the expansion of broadband infrastructure. With the introduction of the smartphone to the global market, the ways in which we interact with information have changed drastically. This study seeks to determine whether currently available information services are affordable to the population at large.

Headings:

Information Services

Digital Divide

Information Society

Social Sciences – Information Services

THE AFFORDABILITY OF INFORMATION SERVICE IN THE DIGITAL AGE

by
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Introduction

Since the advent of the Internet, the concept of the “Digital Divide,” the separation between those with Internet access and those without, has been at the forefront of governmental policy discussions. Even today, debates on how best to close these gaps are occurring. At the beginning of his term in office, President Barack Obama pledged to expand broadband access throughout the nation, and by the end of his first term he called on 14 government Broadband Member Agencies to accelerate broadband infrastructure deployment (Exec. Order, 2012). This is what he hoped would be the first step in bringing all residents of the United States a step closer to broadband¹ Internet access.

To date, the president’s actions have had some success. On June 6, 2013, the National Telecommunications and Information Administration (NTIA) announced that household broadband adoption had climbed to 72.4 percent, which was an increase of 5.5 percent from a July 2011 report (NTIA, 2013). Additionally, in 2012, 78 percent of the population had access to broadband speeds of 25 Mbps or greater, up from nearly 50 percent in 2010. However, the issues of connecting Americans to high-speed Internet go further than the expansion of broadband infrastructure. Purchasing a personal computer is a foreign thought to those who are struggling to even put food on their table (McGrath, 2011; Mossberger, 2012; Pearce, 2013)

¹ For the purpose of this study, broadband is taken as the most basic rates as defined by the National

Literature Review

In an ongoing effort to understand how U.S. residents interact with computers and the Internet, the U.S. Census Bureau conducts the Annual Current Population Survey (CPS). In 2011, the U.S. Census Bureau reported that of individuals with less than \$25,000 in household income, 35.6 percent had no Internet connectivity. Additionally, of individuals with less than a high school diploma, 44.9 percent had no Internet connectivity.

With the introduction of the smartphone to the global market, the ways in which we interact with information have changed drastically. In only two years, the adoption rate of smartphones in America has increased by 21 percent, from 35 percent in May 2011, to 56 percent in May of 2013 (Smith, 2013). Each year saw a rise in subscribership of approximately 10 percent. Recent studies showed nearly two-thirds of Black (Non-Hispanic) and Hispanic cellphone owners using their mobile devices for the Internet, compared to slightly more than half of White (Non-Hispanic) cellphone owners (Lipsman, Aquino, 2013; Smith, 2012). For these same users, this number is up about 20% from studies conducted three years ago. Half of Black (Non-Hispanic) users who use their smartphone for the Internet do most of their online browsing on their phones, compared to two-fifths of Hispanics and one-fourth of Whites surveyed (Lipsman, Aquino, Flosi, 2013; Smith, 2012). However, when compared to the U.S. average, Hispanics are less likely to have access to Internet at home (Yelton, 2012; Sanchez, 2012). There are those who argue that ensuring individuals access to the Internet and the technology to access it in a structured environment will lead to a drastic reduction in the digital divide (Cotten, 2006; Boyera, 2007; Figueiredo, 2012).

While some may think of broadband access and Internet access in general, as a luxury,

others consider it a necessity (Facebook, 2013; Harris, 2013; Kuilema, 2012; Reamer, 2013). Today, the number of activities the average person engages in through the Internet, both business and personal, are astounding, and the importance of broadband does not seem to be dwindling. However, broadband is still mostly prevalent in wealthy, well-educated, White (Non-Hispanic) communities (Warf, 2012). These are but a few of the issues stemming from the Digital Divide.

Methodology

This study used a quantitative research design to determine whether currently available information services are affordable to the population at large. In order to determine affordability of information services, a combination of publically available data was collected from the U.S. Census Bureau's 2012 American Community Survey,² information service provider websites,³ the Wall Street Journal's Wireless Savings Calculator,⁴ the National Broadband Map,⁵ and the Massachusetts Institute of Technology's Living Wage Calculator.⁶

The focuses of this research are 30 metropolitan statistical areas chosen by their rates of poverty as of the 2012 5-Year American Community Survey. The metropolitan areas were broken up into three sets of ten with the first group representing the highest rates of poverty, the second group representing the ten metropolitan areas in the median of poverty rates, and the final group representing the areas with the lowest rates of

² Census Bureau data retrieved from: <https://www.census.gov/acs/www/>

³ Information Service data retrieved from: <http://www.timewarnercable.com/en/internet/internet-service-plans.html>, <http://www.verizon.com/home/fios-fastest-internet/>, <http://www.comcast.com/>, <http://www.att.com/shop/internet.html>

⁴ Wireless Savings Calculator data retrieved from: <http://graphics.wsj.com/PhonePlan/?mg=inert-wsj>

⁵ National Broadband Map data retrieved from: <http://www.broadbandmap.gov/>

⁶ Living Wage Calculator data retrieved from: <http://livingwage.mit.edu/>

poverty. Affordability of information services is decided for these groups by comparing the living wage of each metropolitan population against median household income for each area, and determining whether the remaining income is enough to cover average information service cost. Furthermore, this study looks at family household makeups in order to determine who might be affected the most by high costs of information service.

