EXPLORING THE DIGITAL NATION: HOME BROADBAND INTERNET ADOPTION IN THE UNITED STATES

Prepared by
ECONOMICS AND STATISTICS ADMINISTRATION
and
NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION
in the
U.S. DEPARTMENT OF COMMERCE

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FOREWORD

The Internet Age is here. The effective use of this technology and all that it can provide is a key to success for businesses and individuals. Knowing this, the Obama Administration seeks to ensure that all Americans have affordable access to broadband Internet services. Accomplishing that goal, however, requires a set of facts about Internet use that can underpin and guide this policy objective.

In *Exploring the Digital Nation: Home Broadband Internet Adoption in the United States*, the Commerce Department fulfills its promise to provide authoritative, nationally-comprehensive data on access to the Internet throughout the United States. This new study follows the February 2010 NTIA research preview, *Digital Nation: 21st Century America's Progress Toward Universal Broadband Internet Access*. Both studies draw on the Census Bureau's Current Population Survey Internet Use Supplement, a survey of approximately 54,000 households conducted over one week in October 2009. The Census data show increases in adoption of broadband services at home over time for virtually all demographic groups. The data also reveal that demographic disparities among groups have tended to persist. Persons with high incomes, those who are younger, Asians and Whites, the more highly-educated, married couples, and the employed tend to have higher rates of broadband use at home. Conversely, persons with low incomes, seniors, minorities, the less-educated, non-family households, and the non-employed tend to lag behind other groups in home broadband use. The new study takes the analysis to another level.

This report presents the most accurate statistical profile of U.S. broadband Internet adoption currently available. The report features new analysis of "adoption gaps," i.e., the differences in average broadband Internet adoption at home among different groups after controlling for demographic and geographic factors. There are certain groups in the population that have lower adoption rates even after taking account of differences that typically affect broadband usage. For example, the home broadband adoption gap between the lowest-income households and higher income brackets ranges from 16 to 34 percentage points, even after controlling for differences in education, age, race, ethnicity, household size, urban-rural location, foreign-born status, disability status and state of residence. The gaps between Whites and Blacks registered at 10 percentage points and between

Whites and Hispanics at 14 percentage points, even after controlling for household characteristics. A similar analysis found the urban-rural gap to be 7 percentage points. A special section presents our findings on users with disabilities, who tend to be older and part of lower-income groups.

We look forward to continuing our study of this important subject in the future. Most of all, we hope that the data we make available to the public will be of use to the research community and policy-makers around the United States in their quest to understand the nature of Internet access. Through their research and ours, we hope to learn how to continue to make the benefits of this extraordinary new platform available more widely throughout the country.

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EXPLORING THE DIGITAL NATION: Home Broadband Internet Adoption in the United States

EXECUTIVE SUMMARY

Household use of broadband Internet service has risen dramatically during the first decade of the 21st century as the Internet has become integral to the lives of most Americans. Nonetheless, not everyone uses broadband Internet – either by choice or because they lack access. This report, prepared jointly by the Commerce Department's Economics and Statistics Administration (ESA) and National Telecommunications and Information Administration (NTIA), explores differences in broadband Internet use among households.

Earlier studies by NTIA and others have shown that broadband Internet use varies significantly across households of different socio-economic backgrounds and in different geographic locations. This report builds on the findings of an NTIA report published earlier in 2010 showing that while broadband Internet access rose between 2007 and 2009 for most demographic groups and geographic areas, persistent differences in levels and growth rates remained (NTIA, 2010). That report found highest rates of home broadband Internet use among Asians and Whites, married couples, younger people, urban residents, people with higher incomes, and people with more education. This report expands the analysis presented in the earlier NTIA report to examine these differences in broadband Internet use in greater detail.

This report and the earlier NTIA report used data from a special 2009 supplement to the Census Bureau's Current Population Survey (CPS), which asked questions about broadband Internet use of more than 50,000 households.

The principal findings of this report are as follows:

General Broadband Internet Access

- Seven out of ten American households used the Internet in 2009. The majority of these households used broadband services to access the Internet at home. Almost one-fourth of all households, however, did not have an Internet user. (Section 3, Figure 1)

Determinants of Household Adoption of Broadband Internet

- Income and education are strongly associated with broadband Internet use at home but are not the sole determinants. (Section 4.1, Table 1; Section 4.2, Table 6)
- Broadband Internet adoption was higher among White households than among Black and Hispanic households in 2009. Differences in socio-economic attributes do not explain the entire gap in broadband Internet adoption associated with race and ethnicity. (Section 4.2, Figure 2)

- A similar pattern holds for urban and rural locations. Urban residents were more likely than their rural counterparts to adopt broadband Internet, even after accounting for socio-economic differences. (Section 4.2, Figures 3 and 4)
- Home broadband Internet use by people with disabilities lagged adoption by those with no disability. Differences in socio-economic and geographic characteristics explain a substantial portion of the adoption gap associated with disability. (Section 4.2, Figure 5)

Main Reasons for Non-Adoption of Home Broadband Internet

- Lack of need or interest, lack of affordability, lack of an adequate computer, and lack of availability were all stated as the main reason for not having home broadband Internet access. The significance of these factors, however, varied across non-users, with affordability and demand generally dominating. (Section 5, Figure 6)
- Internet non-users reported lack of need or interest as their primary reason for not having home broadband Internet access (Section 5.1, Figure 7). This group accounted for two-thirds of non-users of home broadband Internet.
- In contrast, households that did not use the Internet specifically at home but reported using the Internet elsewhere ranked affordability as the primary deterrent to home broadband Internet use (Section 5.2, Figure 8). This group represented almost one-fourth of non-users of broadband at home.
- Affordability was also reported as the major impediment to adopting broadband Internet services in households that used dial-up services (Section 5.3, Figure 9). This group represented about one-eighth of non-users of home broadband Internet services. Lack of broadband availability was reported to be a significant factor for rural residents (Section 5.3, Table 13).
- The use of dial-up Internet service is shrinking among households that connect to the Internet from home. Dial-up users, on average, were older, had lower levels of family income and education, and were more likely to reside in rural areas. (Section 6, Tables 16 and 17)

Long-term Trends in Broadband Internet Use

- Between 2001 and 2009, broadband Internet use among households rose sevenfold, from 9% to 64% of American households utilizing broadband Internet. (Section 8.1, Table 23)
- Some of the demographic groups that had lower-than-average adoption rates in 2001 have since exhibited impressive gains. However, sizeable adoption gaps still remain in broadband Internet access among demographic groups defined by income, education, race, and ethnicity. (Section 8.1, Table 23)
- Geographic areas such as states, as well as urban and rural locations, have experienced significant growth in home broadband Internet use between 2001 and 2009. Significant gaps in adoption still persist among the states, some regions, and between urban and rural locations. (Section 8.2, Table 24; Section 8.3, Table 25)

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EXPLORING THE DIGITAL NATION: Home Broadband Internet Adoption in the United States

Section 1: Introduction

The Internet has revolutionized the social and economic environment in which we live by providing an alternative or supplemental channel for communication, gathering and disseminating information, entertainment, commerce, and education. Household use of high-speed, or broadband, Internet services has risen dramatically during this decade which demonstrates the key role the Internet plays in the everyday lives of many individuals. Nonetheless, not everyone either uses the Internet or has access to it. This report, prepared jointly by the Commerce Department's Economics and Statistics Administration (ESA) *and* National Telecommunications and Information Administration (NTIA), seeks to explain differences in broadband Internet use among households.

Despite dramatic growth in recent years, broadband Internet use varies significantly between households with different socio-economic, demographic, and geographic characteristics. A number of recent studies, using data from different surveys, have shown this pattern. For example, a report published by NTIA earlier in 2010 using Census data found that broadband Internet access rose between 2007 and 2009 for most demographic groups defined by income, education, age, race, employment status, household type, and gender. Despite these gains, the report found the highest rates of broadband Internet adoption in 2009 among Asians and Whites, married couples, younger people, urban residents, people with higher incomes, and people with more education. The report also found that the primary reasons given by survey respondents for not having broadband Internet at home were related to affordability, demand, and availability. The Federal Communications Commission (FCC), using data from an FCC survey conducted in 2009, found that people with more education and higher income exhibit higher rates of broadband Internet use (Horrigan, 2010). They also found that Blacks and Hispanics, as well as senior citizens, lag behind in broadband Internet adoption. The Pew Internet Project, using data from a 2009 Pew survey, found that groups with historically lower broadband Internet use—including households with incomes less than $30,000, older people (50 and above), adults with only a high school degree, and rural Americans—exhibited the greatest growth in broadband Internet adoption between 2008 and 2009 (Horrigan, 2009). The most recent 2010 data from the Pew Internet Project show that Blacks experienced impressive growth in broadband Internet adoption between 2009 and 2010, while most other demographic groups experienced either moderate or no growth (Smith, 2010).

This report builds on the findings of the NTIA report published earlier in 2010 in order to more fully explore the differences in broadband Internet use among households with different characteristics. In addition, this report analyzes the main reasons provided by households for non-adoption, characteristics associated with a lag in technology adoption, and long-term growth in home

broadband Internet use across population subgroups and geographic locations. The next section describes the data and methodology employed in this study. Section 3 looks at the pattern of household Internet use in 2007 and 2009. Section 4 shows how demographic characteristics and geographic location of households are associated with home broadband Internet adoption. Section 5 analyzes the main reasons provided by households for non-adoption. Section 6 analyzes who lags in technology adoption by comparing users of dial-up Internet services with users of broadband Internet services. Section 7 looks at broadband Internet adoption by people with disabilities. Finally, Section 8 studies long-term changes in home broadband and Internet use by comparing the most recent data from 2009 with that from 2001, and Section 9 provides some concluding remarks.

Section 2: Data and Methodology

This report uses data from a special supplement to the Census Bureau's Current Population Survey (CPS). The CPS is a monthly survey of a representative sample of the U.S. population, and provides data on labor force participation, income, and demographic characteristics of households. The special supplement utilized in this report, the CPS Internet Use Supplement, periodically gathers information on household Internet use. This report analyzes data from the most recent survey conducted in October 2009, the eighth such Internet survey conducted since the early 1990s. The October 2009 CPS interviewed 54,324 households. For a more detailed description of the survey, see Section A1 of the Appendix.

The October 2009 Internet Use Supplement asked each household whether someone in that household used the Internet and what kind of Internet connection technology was utilized at home (the respondent was asked to choose from three options: "dial-up" telephone service, "broadband,"[1] or "something else"). The survey also asked households in which no one used the Internet or where a "dial-up" telephone service was utilized, to state their main reason for not using broadband Internet services. Using these data, one can therefore identify households and individuals who use broadband Internet at home to connect to the Internet. This report focuses on broadband Internet use at the household level, as opposed to individual level, since the decision to adopt a particular type of Internet service technology at home likely occurs at the household level.[2] One would expect a household to evaluate the cost of the technology relative to the collective benefit of the technology for all household members. The outcome of this decision-making process, comparing the costs versus the collective benefits, is likely to vary across household types.

Our sample consists of all households where the age of the head of the household is 16 or above. There are 54,280 household records in our sample, representing 119 million American households. We analyze broadband Internet use at the household level and its association with household-level characteristics. For characteristics like education, race, ethnicity, age, disability status, and foreign-born status, we use the information for the head of household. In this report we use the words "adoption," "use," "utilization," and "connectivity" interchangeably in order to indicate that a household reported using a broadband service at home to connect to the Internet.

As mentioned in the previous section, this report builds on the findings in NTIA (2010) which shows that certain population subgroups, specifically people with higher incomes, those with more education, Asians, Whites, married couples, those who are younger, and residents of urban areas exhibit the highest rates of broadband Internet use. These findings point to several areas of inquiry, particularly whether socio-economic differences among households explain the differences in broadband Internet use. For instance, is the higher rate of broadband Internet use among urban households explained by the differences in income and education between urban and rural

[1] In the 2009 CPS Internet Use Supplement, a household with at least one of the following Internet services is considered to have broadband: DSL, cable modem, fiber optics, satellite, wireless (such as Wi-Fi), mobile phone or PDA, or some other broadband Internet connection (U.S. Census Bureau, 2009). It is not possible to identify in the survey which particular broadband service a household uses.

[2] Data on average broadband use at the individual level are presented in Appendix Section A2. The underlying trends do not significantly change if persons, instead of households, are the unit of analysis.

households? Or, stated another way, how much of an urban-rural difference in broadband Internet use remains if we compare urban and rural households with similar income, education, and other key characteristics? Similarly, how much of a difference in broadband Internet use between White and Hispanic households remains if we compare adoption between White and Hispanic households that have similar income, education, geographic location, and other observed characteristics?

A simple tabulation of the data by household characteristics does not allow the researcher to answer such questions. By utilizing a regression analysis framework, we can estimate the marginal or "isolated" association between broadband Internet use and a particular household attribute. For example, the marginal effect of income on broadband Internet use can be estimated by comparing broadband Internet use among households that have different income levels but which are otherwise similar with respect to key attributes like education, race, ethnicity, age, geographic location, and other possible determinants of broadband Internet use. The regression will tell us how much the likelihood of broadband Internet use would rise for a given increase in income, holding key demographic and geographic characteristics constant.

The next section of this report (Section 3) looks at home broadband Internet usage patterns for 2007 and 2009, and Section 4 employs a regression analysis framework to analyze how much of the observed differences in broadband Internet use across households is explained by differences in socio-economic and geographic factors.

Section 3: Broadband Internet Use in 2007 and 2009

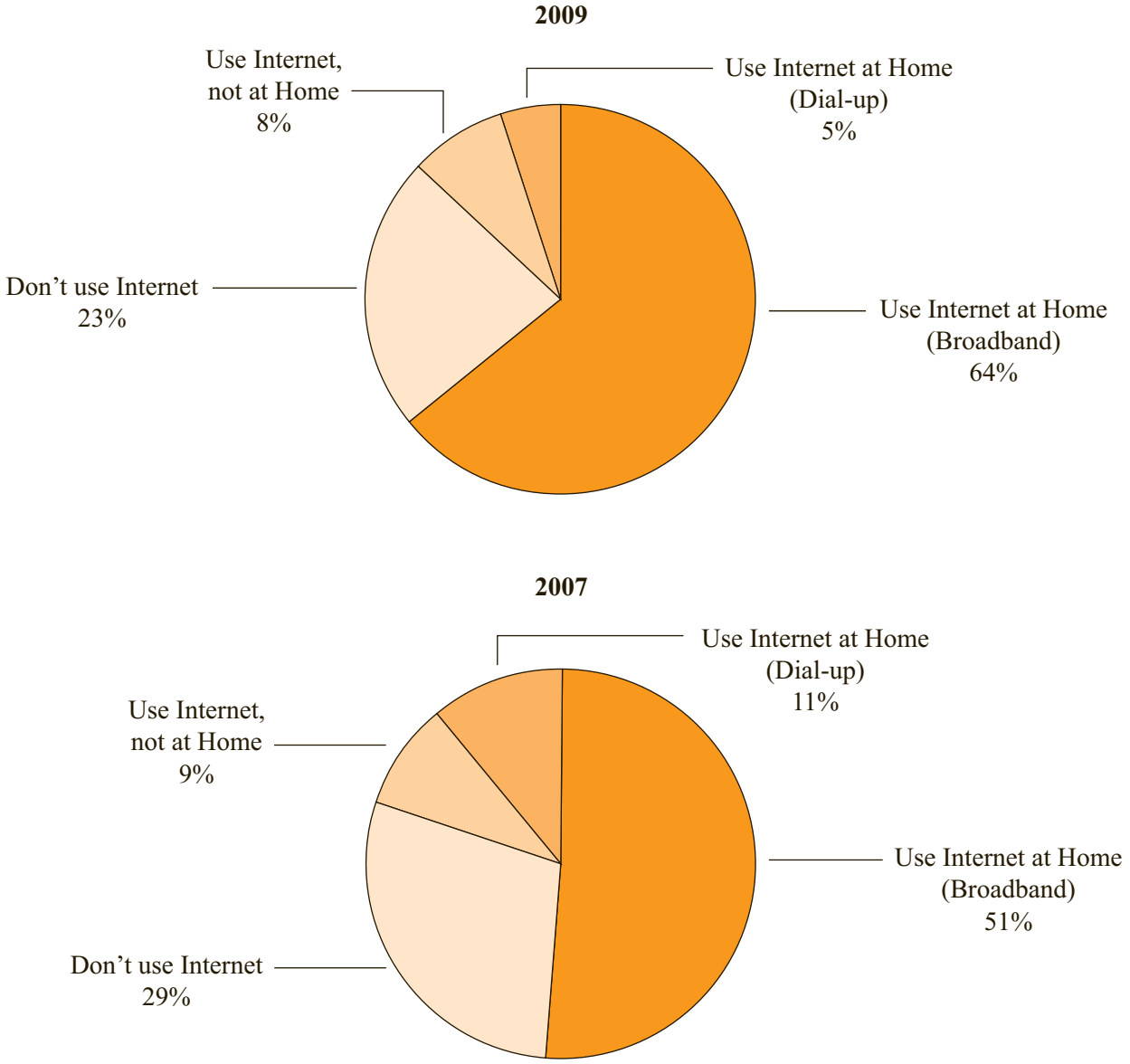
The top half of Figure 1 shows the pattern of Internet use among American households in 2009. Figure 1 shows that a significant portion of American households (64%) connected to the Internet from home utilizing a broadband Internet service. Another 5% used dialup services at home to connect to the Internet. This means that almost seven out of ten American households (69%) connected to the Internet from home in 2009.[3] Another 8% used the Internet at a location other than home, implying that more than three-fourths of all American households (77%) had at least one person who used the Internet in 2009. This was up from 71% in 2007 (the distribution for 2007 is presented in the bottom half of Figure 1).