In order to represent the income elasticity of metropolitan populations in this study more accurately, median household income was calculated through measuring median family income by family size,⁷ against households and family makeup.⁸ Using these measures allowed for focusing on four common household types, Married-couple family households with children under 18 years, single parent father run households with children under 18 years, single parent mother run households with children under 18 years, and nonfamily households with no children under 18 years.

In order to determine living income thresholds, information was collected from the Living Wage Calculator (LWC), created by Dr. Amy K. Glasmeier, Department Head of the Urban Studies and Planning program at the Massachusetts Institute of Technology (Glasmeier, 2013). The LWC determines the necessary income needed to meet the minimum standards of living. In order to determine these standards, the LWC gathers federal, state, and regional data on the costs associated with food, child-care, healthcare, housing, transportation, other necessities, and taxes, for counties and Census places in the United States.

To compare wireless and broadband costs, this study looks at standard packages

⁷ Collected from the 2012 5-Year American Community Survey B19119 Median Family Income in the Past 12 Months (In 2012 Inflation-Adjusted Dollars) By Family Size

⁸ Collected from the 2012 5-Year American Community Survey S1101 Households and Families

offered by four of the largest Internet service providers⁹, and four of the largest wireless service providers¹⁰, in terms of customers and coverage area. In order to account for households with more than one adult requiring phone or Internet access, total average smartphone and broadband costs include the price of two smartphone plans or two basic phone plans¹¹. For wireless services, data was gathered on two-year contracts for new phone lines with plans including unlimited minutes, unlimited text messages, and one Gigabyte of data, as these represented the most common wireless package plans. Three of the four wireless service providers offer subsidized plans in which a new customer can purchase a newly released phone at a subsidized cost or choose an older model phone at no cost. As such, the data collected on three of the wireless service providers does not include the cost of a phone in the two-year total cost. For broadband Internet service packages, data was gathered on two-year contracts for the equivalent of a standard broadband Internet package,¹² costs to purchase or rent a modem, the cost of an affordable home computer,¹³ and the cost of two basic phones and monthly prepay plans.¹⁴

Findings and Discussion

Out of the four wireless providers, the price for two years of service for two lines with unlimited minutes and texts, as well as one Gigabit of data, ranged from a low of \$1,944

⁹ The Internet service providers are: Time Warner Cable, Comcast Xfinity, AT&T, and Verizon FiOS

¹⁰ The wireless service providers are: AT&T, T-Mobile, Sprint, and Verizon Wireless

¹¹ For this study, it is assumed that customers who choose broadband over smartphones will still seek out an affordable basic phone

¹² Standard broadband packages ranged from 15 Mbps to 25 Mbps download speeds, however, they were chosen for their relative pricing

¹³ Dell Inspiron 15" Non-Touch Laptop Computer Retailing at \$300

¹⁴ The four wireless providers used for this study also offer basic phones and monthly plans through the companies: AT&T Aio Wireless, Sprint Boost Mobile, T-Mobile MetroPCS, and Verizon ALLSET

with AT&T, and a high of \$3,700 with T-Mobile. When looking at the four broadband providers, the price for two years of service and two basic prepay phones ranged from a low of \$3,590 with Time Warner Cable, to a high of \$3,866 with Verizon FiOS.¹⁵