Broadband was by far the most frequently used technology for accessing the Internet from home. The share of households subscribing to broadband Internet services rose from 51% in 2007 to 64% in 2009, implying that home broadband Internet use rose by one-fourth during the two year period. Households with a dial-up Internet service accounted for a shrinking share of Internet users – down from 11% in 2007 to 5% in 2009. The decline in dial-up users has been outweighed by the rise in broadband users, resulting in a net increase in Internet use at home.

Despite this overall growth in Internet use, it is important to realize that a significant portion of American households (36%) did not have a broadband Internet service at home. Almost one-fourth of American households (23%) did not have any Internet user in 2009.

[3] A negligible fraction of households (0.4% in 2009) reported using the Internet from home using "something else", that is, something other than a dial-up telephone connection or broadband. As a result, the total share of households connecting to the Internet from home is 68.6% = 63.5% (using broadband) + 4.7% (using dial-up) + 0.4% (using "something else").

Figure 1: Distribution of Internet Use by Households, 2007 and 2009



Source: U.S. Census Bureau, Current Population Survey (CPS) and CPS School Enrollment and Internet Use Supplement, October 2007 and October 2009, and ESA calculations.

Section 4: Broadband Internet Use in 2009: Demographic and Geographic Characteristics

This section will analyze how broadband Internet use varies across households of different demographic and socio-economic backgrounds and in different geographic locations. Section 4.1 looks at average broadband Internet adoption rates by household characteristics and Section 4.2 utilizes a regression analysis framework that enables us to isolate the impact of any one factor or characteristic on broadband Internet adoption. The results indicate that home broadband Internet use is more prevalent among households with higher incomes and more education as well as among Whites and urban households, and that the gaps in adoption between White and non-White households or between urban and rural households are not entirely explained by differences in socio-economic and demographic factors.

Section 4.1: Broadband Internet Use by Household Characteristics

Table 1 shows average broadband Internet usage rates by demographic characteristics. According to Table 1, home broadband Internet use is more prevalent among households with higher incomes, more education, Asians, and Whites. For example, slightly more than a third (36%) of households with annual family incomes less than $25,000 used broadband Internet at home in 2009, compared to the majority of households with higher incomes. Slightly more than one-fourth (29%) of households headed by someone with less than a high school degree used broadband Internet at home, compared to the vast majority (85%) of their counterparts with a college degree or more. Non-Hispanic Asian households (77%) had the highest rate of broadband Internet use in 2009, followed by non-Hispanic White households (68%). Hispanic (48%) and non-Hispanic Black (49%) households lagged behind with adoption rates that were about 20 percentage points lower than their non-Hispanic White counterparts.

Table 1 also shows that broadband Internet use is strongly correlated with age, household type, and disability status. Seventy-one percent of households where the head of the household was between 16 and 44 years of age had broadband Internet at home, compared to 40% of their counterparts aged 65 years or more. The majority of married-couple families with children used broadband Internet services at home (80%), compared to about two-thirds of family households without children (68%) and half of non-family households (51%). Households headed by someone with a disability were almost half as likely as households headed by someone with no disability to have broadband Internet (38% compared to 68%).[4] Finally, foreign-born non-U.S. citizens were less likely than American citizens to utilize broadband Internet at home (51% compared to 64%).[5]

[4] In the CPS, a person with at least one of the following conditions is considered to have a disability: hearing impairment; blindness; impaired vision despite wearing glasses; physical, mental, or emotional condition that impairs the ability to concentrate, remember, or make decisions; difficulty in walking or climbing stairs; difficulty in dressing or bathing; physical, mental, or emotional condition that impairs the ability to do errands alone such as visiting a doctor's office or shopping (U.S. Census Bureau, 2009).

[5] American citizens include both native-born American citizens as well as foreign-born persons who are naturalized U.S. citizens.

Table 1: Household Broadband Internet Use by Demographic Characteristics, 2009

Household Broadband Internet Use: Percent of households connecting to the Internet at home using broadband	
All Households*	63.5
Household Income	
Less than $25,000	35.8
$25,000-$50,000	61.0
$50,000-$75,000	79.3
$75,000-$100,000	87.6
More than $100,000	94.1
Education	
Less than High School Degree	28.8
High School Degree	50.9
Some College	69.5
College Degree or more	84.5
Race and Ethnicity	
White, Non-Hispanic	68.0
Black, Non-Hispanic	49.4
Asian, Non-Hispanic	77.3
American Indian or Alaskan Native, Non-Hispanic	48.3
Hispanic	47.9
Age	
16 to 44 years	71.2
45 to 64 years	68.2
65 years and over	39.9
Gender	
Male	66.7
Female	60.2
Household Type	
Married-couple with children	79.8
Single parent (male)	60.1
Single parent (female)	56.9
Family without children	67.7
Non-family household	50.8
Disability Status	
Has a disability	37.8
No disability	67.6
Foreign-Born Status	
Citizens (including foreign born)	64.4
Non-Citizen	51.0
Sample Size	54,280
Estimated Number of Households	119,267,400

Source: U.S. Census Bureau, Current Population Survey (CPS) and CPS School Enrollment and Internet Use Supplement, October 2009, and ESA calculations.

Note: *Sample includes all households with the head of the household at least 16 years of age. The information for the head of the household is used for education, race, ethnicity, age, gender, foreign-born status, and disability.

Table 2 shows average broadband Internet usage rates by geographic location of households (by urban-rural status and by size of urban area). Note that this report uses the terms "urban" and "rural" to refer to metropolitan and nonmetropolitan areas, respectively.[6] According to Table 2, broadband Internet adoption, on average, was 15 percentage points higher among urban dwellers than among their rural-area counterparts (66% versus 51%). Urban areas with populations between 2.5 million and 5 million displayed the highest broadband Internet adoption rate with 71% of households living in these areas subscribing to broadband Internet services.

Table 2: Household Broadband Internet Use by Geographic Characteristics, 2009

Household Broadband Internet Use: Percent of households connecting to the Internet at home using broadband	
All Households	63.5
Urban-Rural Status	
Urban (Metropolitan)	65.9
Rural (Nonmetropolitan)	51.0
Metropolitan Area (CBSA) Size	
Under 1,000,000	63.1
1,000,000-2,499,999	66.1
2,500,000-4,999,999	70.5
5,000,000 or more	66.9
Sample Size	54,280
Estimated Number of Households	119,267,400

Source: U.S. Census Bureau, Current Population Survey (CPS) and CPS School Enrollment and Internet Use Supplement, October 2009, and ESA calculations.

[6] The geographic variable for identifying a household's location as urban or rural is not available in the CPS public use files. This report uses the terms "urban" and "rural" to refer to metropolitan and nonmetropolitan areas, respectively. The definition of a metropolitan area (effective since 2000) is based on "core based statistical area" (CBSA), which includes both metropolitan and micropolitan statistical areas. According to the 2000 standards, each CBSA must have at least one urban area with at least 10,000 inhabitants. Each metropolitan statistical area must contain at least one urbanized area with population 50,000 or more. Each micropolitan statistical area must contain at least one urban cluster with population between 10,000 and 50,000. As of June 6, 2003, there are 362 metropolitan statistical areas and 560 micropolitan statistical areas in the U.S. For more information, see U.S. Census Bureau (2010a) and Office of Management and Budget (2010).

The next three tables dig deeper into the data by looking at average broadband Internet usage rates by race, ethnicity, income, and education within urban and rural areas (Table 3) and then by cross tabulating broadband Internet usage data by race and income, and by race and education for urban and rural areas separately (Tables 4 and 5). Table 3 shows that rural households with lower incomes, lower levels of education, and Black rural households had particularly low broadband Internet adoption rates. Only about 28% of rural dwellers with incomes less than $25,000 had broadband Internet at home, compared to 38% of their urban counterparts and 86% of their high-income rural counterparts. A similar pattern holds for demographic groups defined by race, ethnicity, and education.

Table 4 shows the cross-tabulated data on average broadband Internet usage rates by race and income, and by urban-rural location. The lowest rates of broadband Internet use (in this three-way urban-rural/race and ethnicity/income split) were among the lowest income Black and Hispanic households living in rural areas (17% and 19%, respectively). Hispanic households in the lowest income category (less than $25,000) living in urban areas displayed the next lowest level (27%) of home broadband Internet utilization.

A similar pattern is displayed in Table 5, which shows the cross-tabulated data on average broadband Internet use by race and educational attainment, and by urban-rural location. Black households headed by someone with less than a high school degree and living in rural areas exhibited the lowest level of broadband Internet use (11%). They were followed by White rural households headed by someone with less than a high school degree (23%), Black rural households headed by someone with a high school degree (24%), Hispanic households headed by someone with less than a high school degree (both urban and rural) (26% and 25%, respectively), and Black

Table 3: Household Broadband Internet Use by Metropolitan Status, Race, and Income, 2009

Household Broadband Internet Use: Percent of households connecting to the Internet at home using broadband

	Urban	Rural
All Households	65.9	51.0
Race and Ethnicity		
Non-Hispanic White	71.2	54.2
Non-Hispanic Black	52.1	28.7
Hispanic	48.6	36.9
Household Income		
Less than $25,000	38.0	28.0
$25,000-$50,000	62.8	52.4
$50,000-$75,000	80.2	73.6
$75,000-$100,000	88.6	81.3
More than $100,000	94.8	86.1
Education		
Less than High School Degree	30.5	21.7
High School Degree	52.8	43.6
Some College	70.8	62.0
College Degree or more	85.5	74.7

Source: U.S. Census Bureau, Current Population Survey (CPS) and CPS School Enrollment and Internet Use Supplement, October 2009, and ESA calculations.

Table 4: Household Broadband Internet Use by Metropolitan Status, Race, and Income, 2009

Household Broadband Internet Use: Percent of households connecting to the Internet at home using broadband

Race and Income	Urban	Rural
Non-Hispanic White		
Household Income: Less than $25,000	42.6	31.3
Household Income: $25,000-$50,000	66.3	53.8
Household Income: $50,000-$75,000	81.7	74.6
Household Income: More than $75,000	92.8	84.2
Non-Hispanic Black		
Household Income: Less than $25,000	33.1	16.8
Household Income: $25,000-$50,000	59.6	36.9
Household Income: $50,000-$75,000	76.4	61.5
Household Income: More than $75,000	88.2	71.9
Hispanic		
Household Income: Less than $25,000	27.4	18.5
Household Income: $25,000-$50,000	49.3	39.6
Household Income: $50,000-$75,000	71.3	70.0
Household Income: More than $75,000	88.7	73.1

Source: U.S. Census Bureau, Current Population Survey (CPS) and CPS School Enrollment and Internet Use Supplement, October 2009, and ESA calculations.

Table 5: Household Broadband Internet Use by Metropolitan Status, Race, and Education, 2009

Household Broadband Internet Use: Percent of households connecting to the Internet at home using broadband		
Race and Education	**Urban**	**Rural**
Non-Hispanic White		
Less than High School Degree	34.4	23.3
High School Degree	56.6	46.4
Some College	74.1	64.3
College Degree or more	86.9	75.6
Non-Hispanic Black		
Less than High School Degree	26.9	10.7
High School Degree	42.4	24.0
Some College	57.0	43.0
College Degree or more	76.9	55.8
Hispanic		
Less than High School Degree	26.0	25.0
High School Degree	45.4	30.8
Some College	67.0	56.0
College Degree or more	77.9	68.8

Source: U.S. Census Bureau, Current Population Survey (CPS) and CPS School Enrollment and Internet Use Supplement, October 2009, and ESA calculations.

urban households headed by someone with less than a high school degree (27%).

Section 4.2: Marginal Effects of Demographic and Geographic Characteristics on the Likelihood that a Household Uses Broadband Internet at Home

The finding that socio-economic characteristics, as well as race, ethnicity, and geographic location are highly correlated with adoption of home broadband Internet services has important implications. These household attributes are themselves correlated with each other. For instance, income and education are likely to be higher in urban areas if employment opportunities requiring high levels of skills and specialization are disproportionately located in urban areas. As a result, it is not clear from the tabulations we have seen so far how much of the urban-rural gap in adoption is driven by differences in income and education between urban and rural residents. The same issue applies for race and ethnicity, that is, looking at average adoption levels by race and ethnicity does not tell us how much of the adoption gap associated with race and ethnicity is explained by differences in socio-economic factors.

The rest of this section will utilize a regression analysis framework that estimates the impact of multiple factors together on the probability that a household adopts broadband Internet services at home. The results allow us to isolate or distinguish the effect of any one factor while holding all other factors constant. We refer to these results as the marginal effect of selected demographic and geographic characteristics on household broadband Internet use. The factors that we control for in this analysis include household income, education, age, race, ethnicity, foreign-born status, household size (total number of persons in household), disability status, and geographic location (urban-rural location and state). Note that the CPS data do not provide information on broadband Internet availability and price in a household's immediate location, which is why we are unable to directly control for these factors. Both price and availability are important determinants of adoption. The regression analysis, however, accounts for a household's geographic location (urban versus rural location, the size of the urban area a household lives in, and state).[7] As a result, these household geographic characteristics would capture some of the variation in broadband Internet price and availability along these geographic dimensions.

[7] Table 6 and Figure 3 show the adoption gap between urban and rural households without controlling for urban area size. Figure 4 and Appendix Table A3 (column 2) show the urban-rural gap by urban area size.

The full set of regression results from this analysis is presented in Section A3 of the Appendix. Table 6 presents the estimated marginal effects of selected demographic and geographic factors on the probability of broadband Internet adoption at home. The marginal effect of a particular household characteristic, for instance, the impact of living in an urban location, is the isolated effect of an urban location on the likelihood of broadband Internet use, after holding constant the above mentioned characteristics. In other words, the marginal effect of living in an urban location is the gap in average broadband Internet adoption between urban and rural households, after accounting for differences between urban and rural households in income, education, age, race, ethnicity, household size, foreign-born status, disability status, and state of residence.

Table 6: Marginal Effects of Selected Demographic and Geographic Characteristics on the Likelihood that a Household Uses Broadband Internet at Home, 2009

Adoption Gap: Difference in average broadband Internet adoption after controlling for demographic and geographic factors	
Household Characteristic	**Adoption Gap** (Percentage point)
Household Income	
Gap between households with incomes $25,000 to $50,000 and households with incomes less than $25,000	16
Gap between households with incomes $50,000 to $75,000 and households with incomes less than $25,000	27
Gap between households with incomes $75,000 to $100,000 and households with incomes less than $25,000	31
Gap between households with incomes more than $100,000 and households with incomes less than $25,000	34
Education	
Gap between those with a high school degree and those with less than high school degree	11
Gap between those with some college and those with less than high school degree	23
Gap between those with college degree or more and those with less than high school degree	29
Race and Ethnicity	
Gap between Non-Hispanic White and Non-Hispanic Black	10
Gap between Non-Hispanic White and Hispanic	14
Gap between Non-Hispanic White and Non-Hispanic Asian	0
Gap between Non-Hispanic White and Other*	5
Urban-Rural	
Gap between urban and rural households	7
Foreign-born Status	
Gap between U.S. citizens and foreign-born non-citizens	6
Disability	
Gap between those with no disability and with disability	5
Sample Size	43,662
Estimated Number of Households	94,963,684

Source: U.S. Census Bureau, Current Population Survey (CPS) and CPS School Enrollment and Internet Use Supplement, October 2009, and ESA calculations.

Note: Sample includes all households with the head of the household at least 16 years of age and with non-missing data on household income. The sample size declines from 54,280 for tabulations to 43,662 for regressions because of excluding observations with missing data on household income. Controls for age, household size and state of residence are included. See Appendix Table A3 (column 1) for the full set of regression results. *This category includes Native Americans, Hawaiian/Pacific Islanders, and those who report two or more races.