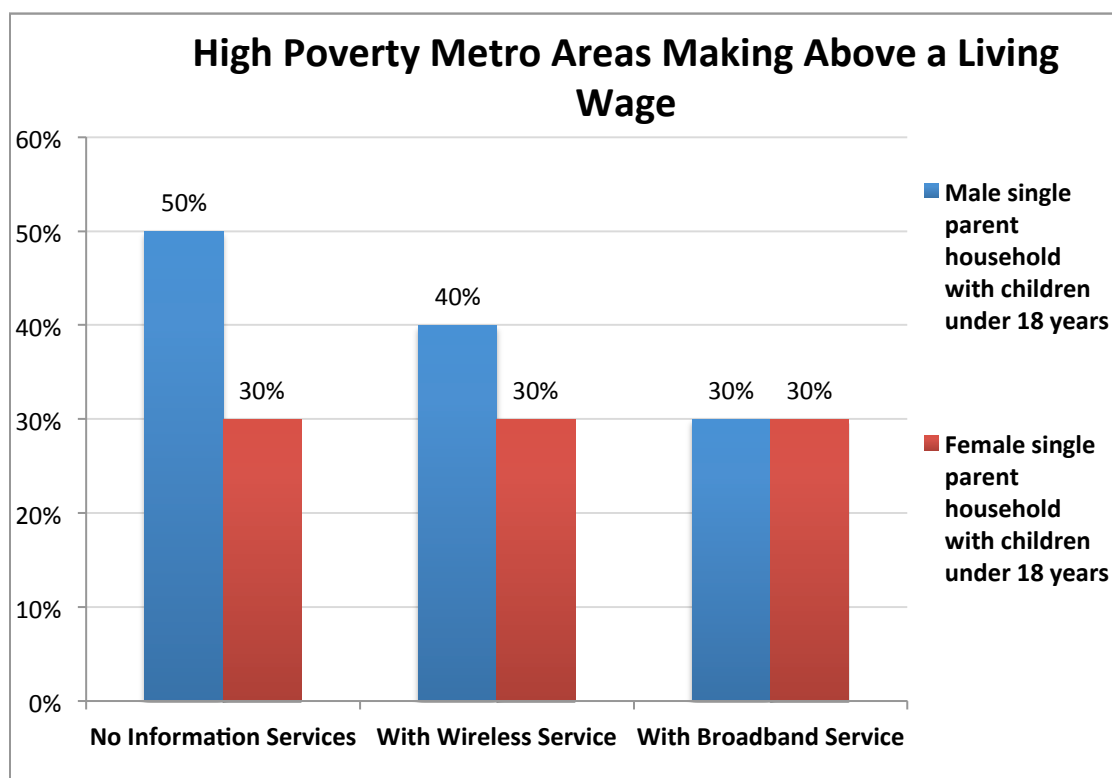


Figure 2: High Poverty Metro Areas Making Above a Living Wage

One of the most significant findings from this study is the majority of single parent households in high poverty areas are unable to afford information services. Before information services are taken into account, in high poverty metro areas, only 50 percent of male run single parent households are making equal to or above a living wage. However, as seen in Figure 2, female run single parent households fare worse at only 30% making equal to or above a living wage. Contrast these findings with affordability of information services in median and low poverty areas, where every household makeup

¹⁵ Look to Appendix 3 for full Wireless and Broadband report

(married-couple, single-parent, and nonfamily) is making above a living wage, and can afford either of the information service types.