According to the results in Table 6, the likelihood of broadband Internet adoption among households with incomes between $25,000 and $50,000 is 16 percentage points higher than that among households with incomes less than $25,000, after accounting for differences in other characteristics (education, age, race, ethnicity, household size, foreign-born status, disability status, urban-rural

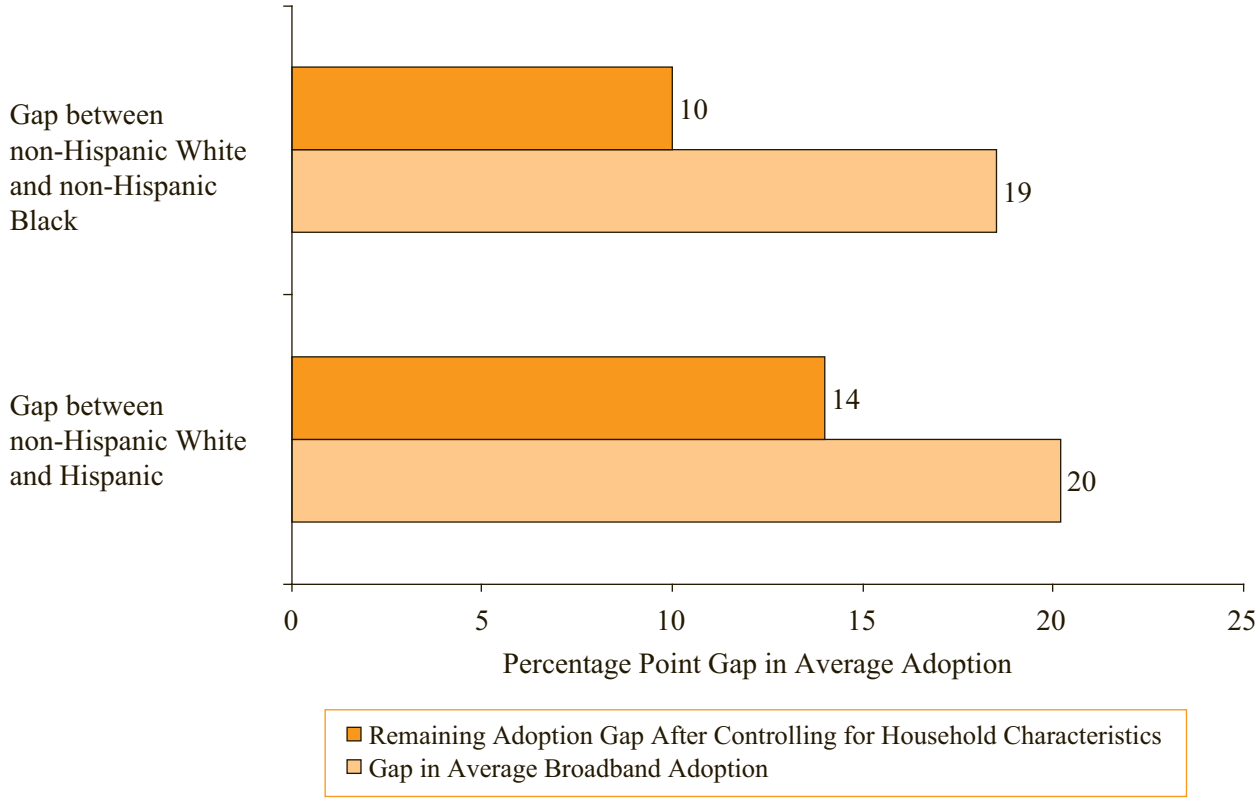
status, and state of residence). Note that Table 1 showed average broadband Internet usage rates of 61% and 36% for these two groups, implying an adoption gap of 25 percentage points before controlling for these other factors. This means that differences in other characteristics like education, race, ethnicity, age, geographic location, household size, foreign-born status, and disability explain some of the differences in broadband Internet adoption between these two groups. Therefore, the adoption gap declines from 25 percentage points to 16 percentage points once we account for these attributes.

Relative to households in the lowest income category (less than $25,000), the increased likelihood of adoption, or adoption gap, is 27 percentage points for households with family incomes between $50,000 and $75,000; 31 percentage points for households with family incomes between $75,000 and $100,000; and 34 percentage points for households with family incomes exceeding $100,000. Two implications are apparent. First, income is strongly associated with broadband Internet use. The positive association between income and broadband connectivity persists even after accounting for differences in a large number of key characteristics including education, age race, ethnicity, and geography. Second, the rising effect of income diminishes as income grows.

A similar phenomenon is apparent for education. According to Table 6, the likelihood of broadband Internet use, on average, is 11 percentage points higher among households that are headed by someone with a high school degree compared to households that are headed by someone with less than a high school degree, again holding all other factors equal. The adoption gap is 23 percentage points between those with some college and those without a high school diploma, and 29 percentage points between those with at least a college degree and those without a high school diploma. As with income, this suggests that education is strongly associated with broadband Internet adoption, even after accounting for differences in income, age, race, ethnicity, and a number of other key characteristics. Households with higher levels of income and education are more likely to have the necessary resources and skills to obtain and use broadband Internet services at home.

Table 1 showed average broadband Internet usage rates of 68% for non-Hispanic White households, 49% for non-Hispanic Black households, and 48% for Hispanic households, implying that the gap in average adoption was 19 percentage points between White and Black households, and 20 percentage points between White and Hispanic households. Table 6 shows that, once we have controlled for socio-economic and geographic attributes, the White-Black adoption gap declines to 10 percentage points and the White-Hispanic adoption gap declines to 14 percentage points. Figure 2 plots these White-Black and White-Hispanic adoption gaps. Figure 2 uses two bars to display the adoption gap between any two groups of people. The bottom bar of each pair (which is also the longer bar) shows the gap in average adoption from Table 1. The top bar of each pair (which is also the shorter bar) shows the remaining unexplained adoption gap after accounting for differences in household demographic, socio-economic, and geographic characteristics (from Table 6). The remaining gap suggests that the broadband Internet adoption gap associated with race and ethnicity is not entirely explained by differences in income or other non-income attributes. Income, education, age, foreign-born status, and other demographic and geographic characteristics explain about one-half of the White-Black gap and one-fourth of the White-Hispanic gap in broadband Internet usage. As a result, a sizeable gap in adoption remains after controlling for socio-economic and geographic factors.

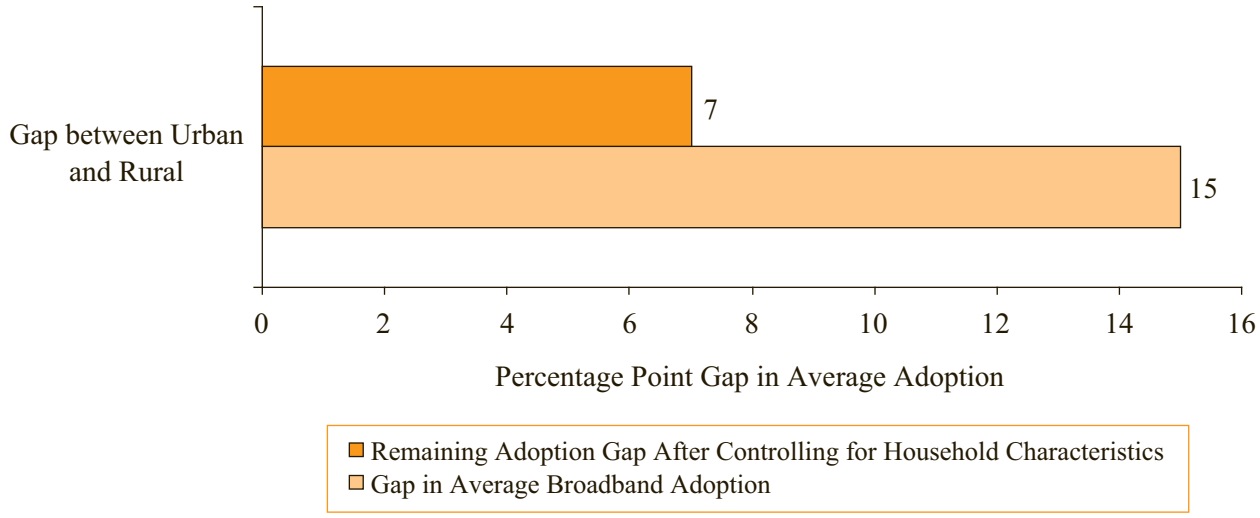
Figure 2: Race and Ethnicity-related Gap in Broadband Internet Adoption Before and After Controlling for Household Characteristics, 2009



Source: U.S. Census Bureau, Current Population Survey (CPS) and CPS School Enrollment and Internet Use Supplement, October 2009, and ESA calculations.

Table 2 showed average broadband Internet usage rates of 66% for urban households and 51% for rural households, reflecting a 15 percentage point urban-rural gap in broadband Internet usage. Our analysis shows that differences in socio-economic and demographic characteristics explain about half of this urban-rural adoption gap. In other words, an adoption gap of 7 percentage points remains between urban and rural dwellers even after controlling for differences in income, education, race, ethnicity, age, household size, foreign-born status, disability status, and state of residence. Figure 3 shows the urban-rural adoption gap.

Figure 3: Urban-Rural Gap in Broadband Internet Adoption Before and After Controlling for Household Characteristics, 2009



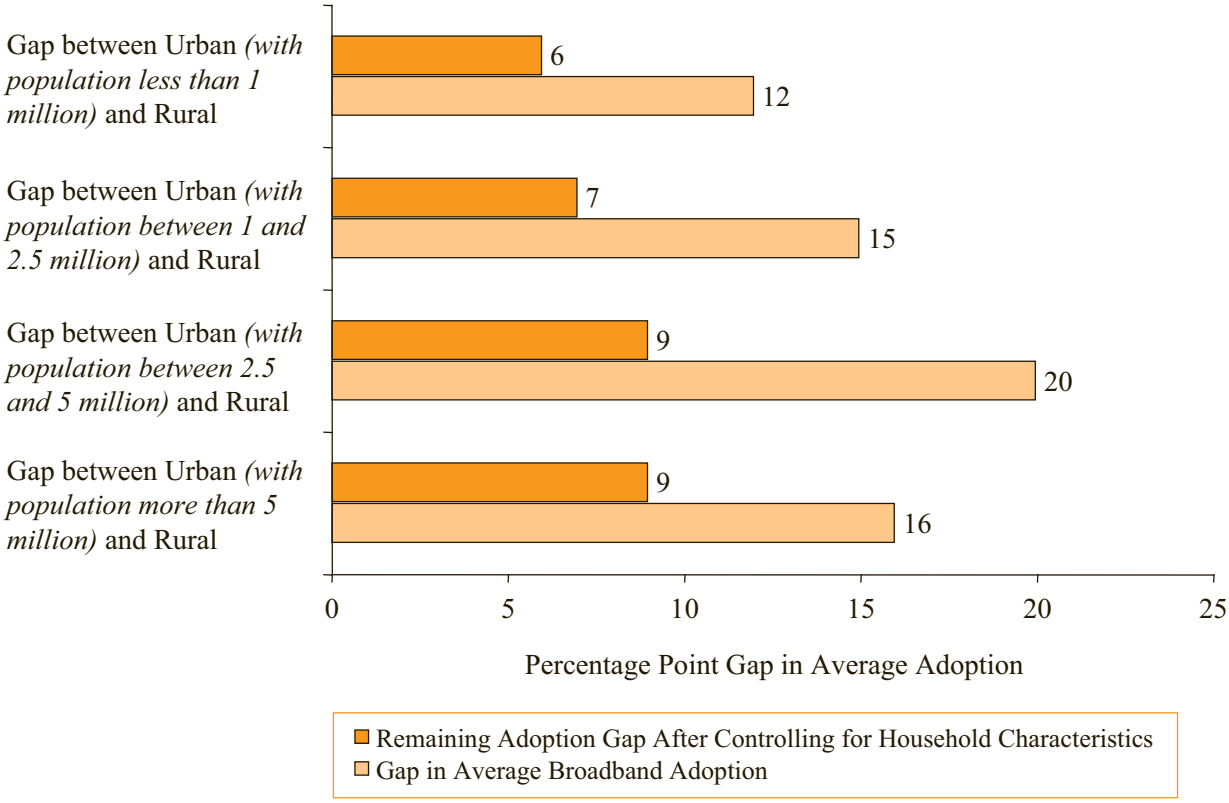
Source: U.S. Census Bureau, Current Population Survey (CPS) and CPS School Enrollment and Internet Use Supplement, October 2009, and ESA calculations.

Our analysis also shows that the urban-rural gap in broadband Internet adoption varies with the size of the urban area. Compared to rural residents, the likelihood of broadband Internet use is 9 percentage points higher for households residing in urban areas with populations exceeding two and half million, and 6 to 7 percentage points higher for households living in urban areas with populations less than two and half million (Appendix Table A3, Column 2). According to Table 2, the urban-rural gap in adoption, before controlling for socio-economic factors and state of residence, ranged from 12 percentage points to 20 percentage points depending on the size of the urban area. Figure 4 plots these adoption gaps by the size of the urban area. This again implies that socio-economic factors explain a substantial, but not the entire, urban-rural broadband Internet adoption gap. Broadband Internet price and availability are likely to explain some of the remaining urban-rural gap—the higher adoption rates in larger urban areas may be driven by lower prices and more availability of broadband Internet services in these areas.

Table 1 showed average broadband Internet adoption rates of 38% for households headed by someone with a disability and 68% for households headed by someone with no disability, implying a 30 percentage point adoption gap. The gap in adoption declines to 5 percentage points after controlling for socio-economic and geographic characteristics (Table 6), implying that the vast majority of the adoption gap associated with disability is explained by differences in these factors. This was not the case for race and ethnicity where a sizeable gap in adoption remained. Figure 5 shows the adoption gap associated with disability.

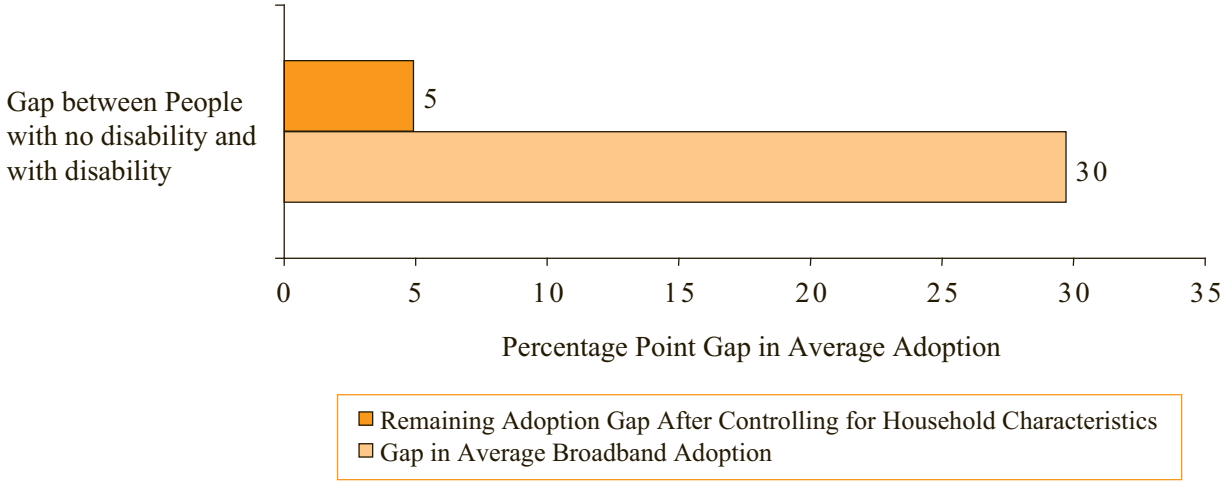
Table 6 also shows that foreign-born non-citizen households were, on average, 6 percentage points less likely than their U.S. citizen counterparts to subscribe to broadband Internet. This means that income, education, race, ethnicity and other observed characteristics explain more than half of the initial 13 percentage point gap in adoption between foreign-born non-citizens and American citizens (Table 1).

Figure 4: Urban-Rural Gap in Broadband Internet Adoption Before and After Controlling for Household Characteristics, by Urban Area Size, 2009



Source: U.S. Census Bureau, Current Population Survey (CPS) and CPS School Enrollment and Internet Use Supplement, October 2009, and ESA calculations.

Figure 5: Disability-related Gap in Broadband Internet Adoption Before and After Controlling for Household Characteristics, 2009



Source: U.S. Census Bureau, Current Population Survey (CPS) and CPS School Enrollment and Internet Use Supplement, October 2009, and ESA calculations.

In addition, our estimates show that the likelihood of broadband Internet use increases with age up to about age 30 to 35, after which it declines as age increases (not shown here). The state indicator variable accounts for a separate state-specific effect (these are not reported) and shows that significant differences exist in broadband Internet use across states, even after accounting for differences in income, education, urban-rural status, and other household characteristics. Finally, our analysis shows that the likelihood of home broadband Internet use increases with household size.

In summary, the regression results presented in this section suggest that income and education are strongly associated with broadband Internet use at home but are not the sole determinants. Other factors, particularly race, ethnicity, and urban-rural location, are also independently associated with home broadband Internet adoption. The adoption gaps associated with race and ethnicity, or urban and rural locations, are not entirely explained by socio-economic characteristics, i.e., these gaps do not disappear after accounting for differences in income, education, and a number of other key household attributes. Socio-economic factors, however, explain a substantial portion of the adoption gap associated with disability.

As mentioned previously, the decision to adopt broadband or any other type of Internet service technology at home likely occurs at the household level after evaluating the cost of the technology relative to the collective benefit of the technology for all household members. This suggests that the decision-making process is likely to vary across household types. We looked at the marginal effects of socio-economic and geographic attributes for four different household types—married couples with children, single parents with children, family households without children, and non-family households. The association between broadband Internet use and socio-economic and geographic attributes was quite robust across different household types. A brief discussion of these results is presented in Section A4 of the Appendix.

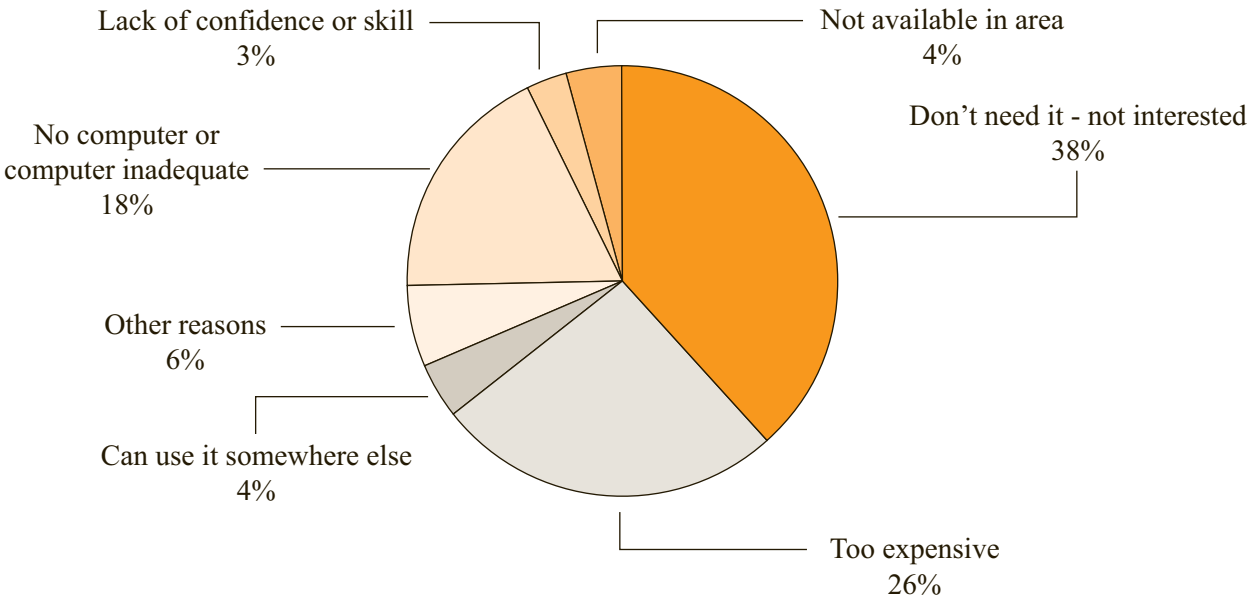
The CPS data do not provide information on price and availability of broadband Internet in a household's immediate location, which is why we are unable to account for these factors and therefore unable to distinguish how much of the variation across socio-economic and geographic dimensions is likely driven by demand versus supply-related factors. Part of the non-adoption may result from lower demand for broadband Internet, related to affordability or cost. But some non-adoption may occur because of lack of supply or availability of broadband Internet services. For instance, are rural residents less likely to adopt because they have lower demand for broadband Internet or because broadband Internet availability is limited in their location?

The CPS Internet Use Supplement does ask households to state their main reason for not using home broadband Internet services. The next section will analyze these reasons. We will see that factors like affordability, perceived need or interest, complementary equipment, and availability all play significant roles in a household's adoption decision.

Section 5: Main Reason for Non-Adoption of Home Broadband Internet

This section will analyze the principal reason for not having broadband Internet access at home. The CPS asks three types of non-users to state their main reason for not using home broadband Internet services—households that do not use the Internet generally, households that do not use the Internet specifically at home but report using the Internet elsewhere, and households that use a dial-up Internet service at home. Figure 6 tabulates the responses from all households without broadband Internet access, whereas Sections 5.1-5.3 separately analyze the responses from each group in order to understand whether adoption decisions of different groups are impacted by different factors. Note that the reasons provided by households reflect their subjective opinion since a household may not have full information on pricing, availability, or the benefit of using broadband Internet. For instance, a household may believe that broadband Internet is not available in its area, but be misinformed. As a result, any comparison across households, while informative, needs to be done with caution.

Figure 6: Main Reason for Non-Adoption of Home Broadband Internet, 2009



Source: U.S. Census Bureau, Current Population Survey (CPS) and CPS School Enrollment and Internet Use Supplement, October 2009, and ESA calculations.

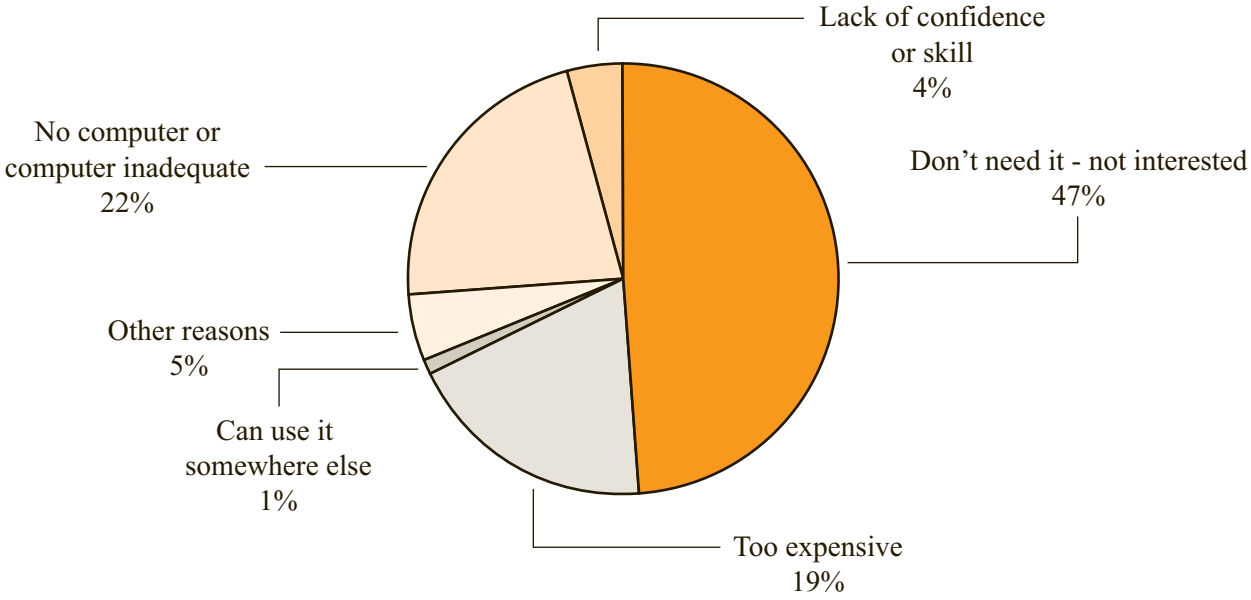
Note: The figure does not include the categories that were reported as the main reason by less than 1% of non-users.

Figure 6 shows that the most commonly cited reason for not having broadband Internet access at home was "don't need" (38%), followed by "too expensive"(26%) and "inadequate computer" (18%). The next three sections, however, will show that the relative significance of these factors varies across different types of non-users.

Section 5.1: Among Internet Non-Users

Figure 1 in Section 3 showed that almost one-fourth of American households (23%) in 2009 reported that no one in those households used the Internet at any location. This section will analyze the reasons given by these households for not having broadband Internet access at home. This group accounts for 65% of all those that do not access broadband Internet at home.

Figure 7: Main Reason Provided by Internet Non-Users, 2009



Source: U.S. Census Bureau, Current Population Survey (CPS) and CPS School Enrollment and Internet Use Supplement, October 2009, and ESA calculations.

Note: The figure does not include the categories that were reported as the main reason by less than 1% of non-users. See column 1 of Table 7 for the full set of results.

Lack of need or interest was the most commonly cited reason for not using broadband Internet services at home. Figure 7 shows that 47% of households who did not use the Internet cited "don't need it—not interested" as their principal reason for not subscribing to home broadband Internet services. Another 22% cited lack of an adequate computer. Only 19% cited affordability or cost. This means that a perceived lack of value or need was a more significant factor than affordability for non-use of broadband Internet services.

Table 7 shows the results for the overall sample as well as for urban and rural households. The two right columns of Table 7 show that the rankings are largely unchanged for urban and rural households. A larger share of rural households than their urban counterparts, however, stated lack of need as the major reason (52% compared to 46%), while a smaller share of rural households stated affordability as the major deterrent (16% compared to 20%). Lack of availability was not a significant impediment for either group.

Table 7: Main Reason Provided by Internet Non-Users, by Metropolitan Status, 2009

	All		Urban	Rural
Distribution of main reason by households (%)				
Don't need it – not interested	47.2		46.0	51.5
Too expensive	18.6		19.5	15.6
Can use it somewhere else	1.4		1.6	0.7
Not available in area	0.7		0.5	1.1
No computer or computer inadequate	22.3		22.1	23.0
Privacy and security	0.3		0.3	0.3
Concern for children's access	0.1		0.1	0.1
Lack of confidence or skill	4.3		4.5	3.7
Other reasons	5.1		5.4	4.1
Sample size	12,467		8,902	3,469
Estimated number of households	27,821,275		21,585,515	6,042,974

Source: U.S. Census Bureau, Current Population Survey (CPS) and CPS School Enrollment and Internet Use Supplement, October 2009, and ESA calculations..

Note: The sample size for urban and rural households does not add up to the total sample size because metropolitan-nonmetropolitan status is not identified for a small number of households. The share of households not using the Internet in 2009 was 23% for all households, 22% for urban households, and 32% for rural households.

Table 8 shows the reasons by income categories. A lack of need or interest was the primary reason for non-use in every income group. Affordability was much more important for low-income households, however. Lack of an adequate computer played an important role for all households.

Table 8: Main Reason Provided by Internet Non-Users, by Income, 2009

	All		Income Less than $25,000	Income $25,000-$50,000	Income $50,000-$75,000	Income $75,000-$100,000
Distribution of main reason by households (%)						
Don't need it – not interested	47.2		42.0	48.3	47.7	54.0
Too expensive	18.6		22.2	17.9	14.8	7.4
Can use it somewhere else	1.4		1.0	2.2	2.5	4.4
Not available in area	0.7		0.5	0.8	1.4	2.8
No computer or computer inadequate	22.3		24.4	21.0	22.6	19.4
Privacy and security	0.3		0.2	0.4	1.1	0.8
Concern for children's access	0.1		0	0.2	0	0.7
Lack of confidence or skill	4.3		4.8	3.6	4.5	4.3
Other reasons	5.1		5.0	5.6	5.3	6.2
Sample size	12,467		5,550	2,619	643	183
Estimated number of households	27,821,275		12,410,004	5,738,875	1,416,225	399,577

Source: U.S. Census Bureau, Current Population Survey (CPS) and CPS School Enrollment and Internet Use Supplement, October 2009, and ESA calculations.

Note: The share of households not using the Internet in 2009 was 23% for all households, 47% for households with incomes less than $25,000, 22% for households with incomes between $25,000 and $50,000, 8% for households with incomes between $50,000 and $75,000, and 4% for households with incomes between $75,000 and $100,000. The highest income category (income exceeding $100,000) was omitted because only a small minority, 2%, of households in this category did not use the Internet.

Table 9 identifies the reasons for non-use by race and ethnicity. The most important factor for all groups was need, although more White households than Black and Hispanic households gave this as the primary reason. In addition, affordability was a more significant factor for Black and Hispanic households.

Table 9: Main Reason Provided by Internet Non-Users, by Race and Ethnicity, 2009

	All		Non-Hispanic White	Non-Hispanic Black	Hispanic
Distribution of main reason by households (%)					
Don't need it – not interested	47.2		53.0	40.7	35.0
Too expensive	18.6		14.1	23.5	29.4
Can use it somewhere else	1.4		1.1	1.8	1.9
Not available in area	0.7		0.7	0.4	0.5
No computer or computer inadequate	22.3		21.1	23.6	26.0
Privacy and security	0.3		0.3	0.3	0.1
Concern for children's access	0.1		0.1	0.1	0.2
Lack of confidence or skill	4.3		4.3	3.9	3.2
Other reasons	5.1		5.3	5.7	3.7
Sample size	12,467		8,259	1,778	1,824
Estimated number of households	27,821,275		16,862,626	4,774,134	4,978,057

Source: U.S. Census Bureau, Current Population Survey (CPS) and CPS School Enrollment and Internet Use Supplement, October 2009, and ESA calculations..

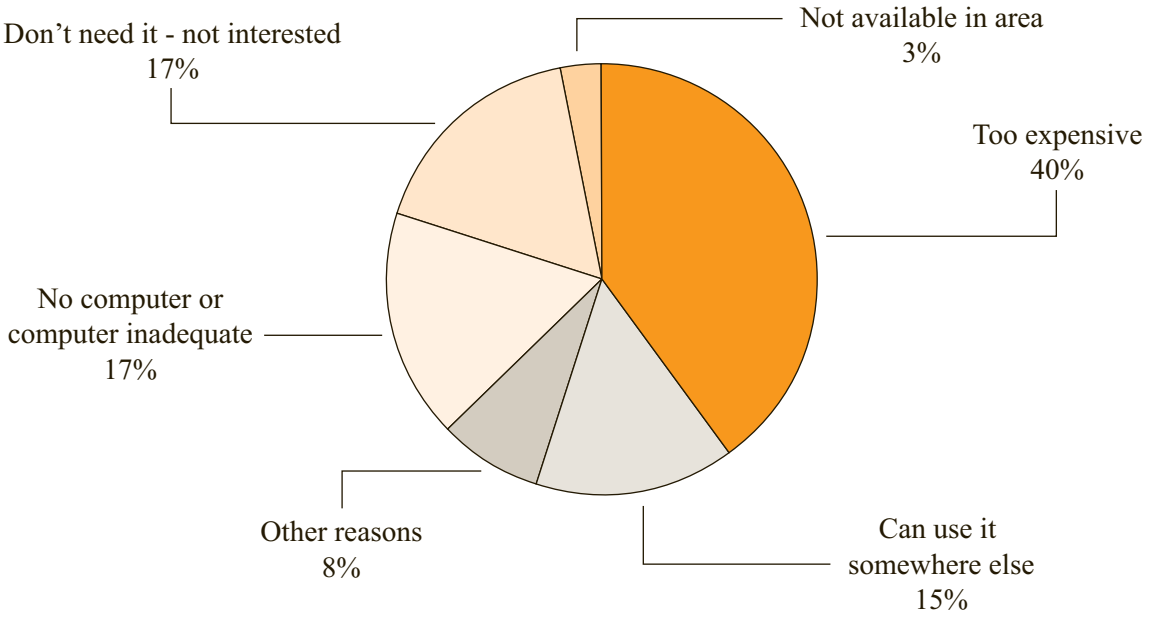
Note: The share of households not using the Internet in 2009 was 23% for all households, 20% for White households, 32% for Black households, and 36% for Hispanic households.

Section 5.2: Among Households Using the Internet Outside of Home

Figure 1 showed that 8% of American households in 2009 did not access the Internet from home but used it elsewhere. This section will analyze the reasons given by these households for not subscribing to home broadband Internet services. This group represents 22% of those that do not use broadband Internet at home.

Unlike the primary reason provided by Internet non-users (lack of need or interest), the most commonly cited reason by households that did not use the Internet specifically at home was related to affordability or cost. This is not surprising since these persons used the Internet, but not at home, demonstrating their perceived interest and need for high-speed Internet. Figure 8 shows that 40% of households that used the Internet at a place other than home cited "too expensive" as the main impediment to using broadband Internet at home. Another 17% cited lack of need or interest, 17% cited lack of an adequate computer, and 15% cited the ability to use it somewhere else.

Figure 8: Main Reason Provided by Households Using the Internet Outside of Home, 2009



Source: U.S. Census Bureau, Current Population Survey (CPS) and CPS School Enrollment and Internet Use Supplement, October 2009, and ESA calculations.

Note: The figure does not include the categories that were reported as the main reason by less than 1% of non-users. See column 1 of Table 10 for the full set of results.

Table 10: Main Reason Provided by Households Using the Internet Outside of Home, by Metropolitan Status, 2009

	All		Urban	Rural
Distribution of main reason by households (%)				
Don't need it – not interested	16.7		16.5	17.9
Too expensive	39.7		40.6	36.5
Can use it somewhere else	14.8		14.7	14.9
Not available in area	2.7		2.1	5.0
No computer or computer inadequate	16.9		16.9	16.5
Privacy and security	0.3		0.3	0.1
Concern for children's access	0.4		0.2	1.1
Lack of confidence or skill	0.4		0.5	0.3
Other reasons	8.2		8.3	7.8
Sample size	4,295		3,158	1,097
Estimated number of households	9,522,716		7,582,552	1,851,736

Source: U.S. Census Bureau, Current Population Survey (CPS) and CPS School Enrollment and Internet Use Supplement, October 2009, and ESA calculations..

Note: The sample size for urban and rural households does not add up to the total sample size because metropolitan-nonmetropolitan status is not identified for a small number of households. The share of households using the Internet at a location other than home in 2009 was 8% for all households, 8% for urban households, and 10% for rural households.

Table 10 shows the results for the overall sample as well as for urban and rural households. The two right columns of Table 10 show that urban and rural households rank these factors in a similar manner. Lack of availability, cited by 5% of rural households and 2% of urban households, was not a major deterrent to home broadband Internet use. As we will see in the next section, this is not the case for households using a dial-up Internet service.

Table 11 identifies the major reasons for not using broadband Internet at home by income categories. Affordability was the primary factor for households in the two lower income categories whereas other factors, like lack of demand, availability somewhere else, and lack of an adequate computer, were at least as important as affordability for households with incomes between $75,000 and $100,000. This suggests that affordability was among the top issues for Internet users that did not purchase home broadband Internet services, and this is true across a broad range of incomes.