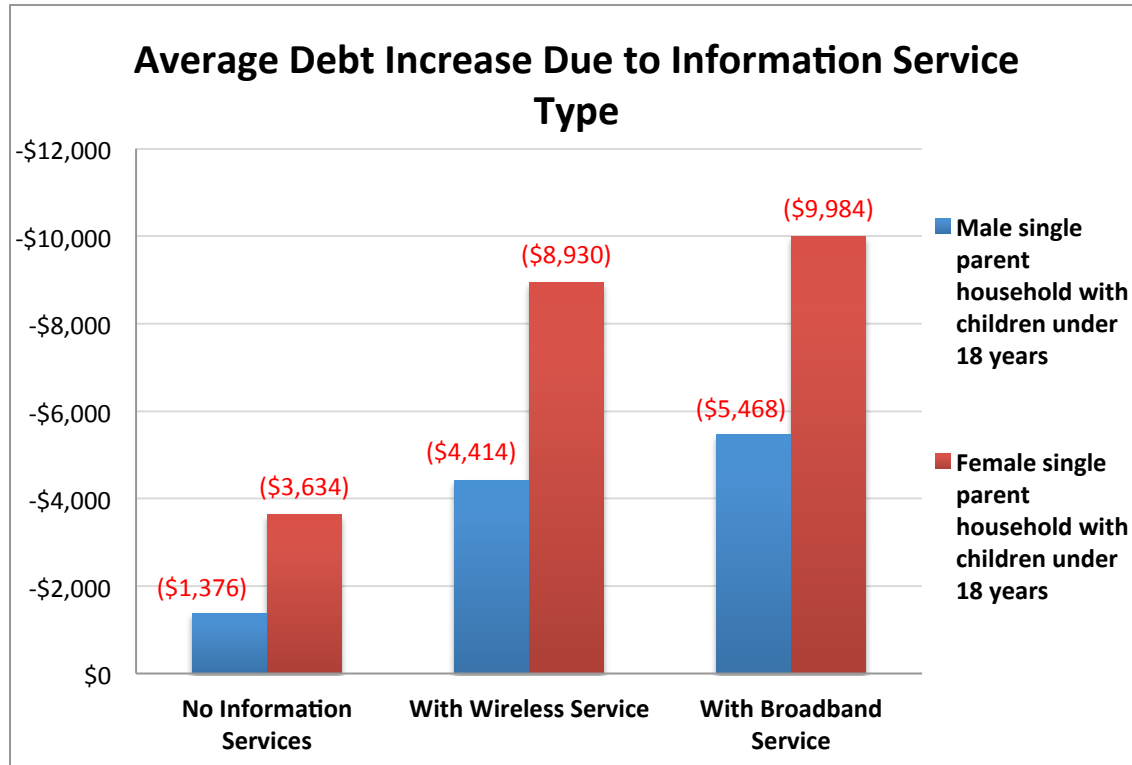


Figure 3: Average Debt Increase Due to Information Service Type

By looking at Figure 2, it might seem as if information service might not be too expensive, as 30 percent of female single parent households in high poverty areas are still able to make a living wage regardless of the information service type they adopt, but this is not the entire picture. In Figure 3, an average is taken of the amount below the living wage households in low poverty areas are experiencing. As you can see from the figure, for households making below the living wage, purchasing a wireless or broadband service would increase the amount of debt they collect by a substantial amount. More precisely, for single parent female run households, by subscribing to a wireless service their debt would increase by 69%, while subscribing to broadband service would increase

their debt by 75%. For single parent male run households, subscribing to a wireless service would increase their debt by 59%, and subscribing to broadband service would increase their debt by 64%.

Smartphone as a % of Living Income				
	Married-couple family household with children under 18 years	Male single parent household with children under 18 years	Female single parent household with children under 18 years	Nonfamily Households with no children under 18 years
Average	4.08%	1.71%	1.65%	5.22%
Median	4.13%	1.70%	1.63%	5.33%

Table 1: Smartphone as a % of Living Wage

Broadband as a % of Living Income				
	Married-couple family household with children under 18 years	Male single parent household with children under 18 years	Female single parent household with children under 18 years	Nonfamily Households with no children under 18 years
Average	5.12%	2.80%	2.69%	6.56%
Median	5.19%	2.78%	2.66%	6.70%

Table 2: Broadband as a % of Living Wage

These findings are in no way meant to suggest that in areas with low to moderate poverty levels 100 percent of the population can afford information services. As these services do not fluctuate a great amount in price throughout most markets in the United States, households can expect to pay anywhere from approximately 1.5 to nearly 7.0 percent of their estimated living wage, depending on their household makeup and type of information service desired.

As seen in Table 1 (Smartphone as a % of Living Wage) and Table 2 (Broadband as a % of Living Wage), single-parent households will typically spend between 1.5 to 3.0

percent of their annual living income on information services. Looking at the same tables, married-couple family households and nonfamily households will spend more on these same services, ranging from 4.0 to 7.0 percent of their annual living income. These services account for less of a single-parent household's annual living income because regardless of the size of the family, there is typically one adult requiring access to a smartphone or basic phone line residing in the household. Considering these numbers, if a household did not have access to an information service, then they could use the Living Wage Calculator and the affordability percentages outlined in Table 1 and Table 2 to determine whether they could afford a specific service. In order to do this, an individual would have to look up what their living wage should be for their specific household size and makeup, determine what their actual household income is, divide their household income by their specific living wage income, and if the outcome is over 1.07, then they should be able to afford either of the services and specific plans outlined in this paper.¹⁶

Struggles of the Potential Broadband Subscriber

In April of 2009, Pew Internet conducted a survey of dial-up Internet subscribers, asking them what it would take to make the move to broadband. Of all the responses, the answer most frequently offered, with 35% of participants responding in the affirmative, was the price of broadband would first have to fall (Horrigan, 2009). Almost five years later and this grievance is still one of the most commonly shared.

¹⁶ The percentages listed in Table 1 and Table 2 are approximations, and focus on specific populations. If you are worried about affordability issues, then discuss your concerns with your local service provider and they should be able to help you find the right service for your budget.

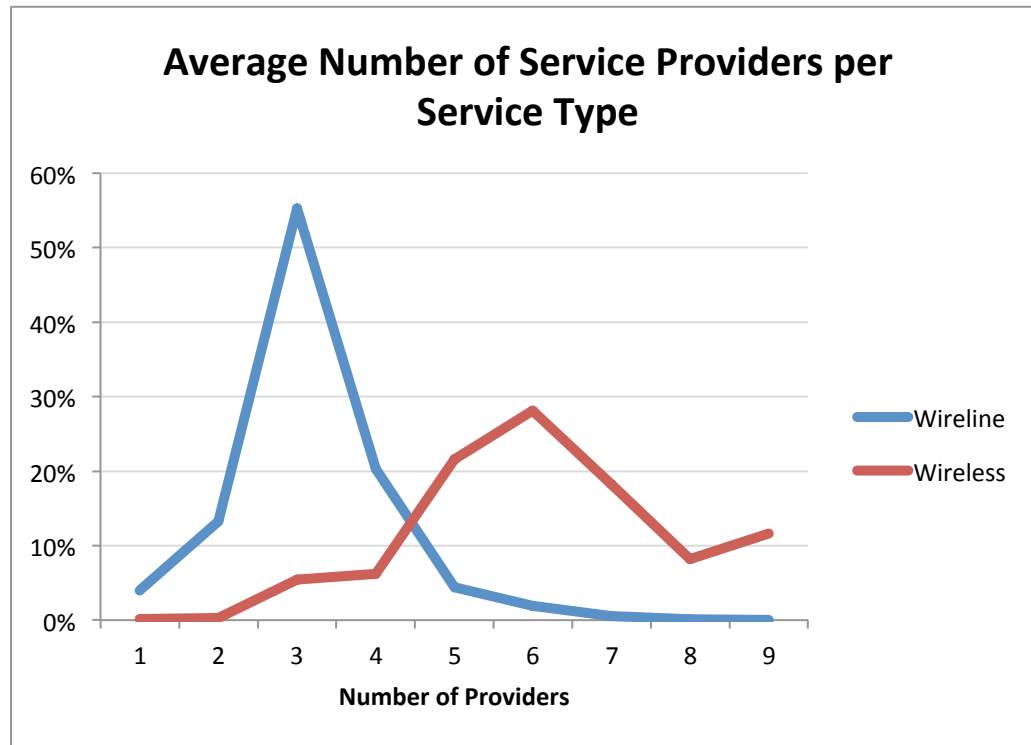


Figure 1: Average Number of Service Providers per Service Type

With the recent move by the Comcast Corporation to acquire Time Warner Cable, the Internet has come alive with people fearing the lack of competition between Internet service providers already occurring may increase broadband costs even further should the merger go through. Are these fears unfounded? According to data collected from the National Broadband Map, of the 30 metropolitan areas in this study, the majority of populations in these areas have access to three Wireline¹⁷ service providers, while the average number of wireless providers is closer to six.

Perhaps these are some of the reasons smartphone use is on the rise at such a rapid pace.

“Differences between racial and ethnic groups are an example of smartphones narrowing the “broadband gap”: While blacks and Latinos are less likely to have access to home broadband than whites, their use of smartphones nearly eliminates that difference” (Zickuhr, 2013).

¹⁷ The National Broadband Map uses Wireline as an all-inclusive term for broadband services

The Effects of Poverty on Affordability

One way in which information services might be more affordable to families in high poverty areas is by gaining access to government subsidies; however, this is not a route all can take. Take food assistance as an example. In order to qualify for the Supplemental Nutrition Assistance Program (SNAP), a family of four cannot make more than \$2,552 in gross monthly income or \$1,963 in net monthly income. For a family of three, in order to qualify for SNAP the total household income cannot exceed \$2,116 in gross monthly income, or \$1,628 in net monthly income (USDA, 2013). These figures may appear reasonable at first glance, however, gross monthly income is the equivalent of 130 percent of the Federal Poverty Threshold, and net monthly income is the equivalent of 100 percent of the same threshold.

One particular region of interest for this study is the McAllen-Edinburg-Mission, TX Metro Area. According to the 2012 5-Year American Community Survey, this region of Texas is home to over 750,000 people, with 35 percent of the population falling under 100 percent of the federal poverty threshold¹⁸. Additionally, over 50 percent of the population in this area falls below 150 percent of the federal poverty threshold. Approximately 39 percent of people aged 25 years and older in the metro area have completed less than four years of high school, while for the same demographic the U.S. estimate is approximately 14 percent. However, what is of particular interest about this area is how much of its population can afford access to information services. When looking at the four major household types in this region, a living income is over determined to be over 150 percent of the federal poverty threshold, which over 50 percent

¹⁸ The McAllen-Edinburg-Mission, TX Metro Area has the highest poverty rate of metro areas in the United States

of the population in the region lives below. While 35 percent of the population lives below 100 percent of the federal poverty threshold, and thus qualifies for SNAP, this still leaves over 15 percent, or about 125,000 people, without this type of food assistance and living below a living wage. This leaves a rather large portion of the population unable to afford any type of information service, yet this is not unheard of. Out of all the metropolitan areas reviewed in this study, a living wage was never determined to fall under 150 percent of the federal poverty threshold for any of the household types.