Table 11: Main Reason Provided by Households Using the Internet Outside of Home, by Income, 2009

	All		Income Less than $25,000	Income $25,000-$50,000	Income $50,000-$75,000	Income $75,000-$100,000
Distribution of main reason by households (%)						
Don't need it – not interested	16.7		8.5	17.8	27.3	26.2
Too expensive	39.7		53.6	35.3	26.6	17.6
Can use it somewhere else	14.8		10.3	15.9	17.8	21.6
Not available in area	2.7		1.0	3.4	2.6	8.6
No computer or computer inadequate	16.9		19.2	17.4	13.5	15.6
Privacy and security	0.3		0	0.5	0.3	0
Concern for children's access	0.4		0.4	0.4	0.6	0
Lack of confidence or skill	0.4		0.4	0.6	0.5	0.1
Other reasons	8.2		6.5	8.7	10.8	10.4
Sample size	4,295		1,452	1,229	535	193
Estimated number of households	9,522,716		3,282,895	2,675,640	1,119,851	397,588

Source: U.S. Census Bureau, Current Population Survey (CPS) and CPS School Enrollment and Internet Use Supplement, October 2009, and ESA calculations.

Note: The share of households using the Internet at a location other than home in 2009 was 8% for all households, 12% for households with incomes less than $25,000, 10% for households with incomes between $25,000 and $50,000, 6% for households with incomes between $50,000 and $75,000, and 4% for households with incomes between $75,000 and $100,000. The highest income category (income exceeding $100,000) was omitted because only a small minority, 2%, of households in this category used the Internet at a location other than home.

Table 12 shows the primary reasons for not using broadband Internet at home by race and ethnicity. The most important reason was once again related to expense. However, a larger share of Black and Hispanic households (46% and 47%, respectively) than White households (35%) cited expense as the primary deterrent.

Table 12: Main Reason Provided by Households Using the Internet Outside of Home, by Race and Ethnicity, 2009

	All		Non-Hispanic White	Non-Hispanic Black	Hispanic
Distribution of main reason by households (%)					
Don't need it – not interested	16.7		18.5	13.6	13.8
Too expensive	39.7		35.4	45.5	47.0
Can use it somewhere else	14.8		16.3	12.3	12.2
Not available in area	2.7		3.8	1.2	0.9
No computer or computer inadequate	16.9		15.5	20.6	17.4
Privacy and security	0.3		0.2	0.2	0.4
Concern for children's access	0.4		0.4	0.5	0.5
Lack of confidence or skill	0.4		0.4	0.3	0.6
Other reasons	8.2		9.3	5.7	7.2
Sample size	4,295		2,714	747	579
Estimated number of households	9,522,716		5,500,807	2,026,284	1,533,738

Source: U.S. Census Bureau, Current Population Survey (CPS) and CPS School Enrollment and Internet Use Supplement, October 2009, and ESA calculations.

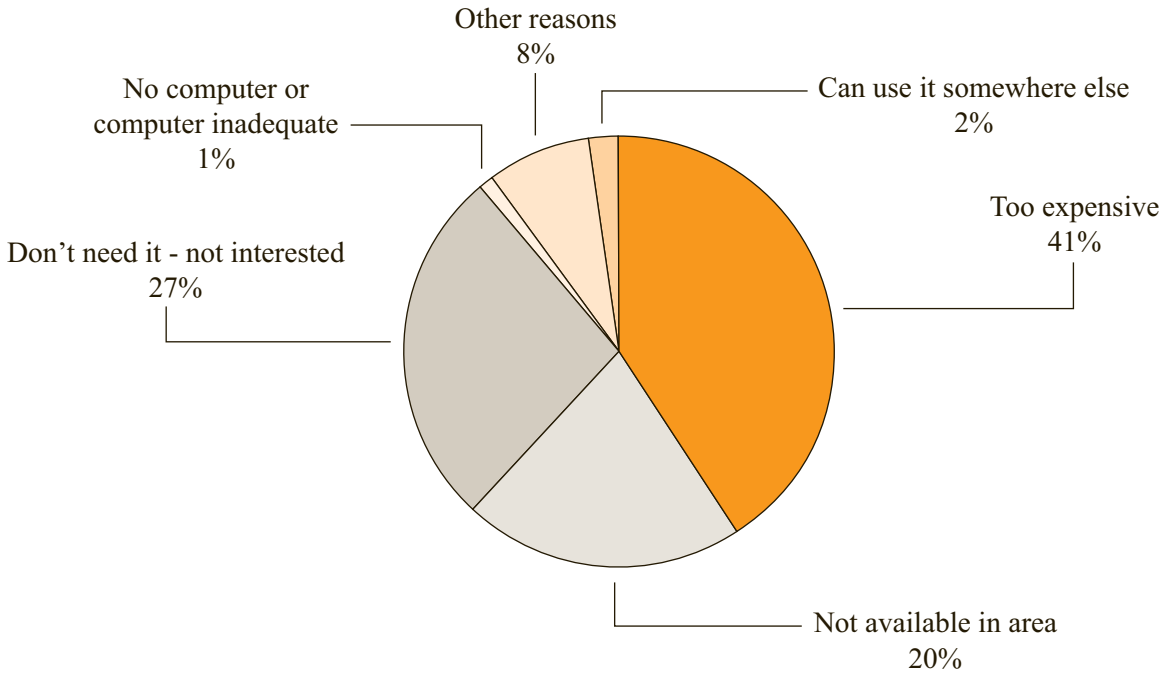
Note: The share of households using the Internet at a location other than home in 2009 was 8.0% for all households, 7% for White households, 14% for Black households, and 11% for Hispanic households.

Section 5.3: Among Households with Dial-up Internet Access

Figure 1 showed that 5% of American households in 2009 used a dial-up telephone service to access the Internet from home. This group comprises the underlying sample for Figure 9 and Tables 13 through 15 (representing 13% of those that do not access broadband Internet at home), and their responses for why they use a dial-up service, as opposed to a broadband Internet connection, are tabulated in these tables.

Figure 9 shows that the most commonly cited reason among dial-up users for not subscribing to broadband Internet at home in 2009 was "too expensive" (41%), followed by "don't need it – not interested" (27%), and lack of availability (20%).

Figure 9: Main Reason Provided by Households with Dial-up Internet Access, 2009



Source: U.S. Census Bureau, Current Population Survey (CPS) and CPS School Enrollment and Internet Use Supplement, October 2009, and ESA calculations.

Note: The figure does not include the categories that were reported as the main reason by less than 1% of non-users. See column 1 of Table 13 for the full set of results.

Table 13: Main Reason Provided by Households with Dial-up Internet Access, by Metropolitan Status, 2009

	All		Urban	Rural
Distribution of main reason by households (%)				
Don't need it – not interested	27.3		29.9	18.8
Too expensive	41.3		42.7	37.1
Can use it somewhere else	1.6		1.8	1.0
Not available in area	19.9		14.7	36.1
No computer or computer inadequate	1.1		1.4	0.2
Privacy and security	0.3		0.2	0.4
Concern for children's access	0.1		0.2	0
Lack of confidence or skill	0.8		0.9	0.4
Other reasons	7.6		8.2	6.1
Sample size	2,639		1817	799
Estimated number of households	5,648,799		4,263,953	1,341,764

Source: U.S. Census Bureau, Current Population Survey (CPS) and CPS School Enrollment and Internet Use Supplement, October 2009, and ESA calculations.

Note: The sample size for urban and rural households does not add up to the total sample size because metropolitan-nonmetropolitan status is not identified for a small number of households.The share of households using a dial-up Internet access in 2009 was 5% for all households, 4% for urban households, and 7% for rural households.

Table 13 shows the results for the overall sample as well as for urban and rural households. The two right columns of Table 13 show that urban and rural dial-up users weighted these reasons differently, however. Lack of availability was as important as affordability for rural dial-up users. Slightly more than one-third (36%) of rural households with dial-up said that lack of broadband availability was their primary reason for not using broadband Internet services, compared to a much smaller share (15%) of their urban counterparts. This implies that lack of availability (or at least a perceived lack of availability) is a more significant deterrent in rural areas than urban areas.

Table 14 identifies the reasons for not purchasing broadband Internet service by income levels. The most important reason, once again, was related to affordability for all but the group of households with incomes between $75,000 and $100,000 (lack of demand, expense, and lack of availability were reported by approximately the same share of households in this group). This means that affordability is a major concern for households across a broad range of incomes. A perceived lack of demand was equally important across the income groups, whereas lack of availability was more important for higher income households.

Table 14: Main Reason Provided by Households with Dial-up Internet Access, by Income, 2009

	All		Income Less than $25,000	Income $25,000-$50,000	Income $50,000-$75,000	Income $75,000-$100,000
Distribution of main reason by households (%)						
Don't need it – not interested	27.3		25.9	25.4	27.1	25.5
Too expensive	41.3		49.5	44.0	36.7	30.7
Can use it somewhere else	1.6		1.3	1.0	1.9	3.6
Not available in area	19.9		14.7	18.9	25.3	25.9
No computer or computer inadequate	1.1		1.4	0.8	1.9	0.7
Privacy and security	0.3		0.2	0.2	0.3	0.4
Concern for children's access	0.1		0	0.3	0	0.8
Lack of confidence or skill	0.8		0.6	0.9	1.0	0
Other reasons	7.6		6.5	8.6	5.7	12.4
Sample size	2,639		532	783	472	192
Estimated number of households	5,648,799		1,155,790	1,608,936	993,354	413,788

Source: U.S. Census Bureau, Current Population Survey (CPS) and CPS School Enrollment and Internet Use Supplement, October 2009, and ESA calculations.

Note: The share of households using dial-up Internet access in 2009 was 5% for all households, 4% for households with incomes less than $25,000, 6% for households with incomes between $25,000 and $50,000, 6% for households with incomes between $50,000 and $75,000, and 4% for households with incomes between $75,000 and $100,000. The highest income category (income exceeding $100,000) was omitted because only a small minority, 2%, of households in this category had a dial-up Internet access.

Table 15 shows similar trends, looking at separate race and ethnic groups. The most important reason for not using broadband Internet was related to expense, although a larger share of Hispanic and Black households (56% and 50%, respectively) than White households (38%) reported "too expensive" as their primary impediment. Lack of availability was more important for White and Black households than Hispanic households. This means a much smaller share of Hispanic households felt impacted by a perceived lack of availability than White and Black households.

Table 15: Main Reason Provided by Households with Dial-up Internet Access, by Race and Ethnicity, 2009

	All		Non-Hispanic White	Non-Hispanic Black	Hispanic
Distribution of main reason by households (%)					
Don't need it – not interested	27.3		27.5	28.8	22.0
Too expensive	41.3		37.8	50.0	55.5
Can use it somewhere else	1.6		1.3	1.3	4.7
Not available in area	19.9		23.3	13.5	6.2
No computer or computer inadequate	1.1		1.2	0.5	1.1
Privacy and security	0.2		0.3	0.5	0
Concern for children's access	0.1		0.2	0	0
Lack of confidence or skill	0.8		0.7	1.1	0.7
Other reasons	7.6		7.8	4.3	9.8
Sample size	2,639		2,033	265	229
Estimated number of households	5,648,799		4,147,090	653,916	600,717

Source: U.S. Census Bureau, Current Population Survey (CPS) and CPS School Enrollment and Internet Use Supplement, October 2009, and ESA calculations.

Note: The share of households using dial-up Internet access in 2009 was 5% for all households, 5% for White households, 4% for Black households, and 4% for Hispanic households.

Section 6: Demographic and Geographic Characteristics of Broadband versus Dial-up Internet Users

This section compares household-level attributes among broadband-using and dial-up-using households. Households that utilized a dial-up Internet service in 2009 accounted for a small minority (7%) of households using the Internet at home, whereas broadband users accounted for the vast majority (93%). The share of dial-up Internet users is shrinking, and the decline in dial-up users has been more than offset by the expansion in broadband-Internet-using households. It is still useful to analyze how dial-up-using households differ from their broadband-using counterparts because such a comparison can help to explain lags in technology adoption.

Tables 16 and 17 show the distributions of income, education, and a number of other demographic and geographic characteristics by dial-up-using and broadband-using households. According to these tables, dial-up users in 2009 were, on average, older, had lower levels of family income and education, and were more likely to reside in rural areas.

Dial-up Internet users were, on average, less affluent than broadband Internet users. Compared to households that subscribed to broadband Internet service, a larger share of dial-up users had family incomes less than $25,000 and a smaller share had incomes exceeding $100,000 (Table 16). Dial-up Internet users also obtained less education than broadband Internet users. Compared to broadband Internet users, a lower fraction of dial-up users had a college degree and a higher share had less than a high school degree.

Dial-up Internet users were older with an average age of 54, compared to 47 among broadband Internet users. A larger share of dial-up-using households was headed by someone with a disability, 16%, compared to half of that (8%) among their broadband-Internet-using counterparts.

Table 17 looks at geographic attributes and shows that households using dial-up Internet services were more likely to be rural dwellers. Almost one in four (24%) dial-up Internet users lived in rural areas, compared to about one in eight broadband Internet users (13%). Compared to dial-up users, broadband Internet users were more likely to live in large urban areas with populations exceeding one million (57% of broadband users, compared to 43% of dial-up users, lived in urban areas with populations exceeding one million).

Table 16: Household Demographic Attributes: Dial-up versus Broadband Internet Users, 2009

	Distribution by Households using Dial-up Internet (%)	Distribution by Households using Broadband Internet (%)
Percent of All Households	4.7	63.5
Percent of Households connecting to the Internet from home	6.9	92.5
Family Income		
Less than $25,000	20.5	12.5
$25,000-$50,000	28.5	20.9
$50,000-$75,000	17.6	18.4
$75,000-$100,000	7.3	11.7
More than $100,000	4.7	18.6
Education		
Less than High School Degree	10.8	5.6
High School Degree	36.4	23.5
Some College	29.7	30.9
College Degree or more	23.1	40.0
Race and Ethnicity		
White, Non-Hispanic	73.4	75.2
Black, Non-Hispanic	11.6	9.7
Asian, Non-Hispanic	2.4	4.7
American Indian or Alaskan Native, Non-Hispanic	0.6	0.5
Hispanic	10.6	8.7
Foreign-Born Status		
Citizens (including foreign born)	93.9	94.8
Non-Citizen	6.1	5.2
Age (mean years)	54.4	46.8
Gender	41.4	24.1
Male	49.3	53.6
Female	50.7	46.4
Household Type		
Married-couple with children	20.0	27.4
Single parents (male)	2.1	2.3
Single parents (female)	7.1	7.3
Family without children	41.6	36.1
Non-family households	29.3	27.0
Disability Status		
Has a disability	15.7	8.4
No disability	84.2	91.1
Sample Size	2,639	34,633
Estimated Number of Households	5,648,799	75,776,370

Source: U.S. Census Bureau, Current Population Survey (CPS) and CPS School Enrollment and Internet Use Supplement, October 2009, and ESA calculations.

Note: The distributions across the income categories do not sum to 100% since income data are not reported by some households.

Table 17: Household Geographic Attributes: Dial-up versus Broadband Internet Users, 2009

	Distribution by Households using Dial-up Internet (%)	Distribution by Households using Broadband Internet (%)
Region		
Northeast	17.1	19.2
Midwest	24.6	22.0
South	35.8	34.9
West	22.5	23.9
Urban-Rural Status		
Urban	75.5	86.6
Rural	23.8	12.8
Metropolitan Area (CBSA) Size		
Under 1,000,000	28.0	26.9
1,000,000-2,499,999	14.6	18.1
2,500,000-4,999,999	12.4	19.1
5,000,000 or more	16.2	19.5
Sample Size	2,639	34,633
Estimated Number of Households	5,648,799	75,776,370

Source: U.S. Census Bureau, Current Population Survey (CPS) and CPS School Enrollment and Internet Use Supplement, October 2009, and ESA calculations.

Section 7: Disability and Broadband Internet Use

This section analyzes broadband Internet adoption by people with disabilities. The disability community is a key population group that presents special challenges for adoption of broadband Internet and other modes of communications. "Disability" is defined by the Americans with Disabilities Act as "a physical or mental impairment that substantially limits a major life activity" (U.S. Department of Justice, 2010).[8] There were 36.1 million people with disabilities in 2008, or about 12.1% of the population (U.S. Census Bureau, 2010(b)). More than half have severe disabilities (Lyle, 2010).

The analysis presented in Section 4 of this report showed that people with disabilities were less likely than people with no disabilities to use broadband Internet at home, and that differences in socio-economic characteristics explain the majority of the adoption gap associated with disability. This section first looks at the profile of people with disabilities and their Internet and broadband Internet usage patterns. We then study their main reasons for non-use. In order to be consistent with the rest of the report, this section looks at broadband Internet (or Internet) adoption at home and its association with disability status of the head of household. Note that people with disabilities in this section refer to household heads with disabilities.[9]

Section 7.1: Profile of People with Disabilities

Table 18 presents data on income, education, age, and geographic location for the entire population, and separately by disability status of the head of the household. Fourteen percent of household heads, representing almost 17 million people, had a disability in 2009.[10] People with disabilities, on average, were older with an average age of 63, compared to 48 among householders with no disability. People with disabilities also had lower levels of household income and obtained less education. Almost half of all householders with disabilities (45%) had family incomes less than $25,000, compared to a fifth (19%) of the population with no disability. One in four people with disabilities (25%) did not have a high school degree, compared to one in ten among people with no disability (10%). People with disabilities were also more likely to live in rural areas—22% of households where the householder had a disability lived in rural areas, compared to 15% of those with no disability.