Existing Solutions

In May of 2011, Comcast launched a program called Internet Essentials, which aimed to reduce the digital divide by offering specific families in low-income communities discounted broadband service, low-cost computers, and free training programs developed by Comcast to teach subscribers how to use the technology (Reardon, 2014). In order to qualify, families must have at least one child receiving a free or reduced lunch, or have a child attending school where at least 70 percent of the students qualify for a free or reduced lunch. Additionally, families cannot have been a Comcast customer for the 90 days preceding their application for the program or be in negative standing with the service provider. If families are approved, they receive access to 5 Mbps broadband Internet for \$9.95 per month. If a family does not have access to a computer at home then they can purchase one from Comcast for a reduced cost of \$150. Since its launch in 2011, more than 300,000 families, or 1.2 million people, have benefited from the Internet Essentials initiative. Additionally, Comcast has sold more than 23,000 subsidized computers.

Another company who is hoping to connect more people to broadband services is Google through their relatively new service Google Fiber (Google, 2014). Currently, Google Fiber is operating in Kansas City, MO, Provo, UT, and Austin, TX. In these markets, Google hopes to compete with other Internet service providers, by offering three different packages, Gigabit + TV, standalone Gigabit Internet, or their “Free Internet.” The last option, their free Internet option, is not entirely free, at least not at first. For customers who cannot afford the \$70 per month price tag that comes along with the Gigabit Internet option, Google offers a package that connects potential customers to basic Internet¹⁹ at a one time \$300 price, or \$25 per month for 12 months. Once customers finish paying the one time or 12-installment plan price, they will receive free Internet at the same speed for the next seven years. With their hopes of expanding into 34 new cities in 9 metro areas, Google has the potential to help many people in low-income communities gain access that they might not have had otherwise.

Conclusion

Across the United States, many people have to go without access to information services due to issues most frequently surrounding affordability. This study reviewed the current costs associated with broadband and wireless adoption, and found that there is no universal definition of information affordability. While the majority of people receiving an income above a living wage do not struggle with being able to afford wireless or broadband services, for many Americans this is not a reality. More research needs to occur to understand how those without Internet access are suffering in our digital world.

¹⁹ Basic Internet is listed as 5 Mbps download & 1 Mbps upload speed

However, not all hope is lost for individuals on the wrong side of the information gap.

With programs like Internet Essentials and Google Fiber, the possibility of closing the digital divide has never been more of a reality.

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Appendix 1

The Massachusetts Institute of Technology's Living Wage Calculator

Living Wage Calculation for Autauga County, Alabama

displaying_results

The living wage shown is the hourly rate that an individual must earn to support their family, if they are the sole provider and are working full-time (2080 hours per year). The state minimum wage is the same for all individuals, regardless of how many dependents they may have. The poverty rate is typically quoted as gross annual income. We have converted it to an hourly wage for the sake of comparison. Wages that are less than the living wage are shown in red.

Hourly Wages	1 Adult	1 Adult, 1 Child	1 Adult, 2 Children	1 Adult, 3 Children	2 Adults	2 Adults, 1 Child	2 Adults, 2 Children	2 Adults, 3 Children
Living Wage	\$8.90	\$18.01	\$23.25	\$29.92	\$14.35	\$17.28	\$18.71	\$21.97
Poverty Wage	\$5.21	\$7.00	\$8.80	\$10.60	\$7.00	\$8.80	\$10.60	\$12.40
Minimum Wage	\$7.25	\$7.25	\$7.25	\$7.25	\$7.25	\$7.25	\$7.25	\$7.25