[8] In the CPS, a person with at least one of the following conditions is considered to have a disability: hearing impairment; blindness; impaired vision despite wearing glasses; physical, mental, or emotional condition that impairs the ability to concentrate, remember, or make decisions; difficulty in walking or climbing stairs; difficulty in dressing or bathing; physical, mental, or emotional condition that impairs the ability to do errands alone such as visiting a doctor's office or shopping (U.S. Census Bureau, 2009).

[9] Changing the unit of analysis from household level to individual level does not change the underlying patterns (the person-level data are presented in Section A5 of the Appendix).

[10] According to the October 2009 Current Population Survey, which collected information on disability only for adult civilian household members, there were about 27 million adults with disabilities.

Table 18: Household Demographic and Geographic Characteristics by Disability Status, 2009

	All Households	Distribution by Households/Householder where the householder has a disability (%)	Distribution by Households/Householder where the Householder has no disability (%)
Percent of All Households	100	14.1	85.6
Family Income			
Less than $25,000	22.1	44.9	18.5
$25,000-$50,000	21.8	19.3	22.1
$50,000-$75,000	14.7	8.6	15.7
$75,000-$100,000	8.5	3.4	9.3
More than $100,000	12.5	3.6	14.0
Education			
Less than High School Degree	12.3	24.7	10.3
High School Degree	29.3	34.4	28.5
Some College	28.3	25.5	28.6
College Degree or more	30.1	15.4	32.5
Age (mean years)	49.7	63.0	47.6
Geographic Location			
Urban	83.4	77.2	84.4
Rural	15.9	22.1	14.9
Sample Size	54,280	7,935	46,140
Estimated Number of Households	119,267,400	16,768,677	102,062,153

Source: U.S. Census Bureau, Current Population Survey (CPS) and CPS School Enrollment and Internet Use Supplement, October 2009, and ESA calculations.

Note: The distributions across the income categories do not sum to 100% since income data are not reported by some households.

Section 7.2: Internet Use by People with Disabilities

Given that people with disabilities have lower levels of income and education, are older, and are more likely to reside in rural areas, it is not surprising that they display lower broadband and Internet usage rates. Table 19 shows Internet and broadband Internet usage rates for the entire population, and separately by disability status of the household head. Only half of all households (51%) headed by someone with a disability had an Internet user, compared to the majority of households (81%) headed by someone without a disability. Only four out of ten households (43%) headed by someone with a disability subscribed to Internet services at home, compared to seven out of ten households (73%) where the householder has no disability. Broadband Internet subscription at home showed a similar pattern (38% compared to 68%).

Table 19: Average Internet Use by Disability Status, 2009

	All Households	Households where the Householder has a disability	Households where the Householder has no disability
Percent of All Households	100	14.1	85.6
Internet Use (%)			
At any location	76.7	50.6	80.9
At home	68.7	43.4	72.7
Use broadband Internet at home	63.5	37.8	67.6
Use dialup Internet at home	4.7	5.3	4.7
Sample Size	54,280	7,935	46,140
Estimated Number of Households	119,267,400	16,768,677	102,062,153

Source: U.S. Census Bureau, Current Population Survey (CPS) and CPS School Enrollment and Internet Use Supplement, October 2009, and ESA calculations.

Section 7.3: Main Reason for Non-Adoption by People with Disabilities

Section 4 of this report showed that socio-economic and geographic characteristics explained most of the adoption gap associated with disability. This report now looks at the main reason for non-adoption for people with disabilities. Tables 20, 21 and 22 analyze the main reasons for not having broadband Internet access at home for three types of non-users – households that do not use the Internet at any location, households that do not use the Internet specifically at home, and households that use dial-up Internet at home. These tables show that the primary reasons for non-adoption are largely similar for people with and without disabilities.

Table 20 shows that the main reason provided by Internet non-users was lack of demand, regardless of disability status. Compared to people with no disabilities, a smaller share of people with disabilities gave cost as the major reason (14% compared to 21%) and a slightly larger share of people with disabilities gave lack of confidence or skill as the major reason (6% compared to 4%).

Unlike Internet non-users, affordability was the biggest impediment to home broadband Internet access for households that did not use the Internet specifically at home (Table 21). A larger share of households headed by someone with a disability provided affordability as the principal reason (47% compared to 39%).

Affordability was among the top concerns for households with dial-up Internet access and was selected by the same share of such households, regardless of disability status.

Table 20: Main Reason Provided by Internet Non-Users, by Disability Status, 2009

	All		With Disability	No Disability
Distribution of main reason by households (%)				
Don't need it – not interested	47.2		48.8	46.6
Too expensive	18.6		13.6	20.7
Can use it somewhere else	1.4		0.5	1.8
Not available in area	0.7		0.4	0.8
No computer or computer inadequate	22.3		24.0	21.6
Privacy and security	0.3		0.4	0.3
Concern for children's access	0.1		0.0	0.1
Lack of confidence or skill	4.3		6.0	3.6
Other reasons	5.1		6.4	4.6
Sample size	12,467		3,912	8,548
Estimated number of households	27,821,275		8,287,550	19,520,186

Source: U.S. Census Bureau, Current Population Survey (CPS) and CPS School Enrollment and Internet Use Supplement, October 2009, and ESA calculations.

Note: The share of households not using the Internet in 2009 was 23% for all households, 49% for households headed by someone with a disability, and 19% for households headed by someone with no disability.

Table 21: Main Reason Provided by Households Using the Internet Outside of Home, by Disability Status, 2009

	All		With Disability	No Disability
Distribution of main reason by households (%)				
Don't need it – not interested	16.5		14.6	17.0
Too expensive	39.7		47.4	38.6
Can use it somewhere else	14.8		10.3	15.4
Not available in area	2.7		2.7	2.7
No computer or computer inadequate	16.9		17.5	16.8
Privacy and security	0.3		0.5	0.2
Concern for children's access	0.4		0.4	0.4
Lack of confidence or skill	0.4		0.3	0.5
Other reasons	8.2		6.4	8.4
Sample size	4,295		552	3,740
Estimated number of households	9,522,716		1,205,891	8,309,436

Source: U.S. Census Bureau, Current Population Survey (CPS) and CPS School Enrollment and Internet Use Supplement, October 2009, and ESA calculations.

Note: The share of households using the Internet at a location other than home in 2009 was 8% for all households, 7% for households headed by someone with a disability, and 8% for households headed by someone with no disability.

Table 22: Main Reason Provided by Households with Dial-up Internet Access, by Disability Status, 2009

	All		With Disability	No Disability
Distribution of main reason by households (%)				
Don't need it – not interested	27.3		27.4	27.3
Too expensive	41.3		39.6	41.6
Can use it somewhere else	1.6		1.5	1.7
Not available in area	19.9		21.0	19.7
No computer or computer inadequate	1.1		1.5	1.0
Privacy and security	0.3		0	0.3
Concern for children's access	0.1		0	0.2
Lack of confidence or skill	0.8		1.2	0.7
Other reasons	7.6		7.8	7.6
Sample size	2,639		425	2,212
Estimated number of households	5,648,799		888,070	4,754,852

Source: U.S. Census Bureau, Current Population Survey (CPS) and CPS School Enrollment and Internet Use Supplement, October 2009, and ESA calculations.

Note: The share of households using dial-up Internet access in 2009 was 5% for all households, 5% for households headed by someone with a disability, and 5% for households headed by someone with no disability.

Section 8: Long-Term Comparisons: 2001 versus 2009

The last section of this report will analyze the change in home broadband Internet adoption over this decade by comparing the most recent data from 2009 with that collected in 2001.[11] Sections 8.1, 8.2, and 8.3 analyze the growth in broadband Internet adoption over this decade by household demographic and geographic characteristics. Section 8.4 compares the marginal effects over time of selected demographic and geographic characteristics on the likelihood of home Internet use (Section 8.4.1) and broadband Internet use (Section 8.4.2).

Section 8.1: Broadband Internet Use by Demographic Characteristics: 2001 versus 2009

Table 23 presents data on average broadband Internet usage rates by demographic characteristics in 2001 and 2009. Table 23 shows that the share of households with broadband Internet service has risen sevenfold between 2001 and 2009, from 9% to 64% of households using broadband Internet services at home. Some of the groups which began with much lower adoption rates in 2001 have since exhibited significant gains. These impressive gains, however, have not eliminated the gaps within demographic groups defined by income, education, race, ethnicity, and age. For example, households in the lowest income group, with annual incomes less than $25,000, exhibited a twelvefold rise in broadband Internet adoption, from 3% to 36%, while households with incomes exceeding $75,000 saw more than a fourfold rise, from 21% to 92%. Despite the faster rise in the share of lower-income households with broadband Internet, a sizeable gap in average connectivity between these two groups, 36% compared to 92%, still persisted in 2009.

A similar pattern holds for other demographic groups. For instance, households where the householder had at least a college degree were much more likely in 2009 to have broadband Internet than their counterparts with a high school degree or less, even though households headed by someone with a high school degree or less experienced faster growth in broadband Internet use. Similarly, Hispanic households and non-Hispanic Black households had broadband Internet adoption rates which were half of non-Hispanic White adoption rates in 2001. Both Hispanic households and Black non-Hispanic households exhibited large gains in connectivity, but substantial gaps in adoption persisted across the race and ethnic groups in 2009. In 2001, the broadband Internet adoption rate for seniors (3%) was about one-fourth of the average rate for those between 16 and 44 years of age (11%). In 2009, the average senior adoption rate was slightly more than half of that for the 16-44 year old group (40% and 71%, respectively).

All groups have seen impressive growth during this decade in the use of home broadband Internet services, which has resulted in a "catching-up" between low adopters and high adopters over time. However, significant adoption gaps persist along demographic and socio-economic dimensions.

[11] Broadband refers to a Digital Subscriber Line (DSL) or a cable modem, the two dominant technologies of choice, in the 2001 CPS Internet Supplement data. In the 2009 CPS Supplement data, broadband refers to DSL, cable modem, fiber optics, satellite, wireless (such as Wi-Fi), mobile phone or PDA, or some other broadband Internet connection.

Table 23: Household Broadband Internet Use by Demographic Characteristics, 2001 and 2009

	Percent of households connecting to the Internet at home using broadband	
	2001	2009
All	9.2	63.5
Family Income		
Less than $25,000	3.1	35.8
$25,000-$50,000	7.3	61.0
$50,000-$75,000	12.2	79.3
More than $75,000	20.8	91.5
Education		
Less than High School Degree	2.4	28.8
High School Degree	5.7	50.9
Some College	10.3	69.5
College Degree or more	16.3	84.5
Race and Ethnicity*		
White, Non-Hispanic	10.2	68.0
Black, Non-Hispanic	4.7	49.4
Asian, Non-Hispanic	15.1	77.3
American Indian or Alaskan Native, Non-Hispanic	7.6	48.3
Hispanic	5.3	47.9
Foreign-Born Status		
Citizens (including foreign born)	9.3	64.4
Non-citizen	7.7	51.0
Age		
16 to 44 years	11.3	71.2
45 to 64 years	10.1	68.2
65 years and over	3.1	39.9
Gender		
Male	10.7	66.7
Female	7.6	60.2
Household Type		
Married-couple with Children	13.9	79.8
Single parents (male)	7.2	60.1
Single parents (female)	5.6	56.9
Family without children	9.1	67.7
Non-family households	7.0	50.8
Sample Size	56,573	54,280
Estimated Number of Households	107,064,178	119,267,400

Source: U.S. Census Bureau, Current Population Survey (CPS) and CPS School Enrollment and Internet Use Supplement, October 2009, CPS and CPS Computer and Internet Use Supplement, September 2001, and ESA calculations.

Note: *Contrary to 2009, the race and ethnicity indicators in 2001 do not separately identify multi-race categories. As a result, the race and ethnicity categories are not strictly comparable between 2001 and 2009.

Section 8.2: Broadband Internet Use by Geographic Region, and Urban and Rural Locations: 2001 versus 2009

Table 24: Household Broadband Internet Use by Geographic Location, 2001 & 2009

Percent of households connecting to the Internet at home using broadband		
	2001	2009
All Households	9.2	63.5
Region		
Northeast	11.3	67.0
Midwest	7.2	62.2
South	7.9	60.0
West	11.7	68.0
Urban-Rural Status		
Urban	10.5	65.9
Rural	3.8	51.0
Sample Size	56,573	54,280
Estimated Number of Households	107,064,178	119,267,400

Source: U.S. Census Bureau, Current Population Survey (CPS) and CPS School Enrollment and Internet Use Supplement, October 2009, CPS and CPS Computer and Internet Use Supplement, September 2001, and ESA calculations.

Note: The terms "urban" and "rural" refer to metropolitan and nonmetropolitan areas, respectively. Metropolitan area identifier in the 2001 CPS is based on Office of Management and Budget's 1990/1993 standards. According to definitions adopted in 1990, the term "metropolitan area" collectively referred to metropolitan statistical areas (MSAs), consolidated metropolitan statistical areas (CMSAs), and primary metropolitan statistical areas (PMSAs). Metropolitan area identifier for 2009 is based on "core based statistical area" (CBSA) which refers collectively to metropolitan and micropolitan statistical areas.

Table 24 presents average broadband Internet usage rates by geographic location (region and urban-rural location) in 2001 and 2009. Table 24 portrays a picture very similar to the one seen in the previous section --- broadband Internet use among households living in geographic areas with historically low adoption rates rose faster than among their counterparts in high adoption areas but some differences, particularly between urban and rural locations, were still present in 2009. According to Table 24, average broadband Internet usage rates in the South and the Midwest were about two-thirds of the average rates in the Northeast and the West in 2001. Households in all four regions have seen gains in broadband Internet adoption, with those in the Midwest and the South experiencing faster gains and therefore narrowing the gap with their counterparts in the Northeast and the West. A similar pattern holds for urban and rural locations, although there remained a 15 percentage point urban-rural gap in home broadband Internet use in 2009.

Section 8.3: Broadband Internet Use by State: 2001 versus 2009

Table 25 ranks the states in descending order by their average broadband Internet adoption rates in 2001 and 2009. The analysis from Section 4 of this report noted that broadband Internet usage varied significantly across states, even after controlling for household demographic characteristics and urban and rural locations. It is therefore not surprising that average state-level broadband Internet adoption rates varied from 42% to 73% in 2009 and from 2% to 18% in 2001. Table 25 shows that the states in the Northeast and West regions generally exhibited higher broadband Internet access than those in the South and the Midwest. The state rankings were relatively constant between 2001 and 2009. For instance, out of the top 15 broadband-Internet-using states in 2001, 11 were still among the top 15 in 2009. The states in the bottom were somewhat unchanged also—out of the bottom 15 states in 2001, 9 states were still among the bottom 15 in 2009.

According to the findings in Section 4, demographic and geographic characteristics - primarily income, education, race, ethnicity, and the extent of urbanization - explain some but not all of the

variation in broadband Internet adoption rates across states. This raises the following question: how much of the variation in adoption across states is driven by variation in broadband Internet availability? The CPS does not provide information on availability of broadband Internet services at the household's location. In order to compare adoption with availability, we utilized state-level data from the Federal Communications Commission (FCC).

The FCC collects data on high-speed Internet access services – both on adoption (number of high-speed Internet connections by type and speed of technology and by state) and availability (number of high-speed Internet service providers, by census tract level and state) (FCC, 2010). In order to compare the adoption measure used in this report with that from the FCC, we compared average state-level broadband Internet adoption from the CPS with FCC's data on the number of high-speed residential connections by state. We found that the two independent measures of adoption were highly positively correlated, validating the reliability of the home broadband Internet adoption measure from the CPS. In order to compare adoption with availability, we utilized three measures of availability at the state level from the FCC: total number of high-speed Internet service providers by state, percent of residences where the local telephone service providers provide DSL, and percent of residences where cable TV service providers provide cable modem Internet services. We found only a weak positive association between our estimated broadband Internet adoption and the data on availability. This weak correlation between adoption and availability at the state level is not surprising. Section 5 on main reasons for non-adoption showed that lack of availability primarily impacted rural households that did not subscribe to a high-speed broadband Internet service at home and used a slower dial-up service instead. This

Table 25: Ranking of States by Average Home Broadband Internet Adoption, 2001 and 2009

2009 Ranking		2001 Ranking	
State	Percent of Households Using Broadband Internet at Home	State	Percent of Households Using Broadband Internet at Home
UT	73 (12)	HI	18
NH	73 (14)	MA	14
AK	73 (13)	NH	14
MA	73 (14)	CA	13
NJ	72 (12)	AK	13
WA	72 (11)	NJ	12
CT	71 (11)	AZ	12
OR	70 (9)	NY	12
HI	70 (18)	UT	12
MD	70 (9)	CT	11
RI	69 (11)	WA	11
CO	69 (10)	RI	11
NV	68 (7)	TN	10
CA	68 (13)	CO	10
ID	67 (6)	FL	10
AZ	67 (12)	KS	10
WI	67 (6)	NE	10
MN	67 (8)	ME	10
KS	67 (10)	OR	9
DE	67 (6)	TX	9
FL	67 (10)	MD	9
DC	66 (7)	MI	9
NY	66 (12)	SD	9
WY	66 (6)	IA	9
VA	65 (8)	SC	8
GA	64 (7)	PA	8
NE	64 (10)	VT	8
IL	63 (6)	MN	8
ND	63 (5)	OK	8
MI	62 (9)	VA	8
IA	62 (9)	OH	8
PA	62 (8)	DC	7
OH	61 (8)	MO	7
ME	61 (10)	NV	7
VT	61 (8)	GA	7
TX	60 (9)	NC	7
SD	60 (9)	ID	6
NC	59 (7)	IL	6
MT	58 (3)	DE	6
MO	57 (7)	WI	6
LA	57 (5)	WY	6
IN	56 (4)	MS	6
OK	56 (8)	LA	5
TN	55 (10)	AL	5
NM	55 (2)	ND	5
KY	54 (3)	WV	4
SC	53 (8)	AR	4
WV	52 (4)	IN	4
AR	51 (4)	MT	3
AL	48 (5)	KY	3
MS	42 (6)	NM	2

Source: U.S. Census Bureau, Current Population Survey (CPS) and CPS School Enrollment and Internet Use Supplement, October 2009, CPS and CPS Computer and Internet Use Supplement, September 2001, and ESA calculations.