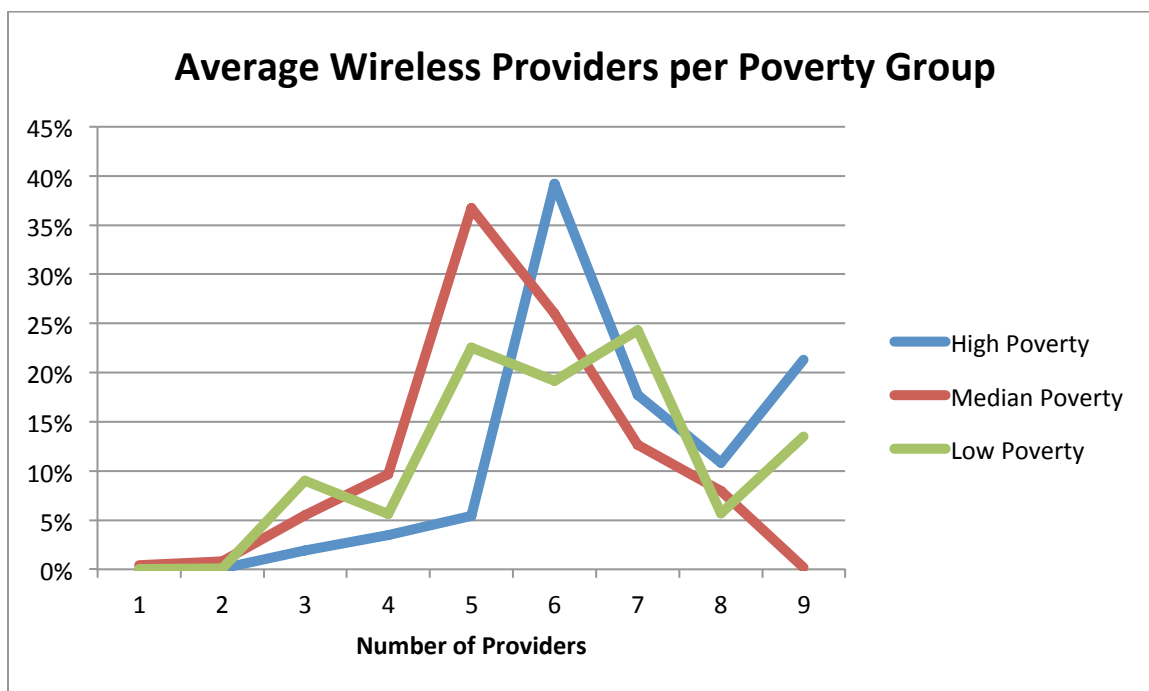
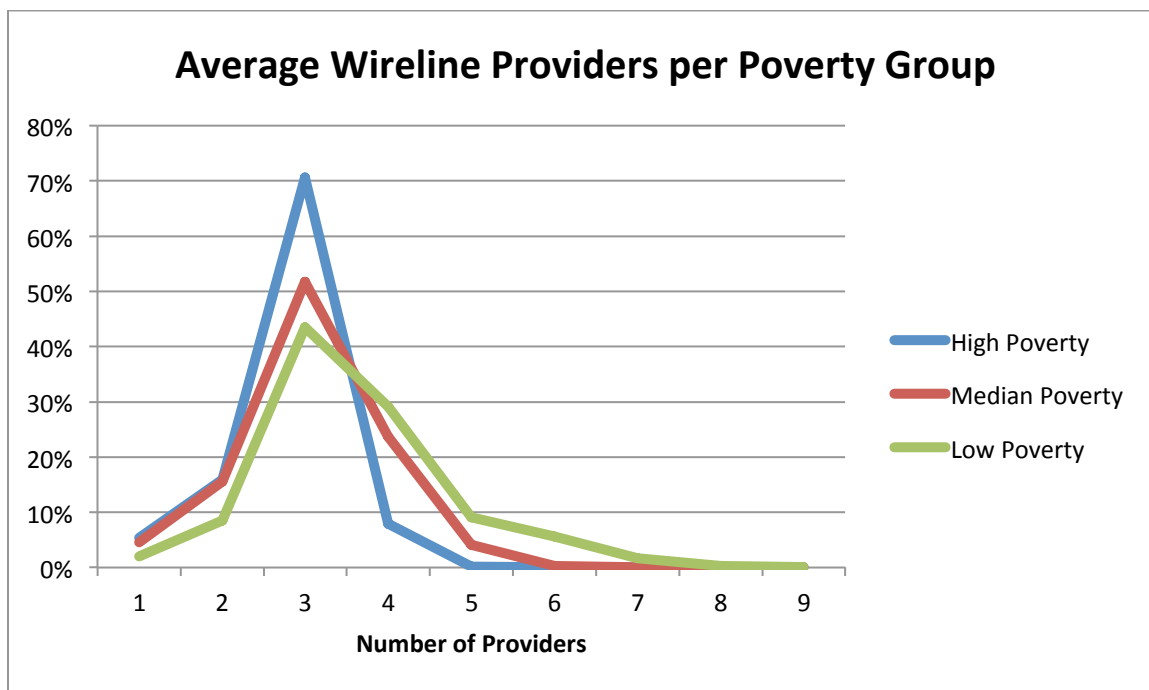
Typical Expenses

These figures show the individual expenses that went into the living wage estimate. Their values vary by family size, composition, and the current location.

Monthly Expenses	1 Adult	1 Adult, 1 Child	1 Adult, 2 Children	1 Adult, 3 Children	2 Adults	2 Adults, 1 Child	2 Adults, 2 Children	2 Adults, 3 Children
Food	\$242	\$357	\$536	\$749	\$444	\$553	\$713	\$904
Child Care	\$0	\$396	\$817	\$1,238	\$0	\$0	\$0	\$0
Medical	\$132	\$396	\$420	\$405	\$279	\$393	\$371	\$381
Housing	\$552	\$735	\$735	\$975	\$653	\$735	\$735	\$975
Transportation	\$318	\$618	\$712	\$764	\$618	\$712	\$764	\$777
Other	\$71	\$159	\$215	\$290	\$127	\$160	\$181	\$210
Required monthly income after taxes	\$1,315	\$2,661	\$3,435	\$4,421	\$2,121	\$2,553	\$2,764	\$3,247
Required annual income after taxes	\$15,780	\$31,932	\$41,220	\$53,052	\$25,452	\$30,636	\$33,168	\$38,964
Annual taxes	\$2,729	\$5,529	\$7,144	\$9,185	\$4,402	\$5,300	\$5,741	\$6,737
Required annual income before taxes	\$18,509	\$37,461	\$48,364	\$62,237	\$29,854	\$35,936	\$38,909	\$45,701