Note: The numbers in parentheses next to the 2009 data refer to the 2001 adoption rate for the state. Because of sampling variability, average adoption rates for two states may not be different from one another in a statistically significant way. Tables A7 and A8 in Appendix Section A6 provide the standard error and 90% confidence interval for each state.

suggests that one is likely to find a stronger association between adoption and availability only when using more granular geographic data. State-level data are aggregated across urban and rural areas and are therefore likely to show little correlation between adoption and availability.

Section 8.4: Marginal Effects of Demographic and Geographic Characteristics on Adoption Over Time

Given the results of this section, one must ask how the adoption gaps, after accounting for differences in demographic and geographic characteristics, have changed over the decade. In other words, how robust are the marginal effects of household characteristics on adoption? Section 4.2 of this report utilized a regression analysis framework that estimated the impact of multiple factors together on the probability that a household adopted broadband Internet services at home. The analysis allowed us to isolate the effect of any one factor, holding everything else constant. We referred to these results as the marginal effects of selected demographic and geographic characteristics on household broadband Internet use. The factors that we controlled for included family income, education, age, race, ethnicity, foreign-born status, household size (total number of persons in household), disability status, and geographic location (urban-rural location and state).

In this section we will apply a similar regression analysis framework to estimate the marginal effects of demographic and geographic factors on home Internet use in 2001 and 2009, and the marginal effects of demographic and geographic factors on home broadband Internet use in 2007 and 2009. Why do we focus on home Internet use generally in lieu of home broadband Internet use for the comparative analysis for 2001 and 2009? Broadband Internet was a relatively new technology in the early 2000s, which is why both availability and adoption levels at that time were low but both grew significantly over the decade. In order to compare the impacts of household characteristics on adoption between two time periods, it is useful to use a metric or indicator of adoption that is consistent over time. This is why we will first focus on Internet use at home to compare the adoption gaps or marginal effects between 2001 and 2009 (Section 8.4.1). In order to compare the adoption gaps or marginal effects for home broadband Internet use, we will use data for 2007 and 2009 (Section 8.4.2).

The full set of regression results from these analyses is presented in Sections A7 and A8 of the Appendix. The factors that we control for in these analyses include household income, education, age, race, ethnicity, foreign-born status, household size (total number of persons in household), and geographic location (urban-rural location and state).[12]

Section 8.4.1: Marginal Effects of Demographic and Geographic Characteristics on the Likelihood of Home Internet Use, 2001 versus 2009

Between 2001 and 2009, Internet use at home rose by one-third, from 51% to 69% of American households connecting to the Internet from home. Table 26 presents the estimated marginal effects

[12] Unlike the regression analysis for 2009 presented in Section 4.2, we are unable to control for disability status in this section since similar data on disability are not available for 2001.

of selected socioeconomic (income, education, race, ethnicity), and geographic (urban-rural status) factors on the probability of Internet use at home. These marginal effects changed only slightly between 2001 and 2009. For example, after controlling for various non-income attributes, the gap between households with incomes exceeding $75,000 and households with incomes less than $25,000 declined slightly, from 37 to 32 percentage points. Compared to households where the householder has less than a high school degree, the relative gains associated with a high school degree and some college have risen but those associated with a college degree or more have not changed.

Table 26 also shows that the White-Black gap in home Internet use, after holding the other attributes constant, has fallen from 16 percentage points in 2001 to 10 percentage points in 2009, whereas the White-Hispanic gap remained largely unchanged. This suggests that Internet use in Black households, on average, has gotten closer to that in White households, after accounting for socio-economic and geographic characteristics, although the same pattern of convergence does not hold for Hispanic households. The urban-rural gap in home Internet use stayed similar, implying that the increased likelihood of home Internet use by urban dwellers relative to their rural-area counterparts has not changed.

Table 26: Marginal Effects of Demographic and Geographic Characteristics on the Likelihood that a Household Uses Internet at Home, 2001 and 2009

Household Characteristics	Adoption Gap in 2001 (percentage point)	Adoption Gap in 2009 (percentage point)
Household Income		
Gap between households with incomes $25,000-$50,000 and households with incomes less than $25,000	16	18
Gap between households with incomes $50,000-$75,000 and households with incomes less than $25,000	30	30
Gap between households with incomes exceeding $75,000 and households with incomes less than $25,000	37	32
Education		
Gap between those with a high school degree and those with less than high school degree	10	13
Gap between those with some college and those with less than high school degree	21	25
Gap between those with a college degree or more and those with less than high school degree	29	30
Race and Ethnicity		
Gap between White, Non-Hispanic and Black, Non-Hispanic	16	10
Gap between White, Non-Hispanic and Hispanic	15	14
Gap between White, Non-Hispanic and Asian	-5	2
Urban-Rural		
Gap between urban and rural households	4	5
Sample Size	47,310	43,662
Estimated Number of Households	88,963,933	94,963,684

Source: U.S. Census Bureau, Current Population Survey (CPS) and CPS School Enrollment and Internet Use Supplement, October 2009, CPS and CPS Computer and Internet Use Supplement, September 2001 and ESA calculations.

Note: Sample includes all households with the head of household aged 16 or more, and non-missing data on income.

Section 8.4.2: Marginal Effects of Demographic and Geographic Characteristics on the Likelihood of Home Broadband Internet Use, 2007 versus 2009

Between 2007 and 2009, broadband Internet use among households rose by one-fourth, from 51% to 64% of American households using broadband Internet services. Table 27 compares the marginal effects of household characteristics on the likelihood of home broadband Internet use between 2007 and 2009. The full set of these regression results is presented in Section A8 of the Appendix. The marginal effects of household demographic and geographic factors on home broadband Internet adoption stayed largely unchanged between 2007 and 2009. For example, relative to households in the lowest income group, the likelihood of adoption rose slightly (from 13 to 17 percentage points) for households with incomes between $25,000 and $50,000, while the likelihood of adoption fell slightly (from 39 to 35 percentage points) for households in the highest income group.

Table 27 also shows that the White-Black and the White-Hispanic gaps in home broadband Internet use, as well as urban-rural gaps, did not change considerably between 2007 and 2009.

Table 27: Marginal Effects of Demographic and Geographic Characteristics on the Likelihood that a Household Uses Broadband Internet at Home, 2007 and 2009

Household Characteristics	Adoption Gap in 2007 (percentage point)	Adoption Gap in 2009 (percentage point)
Household Income		
Gap between households with incomes $25,000-$50,000 and households with incomes less than $25,000	13	17
Gap between households with incomes $50,000-$75,000 and households with incomes less than $25,000	26	28
Gap between households with incomes $75,000-$100,000 and households with incomes less than $25,000	33	32
Gap between households with incomes exceeding $100,000 and households with incomes less than $25,000	39	35
Education		
Gap between those with a high school degree and those with less than high school degree	8	11
Gap between those with some college and those with less than high school degree	21	23
Gap between those with a college degree or more and those with less than high school degree	30	29
Race and Ethnicity		
Gap between White, Non-Hispanic and Black, Non-Hispanic	11	10
Gap between White, Non-Hispanic and Hispanic	12	14
Gap between White, Non-Hispanic and Asian	-4	0
Urban-Rural		
Gap between urban and rural households	8	7
Sample Size	42,481	43,662
Estimated Number of Households	91,153,697	94,963,684

Source: U.S. Census Bureau, Current Population Survey (CPS) and CPS School Enrollment and Internet Use Supplement, October 2007 and October 2009, and ESA calculations.

Note: Sample includes all households with the head of household aged 16 or more, and non-missing data on income.

Section 9: Conclusion

Household use of broadband Internet service has risen dramatically during this decade as the Internet has expanded to become an integral component of life for many American households. Nonetheless, not everyone uses the Internet or has access to it. This report attempts to analyze what factors are associated with home broadband Internet adoption, using data from a special 2009 supplement to the CPS that asked questions about broadband Internet use of more than 50,000 households.

The analysis determines that some significant adoption gaps exist today, particularly by income and education levels. For example, controlling for various non-income household attributes, the gap between households with incomes greater than $100,000 and those with incomes less than $25,000 totals 34 percentage points. Similarly, the controlled gap for those with at least college degrees versus those with no high school diplomas tallies 29 percentage points.

However, this report also shows that income and education levels, although strongly associated with broadband Internet use, are not the sole determinants of broadband Internet adoption by households. Even after accounting for differences in income and education (and a number of other key household attributes), there remain significant differences in adoption rates across race and ethnicity, and across urban and rural areas. For example, the unexplained gaps between Whites and Blacks (10 percentage points) and Whites and Hispanics (14 percentage points) remain at double digits in 2009. The adoption gap for rural versus urban is halved once controlled for household attributes, but still registers 7 percentage points.

This report also finds that lack of need or interest, lack of affordability, lack of an adequate computer, and lack of availability were all stated as main determinants of non-adoption of broadband Internet services. The significance of these factors, however, varied across non-users, with affordability and demand generally dominating. For instance, Internet non-users (representing almost two-thirds of non-users of broadband at home) reported lack of need or interest as the main reason for not subscribing to home broadband Internet services, whereas affordability was the most important deterrent for those who either used the Internet at a location other than home or used a dial-up Internet service at home. This suggests that those who used the Internet had a higher estimation of broadband Internet's value and need than those that did not. The significance of these factors differed somewhat by income, race, and ethnicity, but affordability appeared to be a major concern for households even at relatively high income levels.

This report also finds that broadband Internet use among households rose sevenfold, from 9% to 64%, between 2001 and 2009. Some of the groups that had lower than average adoption rates in 2001 have since exhibited impressive gains. Substantial adoption gaps still persist in broadband Internet access within demographic groups, as well as across states and between urban and rural areas.

Even though broadband Internet use has expanded significantly during this decade, not all groups are participating in the Internet revolution to the same extent. For a number of reasons, some groups lag behind in adopting this technology that has altered the social and economic landscape of the country. For example, broadband Internet adoption is particularly low among rural low-income Black and

Hispanic households. This report enhances our understanding of the factors that are important drivers of – or impediments to – adoption. This information may contribute to the national efforts to ensure that everyone has an opportunity to be linked into the services and information available through the Internet.

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Appendix

Section A1: Data

This report utilizes data from the Department of Commerce's U.S. Census Bureau, taken from the Census Bureau's October 2009 Current Population Survey (CPS) of 54,324 interviewed households. Data collection for the survey took place from October 18 through 26, 2009, and generated response rates of 92.1 percent for the basic CPS, with 93.8 percent of the CPS respondents answering the School Enrollment and Internet Use Supplement (i.e., 86.4 percent of the CPS sample answered the supplement).

The households surveyed were selected from the 2000 Decennial Census with coverage in all 50 states and the District of Columbia. The sample is continually updated to account for new residential construction. The Census divided the United States into 2,025 geographic areas, each typically comprised of a county or several contiguous counties. A total of 824 geographic areas were selected for the 2009 CPS survey. For each household, Census Bureau interviewers spoke to a person (called the "respondent") who was at least 15 years old and was considered knowledgeable about everyone in the household. The survey collected data both at the household level and at the individual level. For purposes of collecting data at an individual level, the respondent provided responses for himself or herself and proxy responses for all other members of that household age 3 and older. The survey, therefore, provided information on more than 129,000 individuals (age 3 and older).

The procedure used in developing estimates for the entire civilian noninstitutional population for the CPS involves weighting sample results using independent estimates of the population by state, sex, age, race, and Hispanic/non-Hispanic categories. These independent estimates are developed by the Census Bureau using civilian noninstitutional population counts from the last decennial census and projecting them forward to current years using data on births, deaths, and net migration.

Table A1: Individual Broadband Internet Use by Demographic Characteristics, 2009

Individual Broadband Internet Use: Percent of persons connecting to the Internet at home using broadband	
All Persons*	59.1
Household Income	
Less than $25,000	31.9
$25,000-$50,000	52.4
$50,000-$75,000	70.0
$75,000-$100,000	78.7
More than $100,000	86.5
Education	
Less than High School Degree	37.3
High School Degree	48.1
Some College	70.6
College Degree or more	83.4
Race and Ethnicity	
White, Non-Hispanic	65.7
Black, Non-Hispanic	45.9
Asian, Non-Hispanic	67.3
American Indian or Alaskan Native, Non-Hispanic	42.6
Hispanic	39.7
Age	
3 to 15 years	49.7
16 to 44 years	68.9
45 to 64 years	63.2
65 years and over	33.4
Gender	
Male	59.3
Female	59.0
Household Type	
Married-couple with children	74.1
Single parent (male)	54.0
Single parent (female)	52.3
Family without children	59.5
Non-family household	50.2
Disability Status	
Has a disability	33.1
No disability	65.1
Foreign-Born Status	
Citizens (including foreign born)	60.5
Non-Citizen	42.3
Sample Size	129,249
Estimated Population	289,420,157

Source: U.S. Census Bureau, Current Population Survey (CPS) and CPS School Enrollment and Internet Use Supplement, October 2009, and ESA calculations.

Note: People who report using the Internet at any location and live in a household that subscribes to a broadband Internet service are considered to use broadband Internet at home. Because of the way the CPS Internet Use Supplement questions are constructed, it is not possible to directly identify people who use broadband Internet at home. *Sample includes all people 3 years of age or older.

Section A2: Broadband Internet Use at the Individual Level, 2009

This section provides data on person-level broadband Internet use by demographic and geographic characteristics. The report presents and analyzes broadband Internet adoption data at the household level. The underlying trends do not change if persons, as opposed to households and heads of households, are the unit of analysis.

Table A2: Individual Broadband Internet Use by Geographic Characteristics, 2009

Individual Broadband Internet Use: Percent of persons connecting to the Internet at home using broadband	
All Persons*	59.1
Metropolitan Status	
Urban	61.1
Rural	48.5
Metropolitan Area (CBSA) Size	
Under 1,000,000	59.3
1,000,000-2,499,999	61.6
2,500,000-4,999,999	65.6
5,000,000 or more	60.1
Sample Size	129,249
Estimated Population	289,420,157

Source: U.S. Census Bureau, Current Population Survey (CPS) and CPS School Enrollment and Internet Use Supplement, October 2009, and ESA calculations.

Note: *Sample includes all people 3 years of age or older.

Section A3: Marginal Effects of Demographic and Geographic Characteristics on the Likelihood that a Household Uses Broadband Internet at Home, 2009

This section contains the underlying regression results for Table 6 in Section 4.2. Section 4.2 indicates that we utilized a regression analysis framework to estimate the simultaneous impact of multiple factors on the probability that a household adopts broadband Internet services at home. The results allow us to isolate the effect of any one factor, holding all the other factors constant. We refer to these results as the marginal effects of selected demographic and geographic characteristics on home broadband Internet use.

Table A3: Marginal Effects: Regression of Broadband Internet Adoption on Demographic and Geographic Characteristics, 2009

Linear Probability Model	Column 1	Column 2
Family Income: Less than $25,000	omitted	omitted
Family Income: $25,000-$50,000	0.1597*** (0.007)	0.1593*** (0.007)
Family Income: $50,000-$75,000	0.2730*** (0.008)	0.2720*** (0.008)
Family Income: $75,000-$100,000	0.3141*** (0.008)	0.3122*** (0.008)
Family Income: $100,000 or more	0.3377*** (0.008)	0.3343*** (0.008)
Education: Less than High School Degree	omitted	omitted
Education: High School Degree	0.1066*** (0.008)	0.1065*** (0.008)
Education: Some College	0.2282*** (0.009)	0.2279*** (0.009)
Education: College Degree or more	0.2887*** (0.009)	0.2872*** (0.009)
Age	0.0067*** (0.001)	0.0068*** (0.001)
Age-squared	-0.0001*** (0.000)	-0.0001*** (0.000)
Non-Hispanic White	omitted	omitted
Non-Hispanic Black	-0.1002*** (0.008)	-0.1039*** (0.008)
Hispanic	-0.1407*** (0.009)	-0.1429*** (0.009)
Non-Hispanic Asian	-0.0043 (0.011)	-0.0079 (0.011)
Non-Hispanic, Other	-0.0486*** (0.017)	-0.0492*** (0.017)
Metropolitan (Urban)	0.0689*** (0.007)	
Nonmetropolitan (Rural)	omitted	omitted
Not-identified (as metropolitan or nonmetropolitan)	0.0463* (0.026)	
Metropolitan size: Less than 1 million		0.0636*** (0.007)
Metropolitan size: 1 to 2.5 million		0.0727*** (0.008)
Metropolitan size: 2.5 to 5 million		0.0908*** (0.009)
Metropolitan size: 5 million or more		0.0855*** (0.010)
Metropolitan size - not identified		0.0302**
		(0.012)
Disability	-0.0525*** (0.007)	-0.0520*** (0.007)
Disability-not identified	0.0870*** (0.023)	0.0924*** (0.024)
Foreign-born non-citizen	-0.0564*** (0.011)	-0.0586*** (0.011)
Total number of persons in household	0.0255*** (0.002)	0.0258*** (0.002)
State indicator variables	yes	yes
Constant	0.0867*** (0.029)	0.0888*** (0.029)
Sample Size	43,662	43,662
Estimated Number of Households	94,963,684	94,963,684
R-squared	0.308	0.309

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: U.S. Census Bureau, Current Population Survey (CPS) and CPS School Enrollment and Internet Use Supplement, October 2009, and ESA calculation

Note: The marginal effects reported on Table 6 in Section 4.2 are from the first column.

Section A4: Marginal Effects of Demographic and Geographic Characteristics on the Likelihood that a Household Uses Broadband Internet at Home, by Household Type, 2009

We performed our regression analysis separately for different household types in order to analyze how stable or robust the associations are between broadband Internet use and household attributes. Table A4 shows the marginal effects of demographic and geographic characteristics on the likelihood of broadband Internet use for four different household types: married-couple households with children, single-parent households with children, family households without children, and non-family households.

In this section, we will briefly discuss the results for married-couple households with children and single-parent households with children. Married-couple families with children represent 22% of our sample and single-parent families with children represent another 11%. The first column of Table A4 presents the results for the overall sample and the next two columns present the results for the two sub-groups.

The marginal effects of most of the characteristics are similar for our two family types, implying that the association between household attributes and broadband Internet use are rather robust among these two family types. For example, income has very similar effects on broadband Internet use for these two groups. The likelihood of broadband Internet use rises with income, and the rising effect of income diminishes as income grows. The effect of education is similar, except that a college degree (or more) has a steeper impact on single-parent families than their married-couple counterparts. Relative to households where the householder has less than a high school degree, a single-parent household headed by someone with a college degree is 31 percentage points more likely to use broadband Internet at home (all else similar), compared to 24 percentage points for their married-couple counterparts.

The adoption gap between White and Black households is larger for single-parent (11 percentage points) families than among their married-couple counterparts (6 percentage points). The adoption gaps between White and Hispanic households are similar for both married-couple and single-parent households.

The marginal effects of foreign-born status, disability status, metropolitan status, and household size are similar for the two groups.

Table A4: Marginal Effects: Regression of Broadband Internet Adoption on Demographic and Geographic Characteristics, by Household Type, 2009

Linear Probability Model	All	Married-couple with Children	Single-parents with Children	Family Households without Children	Non-family Households
Family Income: Less than $25,000	omitted	omitted	omitted	omitted	omitted
Family Income: $25,000-$50,000	0.1597*** (0.007)	0.1552*** (0.019)	0.1404*** (0.019)	0.1405*** (0.014)	0.1207*** (0.011)
Family Income: $50,000-$75,000	0.2730*** (0.008)	0.2524*** (0.019)	0.2508*** (0.024)	0.2414*** (0.015)	0.2160*** (0.013)
Family Income: $75,000-$100,000	0.3141*** (0.008)	0.2718*** (0.020)	0.3195*** (0.031)	0.2912*** (0.016)	0.2695*** (0.016)
Family Income: $100,000 or more	0.3377*** (0.008)	0.2963*** (0.019)	0.3188*** (0.026)	0.3258*** (0.015)	0.2877*** (0.015)
Education: Less than High School Degree	omitted	omitted	omitted	omitted	omitted
Education: High School Degree	0.1066*** (0.008)	0.1429*** (0.021)	0.1102*** (0.024)	0.1094*** (0.016)	0.0830*** (0.012)
Education: Some College	0.2282*** (0.009)	0.2282*** (0.021)	0.2331*** (0.024)	0.2267*** (0.016)	0.2348*** (0.014)
Education: College Degree or more	0.2887*** (0.009)	0.2425*** (0.021)	0.3113*** (0.028)	0.2683*** (0.016)	0.3524*** (0.014)
Age	0.0067*** (0.001)	0.0126*** (0.003)	0.0055 (0.003)	0.0075*** (0.002)	-0.0026** (0.001)
Age-squared	0.0001*** (0.000)	-0.0001*** (0.000)	-0.0001 (0.000)	-0.0001*** (0.000)	-0.0000*** (0.000)
Non-Hispanic White	omitted	omitted	omitted	omitted	omitted
Non-Hispanic Black	0.1002*** (0.008)	-0.0568*** (0.018)	-0.1118*** (0.021)	-0.0868*** (0.016)	-0.1051*** (0.013)
Hispanic	0.1407*** (0.009)	-0.1051*** (0.015)	-0.1258*** (0.025)	-0.1423*** (0.016)	-0.1790*** (0.017)
Non-Hispanic Asian	0.0043 (0.011)	0.0226 (0.016)	0.0255 (0.055)	-0.0326 (0.020)	-0.0291 (0.023)
Non-Hispanic Other	0.0486*** (0.017)	-0.0943*** (0.034)	-0.0508 (0.041)	-0.0015 (0.031)	-0.0486* (0.028)
Disability	0.0525*** (0.007)	-0.0453* (0.024)	-0.0952*** (0.027)	-0.0185 (0.012)	-0.0577*** (0.011)
Disability - not identified	0.0870*** (0.023)	0.0879*** (0.031)	-0.1961 (0.165)	0.1368*** (0.024)	0.1282** (0.054)
Foreign-born non-citizen	0.0564*** (0.011)	-0.0818*** (0.019)	-0.1051*** (0.029)	-0.0521** (0.021)	-0.0119 (0.020)
Total number of persons in household	0.0255*** (0.002)	0.0001 (0.004)	0.0084 (0.006)	0.0296*** (0.006)	0.0430*** (0.008)
Metropolitan (Urban)	0.0689*** (0.007)	0.0704*** (0.013)	0.0901*** (0.023)	0.0703*** (0.011)	0.0630*** (0.012)
Nonmetropolitan (Rural)	omitted	omitted	omitted	omitted	omitted
Not-identified (as metropolitan or nonmetropolitan)	0.0463* (0.026)	0.1082** (0.042)	-0.0189 (0.099)	0.0541 (0.043)	-0.0091 (0.051)
Constant	0.0867*** (0.029)	0.0208 (0.079)	-0.0205 (0.090)	0.1162** (0.053)	0.3381*** (0.051)
Sample Size	43,662	9,857	4,551	14,673	14,581
Estimated Number of Households	94,963,684	21,734,535	10,381,473	30,977,040	31,870,635
R-squared	0.308	0.258	0.234	0.256	0.343

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: U.S. Census Bureau, Current Population Survey (CPS) and CPS School Enrollment and Internet Use Supplement, October 2009, and ESA calculations.

Section A5: People with Disabilities: Profile and Internet Use, 2009

This section provides data on demographic and geographic characteristics for individuals with disabilities, and on Internet use by this group. The report presents and analyzes the data at the household level. The underlying trends do not change if persons, as opposed to households and heads of households, are the unit of analysis.

Table A5: Person Demographic and Geographic Characteristics by Disability Status, 2009

	Distribution for People with disabilities (%)	Distribution for People with no disability (%)
Percent of All People	11.2	88.8
Family Income		
Less than $25,000	37.7	15.7
$25,000-$50,000	21.9	21.1
$50,000-$75,000	11.2	16.2
$75,000-$100,000	4.4	10.2
More than $100,000	5.1	16.2
Education		
Less than High School Degree	27.3	16.5
High School Degree	35.2	28.6
Some College	23.4	27.3
College Degree or more	14.2	27.6
Age (mean years)	60.1	42.6
Geographic Location		
Urban	78.2	84.5
Rural	21.1	14.8
Sample Size	12,638	94,573
Estimated Population	27,024,985	213,523,194

Source: U.S. Census Bureau, Current Population Survey (CPS) and CPS School Enrollment and Internet Use Supplement, October 2009, and ESA calculations.

Note: The distributions across the income categories do not sum to 100% since income data are not reported by some households.

Table A6: Internet Use by Disability Status, 2009

	People with disabilities	People with no disability
Internet Use (%)		
At any location	41.4	74.8
At home	37.4	69.3
Use broadband Internet at home	33.1	65.1
Use dial-up at home	4.0	3.9
Sample Size	12,638	94,573
Estimated Population	27,024,985	213,523,194

Source: U.S. Census Bureau, Current Population Survey (CPS) and CPS School Enrollment and Internet Use Supplement, October 2009, and ESA calculations.

Section A6: Broadband Internet Use by State, 2001 versus 2009

This section presents average broadband Internet usage rates by state, as well as the standard errors and 90% confidence intervals for the estimated state-level average broadband Internet adoption rates.

Table A7: Average Broadband Internet Use by State, 2009

Adoption Rate (%)

State	Mean	Standard Error	90% Confidence Interval	
			Lower Bound	Upper Bound
AL	48	2	45	52
AK	73	2	70	76
AZ	67	2	64	70
AR	51	2	48	54
CA	68	1	66	69
CO	69	1	67	71
CT	71	1	69	73
DE	67	2	64	69
DC	66	2	63	69
FL	67	1	65	68
GA	64	1	62	66
HI	70	2	67	73
ID	67	2	64	71
IL	63	1	61	65
IN	56	2	54	59
IA	62	2	60	65
KS	67	2	64	70
KY	54	2	51	57
LA	57	2	53	61
ME	61	1	59	64
MD	70	1	68	72
MA	73	2	70	75
MI	62	1	60	65
MN	67	1	65	69
MS	42	2	38	45
MO	57	2	55	60
MT	58	2	55	62
NE	64	2	61	67
NV	68	2	65	70
NH	73	1	71	75
NJ	72	1	70	75
NM	55	2	51	58
NY	66	1	64	67
NC	59	1	57	62
ND	63	2	60	66
OH	61	1	59	64
OK	56	2	53	59
OR	70	2	67	73
PA	62	1	60	64
RI	69	1	67	72
SC	53	2	50	56
SD	60	2	57	62
TN	55	2	52	58
TX	60	1	58	61
UT	73	2	70	76
VT	61	2	58	63
VA	65	1	63	67
WA	72	1	70	75
WV	52	2	49	55
WI	67	1	65	69
WY	66	2	63	68

Source: U.S. Census Bureau, Current Population Survey (CPS) and CPS School Enrollment and Internet Use Supplement, October 2009, and ESA calculations.

Table A8: Average Broadband Internet Use by State, 2001

Adoption Rate (%)

State	Mean	Standard Error	90% Confidence Interval	
			Lower Bound	Upper Bound
AL	5	1	4	7
AK	13	1	11	15
AZ	12	1	10	14
AR	4	1	3	5
CA	13	1	12	14
CO	10	1	9	12
CT	11	1	10	13
DE	6	1	5	8
DC	7	1	6	9
FL	10	1	9	11
GA	7	1	6	9
HI	18	2	16	21
ID	6	1	5	8
IL	6	1	5	7
IN	4	1	3	5
IA	9	1	7	10
KS	10	1	8	12
KY	3	1	2	4
LA	5	1	4	7
ME	10	1	8	11
MD	9	1	7	9
MA	14	1	13	16
MI	9	1	8	10
MN	8	1	7	9
MS	6	1	4	7
MO	7	1	6	9
MT	3	1	2	5
NE	10	1	8	12
NV	7	1	6	8
NH	14	1	12	16
NJ	12	1	11	14
NM	2	1	1	3
NY	12	1	11	13
NC	7	1	6	8
ND	5	1	3	6
OH	8	1	6	9
OK	8	1	6	9
OR	9	1	8	11
PA	8	1	7	9
RI	11	1	9	12
SC	8	1	7	10
SD	9	1	7	11
TN	10	1	8	12
TX	9	1	8	10
UT	12	1	10	14
VT	8	1	7	9
VA	8	1	6	9
WA	11	1	9	12
WV	4	1	3	6
WI	6	1	5	7
WY	6	1	4	7

Source: U.S. Census Bureau, Current Population Survey (CPS) and CPS Computer and Internet Use Supplement, September 2001, and ESA calculations.

Section A7: Marginal Effects of Demographic and Geographic Characteristics on the Likelihood that a Household Uses Internet at Home, 2001 versus 2009

This section contains the underlying regression results for Table 26 in Section 8.4.1. The analysis presented in Section 8.4.1 involved performing the regression analysis separately for 2001 and 2009 in order to analyze whether the marginal effects of selected demographic and geographic characteristics on household Internet use have changed over time.

Table A9: Marginal Effects: Regression of Home Internet Use on Demographic and Geographic Characteristics, 2001 and 2009

Linear Probability Model	2001	2009
Family Income: Less than $25,000	omitted	omitted
Family Income: $25,000-$50,000	0.1550*** (0.006)	0.1843*** (0.007)
Family Income: $50,000-$75,000	0.2959*** (0.008)	0.2954*** (0.007)
Family Income: $75,000 or more	0.3730*** (0.008)	0.3200*** (0.007)
Education: Less than High School Degree	omitted	omitted
Education: High School Degree	0.0971*** (0.007)	0.1320*** (0.009)
Education: Some College	0.2142*** (0.008)	0.2503*** (0.009)
Education: College Degree or more	0.2909*** (0.008)	0.3049*** (0.009)
Age	0.0074*** (0.001)	0.0103*** (0.001)
Age-squared	-0.0001*** (0.000)	-0.0001*** (0.000)
Non-Hispanic White	omitted	omitted
Non-Hispanic Black	-0.1631*** (0.008)	-0.1027*** (0.008)
Hispanic	-0.1487*** (0.010)	-0.1396*** (0.009)
Non-Hispanic Asian	0.0456*** (0.014)	-0.0205* (0.011)
Non-Hispanic, Other	-0.1191*** (0.027)	-0.0538*** (0.016)
Foreign-born non-citizen	-0.0623*** (0.011)	-0.0383*** (0.010)
Total number of persons in household	0.0358*** (0.002)	0.0288*** (0.002)
Metropolitan (Urban)	0.0361*** (0.006)	0.0500*** (0.006)
Nonmetropolitan (Rural)	omitted	omitted
Not-identified (as metropolitan or nonmetropolitan)	0.0212 (0.034)	0.0224 (0.025)
State indicator variables	yes	yes
Constant	-0.0414* (0.025)	0.0402 (0.028)
Sample Size	47,310	43,662
Estimated Number of Households	88,963,933	94,963,684
R-squared	0.324	0.315

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: U.S. Census Bureau, Current Population Survey (CPS), CPS School Enrollment and Internet Use Supplement, October 2009, CPS and CPS Computer and Internet Use Supplement, September 2001, and ESA calculations.

Section A8: Marginal Effects of Demographic and Geographic Characteristics on the Likelihood that a Household Uses Broadband Internet at Home, 2007 versus 2009

This section contains the underlying regression results for Table 27 in Section 8.4.2 for comparing the marginal effects of selected demographic and geographic characteristics on home broadband Internet use between 2007 and 2009.

Table A10: Marginal Effects: Regression of Home Broadband Internet Use on Demographic and Geographic Characteristics, 2007 and 2009

Linear Probability Model	2007	2009
Family Income: Less than $25,000	omitted	omitted
Family Income: $25,000-$50,000	0.1297*** (0.007)	0.1671*** (0.007)
Family Income: $50,000-$75,000	0.2619*** (0.008)	0.2818*** (0.008)
Family Income: $75,000-$100,000	0.3309*** (0.009)	0.3233*** (0.008)
Family Income: $100,000 or more	0.3851*** (0.009)	0.3474*** (0.008)
Education: Less than High School Degree	omitted	omitted
Education: High School Degree	0.0812*** (0.008)	0.1104*** (0.008)
Education: Some College	0.2137*** (0.009)	0.2321*** (0.009)
Education: College Degree or more	0.2971*** (0.009)	0.2936*** (0.009)
Age	0.0026*** (0.001)	0.0068*** (0.001)
Age-squared	-0.0001*** (0.000)	-0.0001*** (0.000)
Non-Hispanic White	omitted	omitted
Non-Hispanic Black	-0.1058*** (0.008)	-0.1004*** (0.008)
Hispanic	-0.1198*** (0.009)	-0.1396*** (0.009)
Non-Hispanic Asian	0.0412*** (0.013)	-0.0036 (0.011)
Non-Hispanic, Other	-0.0522*** (0.017)	-0.0527*** (0.016)
Foreign-born non-citizen	-0.0516*** (0.011)	-0.0527*** (0.011)
Total number of persons in household	0.0180*** (0.002)	0.0259*** (0.002)
Metropolitan (Urban)	0.0811*** (0.007)	0.0698*** (0.007)
Nonmetropolitan (Rural)	omitted	omitted
Not-identified (as metropolitan or nonmetropolitan)	-0.0033 (0.026)	0.0472* (0.026)
Constant	0.0686** (0.030)	0.0734** (0.029)
Sample Size	42,481	43,662
Estimated Number of Households	91,153,697	94,963,684
R-squared	0.298	0.307

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: U.S. Census Bureau, Current Population Survey (CPS) and CPS School Enrollment and Internet Use Supplement, October 2007 and October 2009, and ESA calculations.

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