Appendix 2

Number of Information Service Providers per Poverty Group



Appendix 3

Information Service Plan Findings

Wireless Plan: 2 Year Cost for 1 Line	
AT&T	\$960
T-Mobile	\$2,090
Sprint	\$1,680
Verizon Wireless	\$1,920
Wireless Plan: 2 Year Cost for 2 Lines	
AT&T	\$1,944
T-Mobile	\$3,700
Sprint	\$3,120
Verizon Wireless	\$3,120
Broadband Plan: 2 Year Cost + 1 Basic Prepay Phone Plan	
Time Warner Cable	\$2,571
Comcast Xfinity	\$2,660
AT&T	\$2,788
Verizon FiOS	\$2,847
Broadband Plan: 2 Year Cost + 2 Basic Prepay Phone Plans	
Time Warner Cable	\$3,590
Comcast Xfinity	\$3,679
AT&T	\$3,806
Verizon FiOS	\$3,866
Average Wireless Plan Cost: 2 Years for 1 Line	\$1,663
Average Wireless Plan Cost: 2 Years for 2 Lines	\$2,971
Average Broadband Plan Cost: 2 Years + 1 Basic Phone Plan	\$2,717
Average Broadband Plan Cost: 2 Years + 2 Basic Phone Plans	\$3,735

Appendix 4

The Wall Street Journal's Wireless Savings Calculator

WSJ's Wireless Savings Calculator



Confused by wireless-phone plans? To help you find the best option, the Journal created a comparison tool for those looking to subscribe to one of the four biggest U.S. carriers: AT&T, Sprint, T-Mobile and Verizon Wireless.

[About the calculator »](#)

Answer the questions and the tool will show you the cheapest smartphone plans from each carrier closest to your preferences. (The latest update on March 13 added non-subsidized plans that don't require traditional two-year contracts. To view those plans, de-select the "Subsidized" box under each carrier logo.)

Interactive by Lakshmi Ketineni, Paul Antonson and Scott M. Austin/[The Wall Street Journal](#)

Do you need one phone line or multiple lines?

☐ One line ☒ Multiple lines

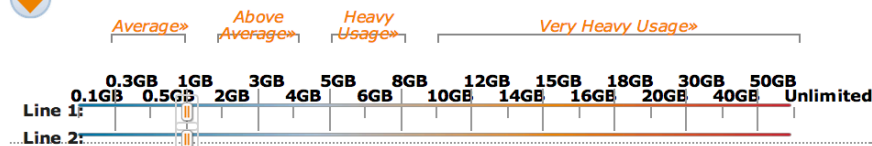
How many wireless phone lines do you need?

[HELP](#)

2

How many gigabytes (GB) of data do you need per month for each line?

[HELP](#)



	T-Mobile	at&t	Sprint	verizonwireless
	No Subsidized Plan	☒ Subsidized	☒ Subsidized	☒ Subsidized
TOTAL COST	\$100 per month *2-year price: \$3,700	\$120 per month *2-year price: \$3,280	\$130 per month *2-year price: \$3,520	\$130 per month *2-year price: \$3,520
LINES	\$80 Line 1: \$50 Line 2: \$30	\$80 \$40 x 2	\$90 Line 1: \$50 Line 2: \$40	\$80 \$40 x 2
VOICE	Unlimited	Unlimited	Unlimited	Unlimited
MESSAGING	Unlimited	Unlimited	Unlimited	Unlimited
DATA	\$20 Line 1: 2GB = \$10 Line 2: 2GB = \$10	\$40 2GB	\$40 Line 1,2: 1GB = \$20	\$50 2GB
PLANS	Simple Choice	Mobile Share	Unlimited, My Way	More Everything
CARRIER SNAPSHOT	About T-Mobile	About AT&T	About Sprint	About Verizon

*The two-year price includes the cost of an iPhone 5S (16 GB) as an example to compare the total price over the length of a traditional service contract. If you purchase a subsidized plan (two-year contract) from AT&T, Sprint or Verizon, the cost of the iPhone would be \$200. T-Mobile customers -- and non-subsidized plans from the other three carriers -- must pay the \$650 full price, unless they bring their own phone.

Sources: AT&T Inc., Sprint Corp., T-Mobile US Inc., Verizon Wireless

Share your feedback:

