Race and the Digital Divide

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Race and the Digital Divide

Abstract

In recent years, a plethora of public and private programs in the United States have been created to close the "Digital Divide." Interestingly, however, we know very little about the underlying causes of racial differences in rates of computer and Internet use. In this paper, I use data from the Computer and Internet Use Supplement to the August 2000 Current Population Survey (CPS) to explore this question. Estimates from the CPS indicate that Mexican-Americans are roughly one-half as likely to own a computer and one-fourth as likely to use the Internet at home than are whites. The black home computer rate is 58 percent of the white rate and the black home Internet use rate is 46 percent of the white rate. Using a special non-linear decomposition technique, I find that racial differences in education, income and occupation contribute substantially to the black/white and Mexican-American/white gaps in home computer and Internet use rates. I do not find evidence that price or school differences are responsible for the remaining gaps. I find some evidence, however, that language barriers may be important in explaining low rates of computer and Internet use among Mexican-Americans.

1. Introduction

Although computer and Internet use is expanding rapidly in the United States, large disparities exist between ethnic and racial groups. For example, only 29.3 percent of African-Americans and 23.7 percent of Latinos use the Internet. In contrast, 50.3 percent of white, non-Latinos use the Internet (U.S. Department of Commerce 2000). Racial differences in computer ownership are not as large, but remain substantial.[1] This "Digital Divide" may have serious economic consequences for disadvantaged minority groups as information technology skills become increasingly important in the labor market, and the Internet is "expected to become a primary medium for communications, commerce, education, and entertainment in the 21st century" (U.S. General Accounting Office 2001).[2] Future economic, education and political advancement for these groups may depend on access to computers, the Internet and broadband technology.[3]

Based on these concerns, a plethora of public and private programs in the United States have been created in recent years to close the digital divide. For example, in the federal government alone, the Department of Agriculture, Commerce, Education, Health and Human Services, Housing and Urban Development, Justice and Labor, each have programs addressing the digital inclusion of various groups. One of the largest programs, known as the E-rate

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[1] I henceforth use the term race to refer to ethnicity and race for brevity.

[2] The U.S. Department of Labor's 2000-01 Occupational Outlook Handbook lists Computer engineers, Computer support specialists, and Computer system analysts as the three occupations that are projected to grow the fastest from 1998 to 2008. A high percentage of new hires are required to use computers (Holzer 1996), and workers who use computers on the job earn more than their non-computer-using counterparts, although there is some debate over why (Krueger 1993, Autor, Katz and Krueger 1998, and DiNardo and Pischke 1997). Furthermore, employers spent $14 billion on information technology training in 1999 (Computer Dealer News, Sept. 8, 2000). Online-job search is also becoming increasingly popular. Monster.com posted 3.9 million resumes and 430,000 jobs in August 2000 (Autor 2001), and 15 percent of unemployed workers in December 1998 reported using the Internet to search for jobs (Kuhn and Skuterud 2000a). Finally, Kuhn and Skuterud (2000b) provide evidence that on-line job search reduces unemployment spells.

[3] Access to the Internet may also be increasingly important for consumers as it has lowered the price of many goods and services, provides extensive information on many products, and has made shopping more convenient. As a result online sales represent an increasing share of all retail sales (see Morton, Zettelmeyer and Risso 2000, Bakos 2001, Borenstein and Saloner 2001, and Ratchford, Talukdar and Lee 2001).

program, provides discounts to schools and libraries for the costs of telecommunications services and equipment with the level of discount depending on economic need and rural location (Puma, Chaplin, and Pape 2000). As of February 2001, $5.8 billion has been committed to E-rate applicants.

Although several previous studies using different data sources document large racial differences in rates of computer and Internet use, we know very little about the underlying causes of these differences. A recent report by the U.S. Department of Commerce (2000) finds that group differences in income and education account for approximately 50 percent of the gap in Internet use between African-Americans or Latinos and the national average. A simple "shift-share" analysis is used, however, to calculate this estimate, which does not control for other factors correlated with income and education. Additional factors that may be especially important are employment status, occupation and family structure. Exposure to computers at work or the perceived need to acquire computer skills for future employment opportunities may be the catalyst for many individuals to purchase computers and subscribe to Internet service.

Using data from the Computer and Internet Use Supplement to the August 2000 Current Population Survey (CPS), I document and explore the underlying causes of racial differences in computer and Internet use. In particular, I examine whether racial differences in the most likely "suspects" -- family income, education, occupation, employment status and family structure -- have independent effects on disparities in computer and Internet use? To date, we know very little about the importance of these potential causes. Using detailed information on computer and Internet use, I also explore whether telephone access, price differences, and language barriers contribute to the digital divide.

2. Data

I use data from the Computer and Internet Usage Supplement to the August 2000 Current Population Survey (CPS). The survey, conducted by the U.S. Census Bureau and the Bureau of

Labor Statistics, is representative of the entire U.S. population and interviews approximately 50,000 households. It contains a wealth of information on computer and Internet use by families and individuals.

In the August 2000 Computer and Internet Supplement, all of the questions pertaining to computers refer to home computers. Information on Internet use outside the home exists, however, I focus on home Internet use. Rates of Internet use outside the home are substantially lower than inside the home as discussed below. They are also of more interest because racial disparities in access to the Internet at any location, at least among urban residents, should be negligible. Most Americans have access to the Internet at a public library (U.S. General Accounting Office, 2001).

The samples include all working-age (25-55) civilian adults who do not live in group quarters. In some analyses, I include controls for labor force status and occupations. Thus, I do not include children in the analysis.[4] I do not include individuals older than 55 to avoid retirement issues and possible connections with computer use (see Friedberg 2001).

3. Computer and Internet Use

Blacks and Latinos are substantially less likely to have a computer at home than are white, non-Latinos. Table 1 reports the fraction of all working-age adults (ages 25-55) who have a computer at home. Estimates from the 2000 CPS indicate that 70.9 percent of whites have access to a home computer. In contrast, only 41.3 percent of blacks and 38.8 percent of Latinos have access to a home computer.[5] These large racial disparities are not simply due to differences in who owns the personal computers. For example, only 2.8 percent of whites and 1.6 percent of blacks and Latinos report that their employer owns the computer in their home. Similarly, home

[4] See Krueger (2003) for an analysis of computer use from 1984 to 1997 by schoolchildren.
[5] The rates are similar for men and women among whites and blacks. The Latina rate, however, is somewhat larger than the Latino rate (41.2 percent compared to 36.5 percent).

computers that are leased or are used for home businesses represent only a small fraction of all home computers.

Racial disparities in access to home computers have existed for at least as long as the government began collecting data on computer use. Figure 1 displays the percent of adults (18 and over) who have access to a home computer by race for selected years from 1984 to 2000. These estimates are from the computer use supplements to the CPS and are reported in U.S. Bureau of the Census (1984, 1989, 1993, 1997). I calculate the estimates for 2000 using similar sample criteria and racial group definitions. In 1984, only 4.4 percent of blacks and 4.1 percent of Latinos had home computers, whereas 10.0 percent of whites and those of other race had home computers. Over the past 16 years, the racial gaps have declined in percentage terms, but not in percentage point terms. The estimates clearly indicate, however, that blacks and Latinos have been and continue to be much less likely to have access to a home computer than whites.

Racial differences in Internet use are also a cause of concern among policymakers. For example, the U.S. Department of Commerce (2000) has argued that economic advancement, educational advancement, and community participation are increasingly dependent on access to the Internet. Table 1 reports the fraction of adult computer owners who use the Internet at home. Conditional on having a home computer, blacks are less likely than whites to use the Internet. Their rate of home Internet use is roughly 80 percent of the white rate. Latinos are even less likely to use the Internet conditional on having a home computer. Their rate of Internet use is approximately 70 percent of the white rate.

Black and Latino households are less likely to have telephones than are white households (U.S. Department of Commerce 1999). These disparities in telephone penetration may underlie the differences in conditional Internet use. To explore this question, I remove individuals who do not have a telephone in their house from the sample used above. The new conditional Internet use rates are 73.1, 57.5 and 50.3 percent for whites, blacks and Latinos, respectively. These rates

are very similar to those reported in Table 1 and suggest that the lack of access to telephones is not responsible for the racial disparities in conditional Internet use rates.

From the computer ownership rate and conditional Internet use rate, the unconditional rate of home Internet use can be calculated. It represents the fraction of *all* working-age adults who use the Internet at home. The racial disparities noted above become even larger for the unconditional Internet use rate. Only 24.0 percent of blacks and 19.7 percent of Latinos use the Internet at home. The ratios of these rates of Internet use to the white rate are 0.461 and 0.378, respectively.

Racial disparities in home Internet use have existed for several years. In 1997, the fraction of white, non-Latinos ages 18 and over that used the Internet at home was 16.7 percent. In contrast, only 5.8 and 5.7 percent of blacks and Latinos used the Internet at home, respectively (U.S. Bureau of the Census 1997). Both of these rates are roughly 35 percent of the white rate.[6] Although Internet use has increased dramatically since 1997, racial disparities have changed only slightly. Using the same age group (ages 18 and over), I find that 42.9 percent of whites use the Internet at home, whereas only 20.5 percent of blacks and 17.5 percent of Latinos use the Internet at home. These estimates imply that the black/white ratio in home Internet use is 0.478 and the Latino/white ratio is 0.408. As a percentage of the white rate, minorities have made some gains, however, it is difficult to compare rates when they are changing rapidly over time.

Estimates from several surveys of the Pew Internet & American Life Project between March and August 2000 indicate similar relative patterns of Internet use by race (Lenhart 2000). Fifty percent of whites have access to the Internet, whereas 36 percent of blacks and 44 percent of Latinos have access to the Internet. These access rates are higher than those reported above partly because they measure use of the Internet anywhere. Using the CPS, I can also examine Internet use rates for any location. The racial disparities are substantial. Sixty-two percent of

whites use the Internet somewhere, compared to 34.7 percent of blacks and 26.2 percent of Latinos. Evidently, the low rates of home Internet use among blacks and Latinos relative to whites are not simply due to substitution of outside-the-home use for home use.[7]

MEXICAN-AMERICANS AND OTHER LATINOS

Latinos are a heterogeneous group. For example, economic outcomes differ greatly across Latino groups (U.S. Bureau of the Census 1993). Table 2 reports home computer, conditional Internet and unconditional Internet rates for several Latino groups. As expected, computer and Internet use rates also differ across Latino groups. Mexican-Americans have the lowest rates, whereas Cuban-Americans, Puerto Ricans, and Latinos from Central and South America have higher rates. All Latino groups, however, are substantially less likely to own a computer or have access to the Internet than are whites.

The difference between Mexican-Americans and whites is striking. Mexican-Americans are half as likely as whites to own a computer. They are one fourth as likely to use the Internet at home. These differences have been masked somewhat in government publications, which only report estimates for all Latinos. I make comparisons between Mexican-Americans and whites below. I do not make comparisons to whites for other Latino groups because of small sample sizes.

DECOMPOSING INTERNET USE RATES

I next simulate the unconditional Internet use rate assuming different racial home computer rates and conditional Internet use rates. Table 3 reports simulations using black and white rates. The top left cell of the table reports the Internet use rate for blacks. The cell directly

[6] Racial differences in home Internet use were also large in 1998 using all ages. The white, non Latino home Internet use rate was 26.7 percent, compared to 9.2 percent for blacks and 8.7 percent for Latinos (U.S. Department of Commerce 1999).

to the right reports the unconditional Internet use rate for blacks when they are given the white conditional Internet use rate. If blacks had the same average probability of using the Internet conditional on having a home computer as whites their average probability of using the Internet would increase from 0.237 to 0.301.

Another thought experiment is to simulate what would happen if blacks instead were given the white home computer rate. The cell immediately below the top left cell reports the estimate from this simulation. The mean unconditional probability of Internet use increases from 0.237 to 0.407, providing an interesting comparison. The increase in the unconditional Internet use probability is much larger when the home computer rate is switched than when the conditional Internet use probability is switched. This result suggests a simple decomposition.

Define $\overline{p}_I^j$ as the average probability of having access to the Internet for group j, $\overline{p}_{I|C}^j$ as the average probability of Internet access conditional on having a home computer, and $\overline{p}_C^j$ as the average probability of having a home computer. The racial gap between the white rate and the minority group's rate can be expressed as:

(3.1) $\overline{p}_I^W - \overline{p}_I^M = \overline{p}_{I|C}^W \overline{p}_C^W - \overline{p}_{I|C}^M \overline{p}_C^M$.

This expression can be written as:

(3.2) $\overline{p}_{I|C}^W (\overline{p}_C^W - \overline{p}_C^M) + (\overline{p}_{I|C}^W - \overline{p}_{I|C}^M) \overline{p}_C^M$, or

(3.3) $\overline{p}_{I|C}^M (\overline{p}_C^W - \overline{p}_C^M) + (\overline{p}_{I|C}^W - \overline{p}_{I|C}^M) \overline{p}_C^W$.

The first terms in (3.2) and (3.3) represent the contribution from white/minority differences in home computer rates, and the second terms represent the contributions from racial differences in conditional Internet use rates. The first terms in (3.2) and (3.3) are reported in the bottom row of Table 3 and the second terms are reported in the last column. The decomposition estimates

[7] In addition, as reported in Table 11 only a small percentage of individuals who do not use the Internet at home report that they can use it somewhere else as the main reason for not subscribing to Internet service.

indicate that from 60.9 to 77.1 percent of the white/black gap in Internet use rates is due to racial differences in home computer rates.

Table 4 reports estimates for Mexican-Americans. The results are somewhat dependent on the choice of decomposition. Using (3.2), group differences in home computer rates explain 74.8 percent of the white/Mexican-American gap in the unconditional Internet rate. In contrast, estimates of (3.3) indicate that only 46.1 percent of the gap is due to group differences in home computer rates.

Overall, the low rates of computer ownership among blacks and Mexican-Americans play a major role in explaining why these groups are less likely to use the Internet at home than are whites.

Therefore, the primary (but not the only) reason that blacks use the Internet at home less than whites is because they are less likely to own computers. This interpretation, however, assumes that the two decisions are independent, which is unlikely to hold for some consumers.

HOW DO MEXICAN-AMERICANS AND BLACKS USE THE INTERNET AT HOME

It is potentially useful to examine whether racial groups differ in how they use the Internet. Information is available in the 2000 CPS on types of Internet use, but unfortunately not on other types of computer use. Table 5 reports results.

As expected, the most common use of the Internet is for email. Among black Internet users, 83.3 percent use email regularly. A slightly lower percentage of Mexican-Americans use the Internet for email, and a slightly higher percentage of whites use the Internet for email. The next two most common uses of the Internet are "searching for information, such as government, business or health," and "to check news, weather, or sports." The percentages are fairly similar across groups. In fact, the main conclusion that can be drawn from these results is that blacks, Mexican-Americans and whites do not differ substantially in how they use the Internet.

The use of online job search is of special interest. Kuhn and Skuterod (2000) find that 15 percent of unemployed jobseekers used the Internet for job search in December 1998. Conditioning on unemployment, I find that 30.9 percent of whites use the Internet at home to search for jobs. In contrast, only 9.1 percent of unemployed blacks and 10.9 percent of unemployed Mexican-Americans use the Internet at home for job search. These disparities are primarily due to differences in access to the Internet at home. I find that conditioning on using the Internet at home, 59.6, 52.1 and 58.4 percent of unemployed whites, blacks, and Mexican-Americans use the Internet at home to search for jobs, respectively. Relatively low rates of access to the Internet among minorities may have the negative consequence of increasing unemployment compared to whites (Kuhn and Skuterod 2000b).

4. An Empirical Model of Home Computer and Internet Use

A simple linear random utility model of the decision to purchase a computer is used. Assume that the utility associated with having a computer or not having a computer is a function of an individual's characteristics, x, and an additive error term, ε. Define U_{i0} and U_{i1} as the ith person's indirect utilities associated with not having a computer and having a computer, respectively. These indirect utilities can be expressed as:

(4.1) $U_{i0} = \alpha_0 + x_i'\beta_0 + \varepsilon_{i0}$, and

(4.2) $U_{i1} = \alpha_1 + x_i'\beta_1 + \varepsilon_{i1}$.

The ith person purchases a home computer if $U_{i1} > U_{i0}$. If $y_i=1$ if the ith person owns a computer then:

(4.3) $P(y_i=1) = P(U_{i1} > U_{i0}) = F[(\alpha_1-\alpha_0) + x_i'(\beta_1-\beta_0)]$,

where F is the cumulative distribution function of $\varepsilon_{i1}-\varepsilon_{i0}$. The model can be estimated with a logit regression by assuming that $\varepsilon_{i1}-\varepsilon_{i0}$ has a logistic distribution.

The indirect utilities are functions of several measurable individual characteristics. Income is likely to be a key determinant. It has an effect on the budget constraint underlying (4.1) and (4.2), and it may also affect preferences for owning a computer, especially in the sense of "keeping up with the Joneses." Income may be especially important in the presence of liquidity constraints. Although some consumers may view computers as a worthwhile investment they may not be able to finance the purchase of one.

Preferences for owning a computer are likely to vary across individuals and may depend on exposure to and the perceived usefulness of owning a computer. This may be related to a person's education level, marital status, presence of children, region of the country, employment status and occupation.

The prices of computers and software also affect the decision. It is not clear, however, how to include this information in an empirical model. There must exist some variation in prices faced by consumers. The primary source of price variation used in empirical studies is geographic. The results presented below, however, indicate that many computers are purchased online or from large retail chains that set national prices. Furthermore, it is unlikely that minorities face different prices than whites. There could be fewer computer stores in minority areas, however, a computer is a substantial and long-term purchase suggesting that consumers would be willing to travel outside their local community to purchase one. Thus, for example, the prices faced by inner-city and suburban residents in the same metropolitan area should be fairly comparable. Finally, it is unlikely that racial discrimination in pricing exists.

A similar model can be created for subscribing to Internet service conditional on having a home computer.[8] Income has an effect on the budget constraint and may have an additional effect on preferences. In addition, preferences for Internet service may be influenced by the individual's education level, marital status, presence of children, region of the country,

employment status and occupation. Finally, there may exist geographical variation in prices or access to high-speed services that may have an effect on choices. For example, the barriers facing low-income, inner-city residents to obtain high-speed services may include the poor quality of telecommunications plants and inside wiring of multiple-tenant buildings (Federal Communications Commission, 2000).

Table 6 reports estimates from a logit regression for the probability of having access to a home computer. Marginal effects and their standard errors are reported.[9] Specification 1 includes only dummy variables for all racial groups. The left out group is white, non-Latino. The coefficient estimates capture the racial differences discussed above. Blacks, Mexican-Americans, and other Latinos are less likely to have access to a home computer than are whites. Asians have only a slightly lower probability, and Native Americans have a much lower probability of owning a home computer.

Specification 2 includes measures of sex, age, marital status, children, education, family income, region, and central city status in addition to the racial group dummy variables. The coefficients on the female and age variables are small and statistically insignificant. Being married has a positive effect on the probability of having a home computer, which may simply be due to having at least one additional adult in the household. Consistent with this hypothesis, and not the effect of an unobserved "married" characteristic, the coefficient on being previously married is small and statistically insignificant. The coefficient on the number of children is statistically insignificant, but the coefficient on the dummy variable indicating the presence of children between the ages of 6 and 17 (controlling for the number of children) is large and statistically significant. Having children in this age group increases the probability of having a

[8] An alternative approach that combines the two decisions is to estimate the computer and conditional Internet decisions as a nested or "mixed" nested logit model. The model cannot be estimated, however, because of the lack of variation in measurable characteristics of the alternative choices.

[9] The reported marginal effect provides an estimate of the effect of a 1-unit increase in the independent variable on the home computer probability. It equals the sample average of $e^{X_i\hat{\beta}}/(1+e^{X_i\hat{\beta}})$.

home computer by 0.119. This represents a large increase relative to the average probability in the sample of 0.659.

As expected, education is an important determinant of owning a home computer. Each education level is associated with a substantially larger probability of owning a home computer. Individuals who have a college degree have a 0.277 higher probability of owning a computer than high school dropouts (the left-out category). Individuals who have a graduate degree have a 0.333 higher probability of having access to a home computer than do high school dropouts. Education may be a proxy for wealth or permanent income and have an effect on the budget constraint or may have an effect on preferences for computers through pure tastes, exposure, perceived usefulness, or conspicuous consumption.

Family income also plays a major role in determining who owns a home computer. The relationship between the home computer probability and income is almost monotonically increasing across the listed categories. The effect on the probability of having a home computer when moving from the lowest income level (less than $10,000) to the highest income level (more than $75,000) is striking. The effect is 0.354, which represents more than half the sample mean for the dependent variable. Not surprisingly, income has a large effect on the probability of owning a home computer. It is likely to be primarily due to its effect on the budget constraint, however, it may also be due its effect on preferences.

Most regions of the country, with the exception of the Pacific region, have a lower probability of owning a computer than the New England region. There is no statistically significant difference between rates of computer ownership in the central city and suburbs. Residents of rural areas, however, have a lower probability of owning a home computer, all else equal.

The inclusion of marital status, children, family income, education, and the other controls has a notable effect on the racial group coefficients. For all groups, except Asians, the

coefficients have become substantially smaller in absolute value. The coefficient for blacks increased from -0.2665 to -0.1313, and the coefficient for Mexican-Americans increased from -0.3533 to -0.1805. Apparently, racial differences in individual characteristics, such as family income and education, account for a sizeable portion of the differences in home computer rates.

Employment status may also affect the probability of owning a home computer. It is not included, however, in the main specification because of concerns regarding endogeneity. The skills that individuals acquire in using their own personal computer may be valuable in the labor market, and thus increase their likelihood of being employed. With these potential problems in mind, nevertheless, it is useful to examine regression estimates that include dummy variables for being unemployed and not in the labor force (reported in Specification 3). The coefficient estimates are negative on both variables, however, neither is statistically significant. Furthermore, the point estimates imply only small effects and their inclusion has virtually no effect on the racial dummy variables.

The final specification reported in Table 6 includes controls for 11 major occupation categories. The sample size is smaller because of the exclusion of individuals who are not in the labor force. The Professional and the Executive, Administrative and Managerial occupations have the highest probabilities of computer ownership. The occupations with the lowest probabilities are Machine Operators and Transportation. Most of the coefficients on the occupation dummies are statistically significant and imply somewhat large effects. Surprisingly, however, the coefficients on the racial controls do not change with the addition of these occupation controls.[10] The black and Mexican-American coefficients are only slightly smaller in absolute value. The strong correlation between education and occupation may be partly responsible. The decomposition technique used in the following section will shed light on this possibility.

[10] I also find similar ethnic/racial coefficients when estimating the model with the same sample, but not including the occupation controls.

The determinants of Internet use conditional on having a home computer are also of interest. Logit regressions for the probability of conditional home Internet use are estimated with the results reported in Table 7. The sample only includes adults ages 25-55 who have access to a home computer. Table 7 reports the same specifications as those reported in Table 6. The relative patterns across racial groups in conditional Internet use are generally similar to those for computer use. All minority groups are less likely to use the Internet conditional on having a home computer than are whites.

Interestingly, the addition of controls for individual characteristics in Specification 2 has a large effect on the Mexican-American coefficient, but only a relatively small effect on the black coefficient. This is surprising given the strong effects of education and income on the probability of Internet use among computer owners. Each step to a higher level of education results in a large increase in the probability of Internet use. For example, college graduates have a 0.082 higher probability than individuals who only attend some college. The difference between the highest and lowest levels of education is 0.336, which is roughly half the size of the sample mean for the dependent variable. The Internet probability generally increases with each level of income, although the effect is not as large as it is on the probability of having a home computer. The effect on the probability of Internet use when moving from the lowest family income level (less than $10,000) to the highest (more than $75,000) is 0.146, which represents 20.1 percent of the sample mean for the dependent variable.

Several additional controls affect the probability of Internet use conditional on having a home computer. Women have a slightly higher probability of using the Internet at home than men, all else equal. Age has a large negative effect on the probability of Internet use among computer owners. Being previously married has a positive effect, and the probability decreases with the number of children in the family. The Pacific and New England regions have the highest probabilities. Living in a rural area has a negative effect on conditional Internet use relative to

living in the central city suggesting that price or accessibility differences may exist (see Federal Communications Commission 2000).

Specification 3 includes dummy variables for whether the individual was unemployed or not in the labor force. The coefficient on unemployment is large, positive and statistically significant. Conditional on having a home computer, the unemployed have a 0.046 higher probability of using the Internet at home than the employed, all else equal. This may in part be due to the unemployed using the Internet for job search as noted above. Similar to the results for the home computer rate, the inclusion of controls for labor force status has little effect on the racial coefficients.

Specification 4 includes occupation controls. Most of the coefficients on these variables are large and statistically significant. The Professional and the Executive, Administrative and Managerial occupations have the highest probabilities of Internet use and the Machine Operator and the Transportation occupations have the lowest. The racial coefficients are not sensitive to their inclusion.

5. Decomposition of Racial Gaps in Computer and Internet Use Rates

The estimates reported in Tables 6 and 7 indicate that the large racial differences in computer and Internet use rates can be explained in part by group differences in individual characteristics, such as marital status, children, education and income. The estimates, however, cannot identify the separate contributions from group differences in each of these variables. They also cannot shed light on whether racial differences in labor force status or occupation distributions have an independent effect on racial differences in computer and Internet use.

To explore these issues further, I employ a variant of the familiar technique of decomposing inter-group differences in a dependent variable into those due to different observable characteristics across groups and those due to different "prices" of characteristics of

groups (see Blinder 1973 and Oaxaca 1973). The technique that I describe here takes into account the nonlinearity of the logit regressions discussed above.[11]

For a linear regression, the standard Blinder-Oaxaca decomposition of the white/minority gap in the average value of the dependent variable, Y, can be expressed as:

$$(5.1)\quad \overline{Y}^W - \overline{Y}^M = \left[(\overline{X}^W - \overline{X}^M)\hat{\beta}^W\right] + \left[\overline{X}^M(\hat{\beta}^W - \hat{\beta}^M)\right],$$

where $\overline{X}^j$ is a row vector of average values of the independent variables and $\hat{\beta}^j$ is a vector of coefficient estimates for race *j*. For a nonlinear equation, such as $Y = F(X\hat{\beta})$, the decomposition can be written as:

$$(5.2)\quad \overline{Y}^W - \overline{Y}^M = \left[\sum_{i=1}^{N^W}\frac{F(X_i^W\hat{\beta}^W)}{N^W} - \sum_{i=1}^{N^M}\frac{F(X_i^M\hat{\beta}^W)}{N^M}\right] + \left[\sum_{i=1}^{N^M}\frac{F(X_i^M\hat{\beta}^W)}{N^M} - \sum_{i=1}^{N^M}\frac{F(X_i^M\hat{\beta}^M)}{N^M}\right],$$

where N^j is the sample size for race *j*. This alternative expression for the decomposition is used because $\overline{Y}$ does not necessarily equal $F(\overline{X}\ \hat{\beta})$. In both (5.1) and (5.2), the first term in brackets represents the part of the racial gap that is due to group differences in distributions of *X*, and the second term represents the part due to differences in the group processes determining levels of *Y*. To calculate the decomposition, I define $\overline{Y}$ as the sample mean home computer rate and *F* as the logistic cumulative distribution function.[12]

An equally valid method of calculating the decomposition is to use the minority coefficient estimates, $\hat{\beta}^M$, as weights for the first term and the white distributions of the independent variables, $\overline{X}^W$, as weights for the second term. This alternative method of calculating the decomposition often provides different estimates, which is the familiar index

[11] See Fairlie (1999) for more details.

[12] A useful property of the logit regression that includes a constant term is that the average of the predicted probabilities must equal the proportion of ones in the sample. In contrast, the predicted probability evaluated at the means of the independent variables is not necessarily equal to the proportion of ones, and

problem with the Blinder-Oaxaca decomposition technique. A third commonly-used alternative is to weight the first term of the decomposition expression using coefficient estimates from a pooled sample of the two groups or all groups (see Oaxaca and Ransom 1994 for example). I follow this approach to calculate the decompositions.

The first term in (5.2) provides an estimate of the contribution of racial differences in the entire set of independent variables to the racial gap. An additional calculation, however, is needed to identify the contribution of racial differences in specific variables to the gap. For example, assume that X includes two variables, X_1 and X_2. The independent contribution of X_1 to the racial gap can then be expressed as:

$$\frac{1}{N^M}\sum_{i=1}^{N^M} F(X_{1i}^M \hat{\beta}_1^* + X_{2i}^W \hat{\beta}_2^*) - F(X_{1i}^W \hat{\beta}_1^* + X_{2i}^W \hat{\beta}_2^*). \tag{5.3}$$

Similarly, the contribution of X_2 can be expressed as:

$$\frac{1}{N^M}\sum_{i=1}^{N^M} F(X_{1i}^M \beta_1^* + X_{2i}^M \beta_2^*) - F(X_{1i}^M \beta_1^* + X_{2i}^W \beta_2^*). \tag{5.4}$$

The contribution of each variable to the gap is thus equal to the change in the average predicted probability from replacing the minority distribution with the white distribution of that variable while holding the distribution of the other variable constant.[13] The calculation of (5.3) and (5.4), however, is not possible without first matching the white distribution of X_1 and the minority distribution of X_2. I draw a random subsample of whites with a sample size equal to N_B and randomly match it to the minority sample.

The decomposition estimates obtained from this procedure depend on the randomly chosen subsample of whites. Therefore, to obtain estimates that use the entire white sample, I

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in the sample used here it is likely to be larger because the logit function is concave for values greater than 0.5.

draw a large number of random white subsamples. I then calculate the mean value of estimates from all of these samples. In the decompositions reported below, I use 1000 random subsamples of whites to calculate these means.

Table 8 reports estimates from this procedure for decomposing the black/white and Mexican/white gaps in home computer rates. The individual contributions from racial differences in sex and age, marital status and children, education, income, region, central city status, labor force status, and occupation are reported. I first describe the results for blacks, which are reported in Specifications 1 and 2. Specification 1 does not include estimates for labor force status and occupation, and thus uses the full sample of blacks.[14] The white/black gap in the home computer rate gap is large (0.303). Racial differences in sex and age explain virtually none of the gap. Marital status and children explain only a small part of the gap (5.7 percent). This contribution is primarily due to blacks having a substantially lower probability of currently being married than whites and the positive effect of marriage on having a home computer. In the sample of adults ages 25 to 55, only 43.9 percent of blacks are currently married compared to 69.6 percent of whites. Lower marriage rates among blacks may limit their opportunities to take advantage of increasing returns to scale in family members.

Blacks have lower levels of education, on average, than whites. Only 12.6 percent of blacks have a Bachelor's degree, and only 5.6 percent of blacks have a graduate-level degree. In contrast, 22.5 and 10.6 percent of whites have Bachelor's and graduate degrees, respectively. The combination of these patterns and the finding earlier that education is a major determinant of computer ownership suggests that racial differences in education account for a large part of the gap. Indeed, the decomposition estimate indicates that white/black differences in education distributions account for 11.0 percent of the home computer rate gap.

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[13] Unlike in the linear case, the independent contributions of X_1 and X_2 depend on the value of the other variable. This implies that the choice of a variable as X_1 or X_2 (or the order of switching the distributions) is potentially important in calculating its contribution to the racial gap.

As expected, the largest factor explaining racial disparities in home computer ownership is income. Lower levels of income among blacks account for 31.0 percent of the white/black gap in the probability of having a home computer.[15] As noted above, it is likely that this primarily captures racial differences in the ability to purchase computers, however, it may also partly capture racial differences in preferences for owning computers. Although income differences provide a large contribution, they do not explain the entire gap. Thus, low levels of computer ownership among blacks are not simply due to an inability to purchase computers. In fact, 80.0 percent of blacks with family incomes of $60,000 or more have a home computer, whereas 87.2 percent of whites with similar income levels have home computers.

The 31.0 percent contribution from income differs from earlier results reported in Novak and Hoffman (1998) using the 1997 Commerce Net/Nielsen Internet Demographic Study. The study finds that 44.2 percent of whites and 29.0 percent of blacks have a home computer in their household and that these observed differences are eliminated after statistically adjusting for household income. Their adjustment, however, does not simultaneously control for differences in education.[16] Interestingly, they find that for each reported income category under $40,000 whites had higher home computer ownership rates, but for each reported category above $40,000 blacks had higher computer ownership rates. Estimates from the 2000 CPS do not indicate these patterns. For all income categories reported in the CPS, blacks have lower probabilities of having a home computer than do whites.

The included geographical factors do not play a major role in explaining black/white differences in computer ownership. Racial differences in regional distributions explain 3.0 percent of the gap, and racial differences in central city status explain virtually none of the gap.

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[14] The decomposition estimates do not differ substantially when using white or black coefficients instead of the pooled coefficients.

[15] This contribution estimate is not overly sensitive to changing the order of when the income distributions are switched.

[16] They find in a separate analysis that education cannot explain the white/black differences in computer ownership.

Although blacks are much more likely to live in the central city than are whites, the contribution is essentially zero because central city status does not affect home computer ownership.

Specification 2 includes contributions from racial differences in labor force status and occupation. The logit regression estimates underlying these contributions are reported in Specification 4 of Table 6. Racial differences in unemployment and labor force participation do not explain the white/black gap in computer ownership. Although blacks have substantially higher unemployment and jobless rates than do whites, the contribution is small because labor force status has little effect on computer ownership. The contribution from occupation is larger, but still relatively small. Racial differences in occupational distributions explain 7.1 percent of the white/black gap. Blacks are less likely to be employed in executive, administrative, managerial and professional occupations than whites and more likely to be employed in machine operator and transportation occupations. The different occupational distributions provide disparities in exposure to computers at work possibly translating into different preferences for home computers. The effect of occupation on home computers is not through employer-owned computers because these computers represent only a small fraction of all home computers.

The decompositions reveal that low levels of education and, especially income, are responsible for a large part of the relative lack of computer ownership among blacks. Occupational, marital status, and regional differences also contribute to the gap. Controlling for these measurable differences, roughly half of the gap between blacks and whites in home computer ownership is explained.

COMPUTERS AND MEXICAN-AMERICANS

The disparity between the rate of computer ownership among Mexican-Americans and whites is even larger than that for blacks. The Mexican-American home computer rate of 0.341 is less than half the white rate, resulting in a gap of 0.401. Specifications 3 and 4 of Table 8 report the decomposition results for this gap. Similar to the results for blacks, racial differences in sex

and age do not contribute to the gap. Marital status and children provide a small negative contribution to the home computer gap. This result suggests that the gap would be even larger if Mexican-Americans did not have a higher probability of having children ages 6 to 17, which increases the probability of home computer ownership.

Mexican-Americans have substantially lower levels of education than whites. Only 6.9 percent of Mexican-Americans have Bachelor's degrees and 1.9 percent have graduate degrees compared to 22.5 and 10.6 percent for whites, respectively. The decomposition results indicate that these lower levels of education are a major cause of why so few Mexican-Americans own home computers. Racial differences in education explain 26.6 percent of the white/Mexican gap in home computer rates.

Relatively low levels of income among Mexican-Americans also contribute greatly to the gap in computer ownership. The results indicate that 27.7 percent of the gap is due to white/Mexican differences in income. This contribution is comparable in magnitude to that for the white/black gap and is consistent with Mexican-Americans being less able to afford computers than whites, on average.

Similar to blacks, however, it is somewhat surprising that income does not explain more of the gap. Even at income levels of $60,000 or more, only 74.2 percent of Mexican-Americans have a home computer compared to 87.2 percent of whites. To be sure, income differences are important, but they cannot explain everything.

Racial differences in regions, central city status and labor force status do not contribute substantially to the gap. In contrast, however, occupational differences explain a large part of the gap. Mexican-American workers are more concentrated than whites in farming, handlers, and machine occupations (low computer rate occupations) and less concentrated in professional and technical occupations (high computer rate occupations).

In sum, Mexican-Americans are less likely to own home computers than are whites primarily because they have substantially lower levels of education and income. Occupational

differences also contribute to the gap. Similar to the results for blacks, roughly half of the computer ownership rate gap is explained by group differences in the included variables.

WHY ARE BLACKS AND MEXICAN-AMERICANS LESS LIKELY TO USE THE INTERNET?

Racial differences in family structure, education, income, and occupation partly explain why blacks and Mexican-Americans are less likely to own computers than whites. Racial differences in these same factors may also explain why black and Mexican-American computer owners are less likely to use the Internet at home than whites. Although there are many similarities between the home computer logit results and the conditional Internet logit results, minority/white differences between the distributions of education, income and other variables change in nontrivial ways (see Appendices 1 and 2). Therefore, the explanations for racial differences in conditional Internet use may differ from those for racial differences in computer ownership.

Table 9 reports estimates from decompositions of the racial gaps in conditional Internet use. The contributions from the same individual variables as those reported in Table 8 are calculated. I first discuss the results for blacks reported in Specification 1. The gap between blacks and whites in conditional Internet use rates is 0.151, which is approximately half the size of the gap in home computer rates. Racial differences in the means of many variables, especially those with large explanatory power in the home computer decomposition such as education and income, are also smaller in these decompositions.

The decomposition results indicate that group differences in education and income are the only two factors that explain a substantial portion of the white/black gap in conditional Internet use. Lower levels of education among blacks than whites account for 0.013 or 8.3 percent of the gap. This contribution in percentage terms is similar to that for the gap in the home computer rate.

Racial differences in income also contribute to the white/black gap in conditional Internet use. They explain 0.018 or 12.1 percent of the gap. This contribution is much smaller than that reported in Table 8. Racial differences in income are mitigated by conditioning on home computer ownership, but also income has less of an effect on the probability of conditional Internet use than it does on home computer ownership. This is consistent with lower costs of obtaining Internet access than purchasing a personal computer.

Specification 2 reports decomposition results for the labor force sample. Racial differences in unemployment rates do not contribute to gap, whereas racial differences in occupational distributions contribute to the gap. They explain 7.3 percent of the white/black gap in conditional Internet use. The concentration of blacks in relatively "low-tech" occupations may limit their exposure to and perceived need of home Internet use. Similar to the results above, controlling for group differences in occupations lessens the impact of racial differences in education on the gap in conditional Internet use. The contribution from racial differences in education is now only 3.3 percent. This finding is difficult to interpret because of concerns over the endogeneity of occupational choice and Internet use. The contribution from income is also smaller in this specification.

The combined effect of education, income and occupation to the white/black gap in conditional Internet use is smaller in both absolute and percentage terms than its effect on the gap in home computer rates. Group differences in all of the included variables explain only 11.7 to 12.9 percent of the white/black gap in conditional Internet use, whereas they explain 46.6 to 50.1 percent of the home computer rate gap. Clearly, the decomposition analysis has uncovered much less about why black computer owners are relatively unlikely to use the Internet than why blacks are relatively unlikely to own computers.

Specifications 3 and 4 of Table 9 report the results for Mexican-Americans. The gap between whites and Mexican-Americans is 0.265. Although the gap is much larger than the white/black gap, the only factors that make large contributions to the gap are income, education,

and occupation. The results for education are the most striking. Differences in education explain 25.8 and 19.7 percent of the white/Mexican-American Internet use gaps in Specifications 3 and 4, respectively. Again, the scarcity of college-educated Mexican-Americans relative to whites limits their "digital inclusion."

Conditioning on computer ownership reduces income disparities between Mexican-Americans and whites, which translates into a smaller contribution. Differences in income explain 8.8 to 10.7 percent of the white/Mexican-American gap in conditional Internet use rates. Many Mexican-Americans may not be able to afford Internet subscription services. This, however, is only part of the story as only 66.7 of Mexican-Americans who have annual family incomes of $60,000 or more and access to a home computer use the Internet at home. In contrast, 80.0 percent of white computer owners with high incomes use the Internet at home. It is difficult to imagine that these high-income families cannot afford a regular dial-up Internet service, which averages less than $20 per month (see below). Much of the software for using the Internet is free (e.g. Netscape and Eudora).

Finally, occupation contributes to the gap. Differences in occupation explain 9.9 percent of the white/Mexican-American gap in conditional Internet use. Combining the individual contributions, 29.5 to 31.4 percent of the gap in Internet use is explained by racial differences in observable characteristics. Again, the decompositions reveal less about why Mexican-Americans and whites differ in Internet use conditional on having a home computer than about why they are less likely to have access to a home computer.

6. Explanations for Remaining Differences

The decomposition results indicate that education, income, and occupation explain part of the racial gaps in home computer and Internet use rates. What are the causes of the remaining differences? This section investigates a few potential explanations.

To start, it may be informative to examine responses to why computer owners did not use the Internet. A subsample of respondents who have access to a home computer, but do not use the Internet at home were asked the question, "What is the MAIN reason that you don't have access to the Internet at home?"[17] Table 10 reports the responses to this question by race.

As expected, price is an important factor for minorities. Almost one-fourth of Mexican-American and one-fifth of black computer owners report that cost is the main reason that they do not use the Internet at home. Among white computer owners, 16.6 percent report that cost is the main reason that they do not currently use the Internet. These percentages for minorities are consistent with the finding that differences in abilities to pay for Internet services contribute to differences in Internet use, but do not explain all of the differences.

Another interesting response is "not wanting it." Only 23.7 percent of Mexican-Americans and 32.8 percent of blacks report not wanting access to the Internet. The percent of whites not wanting access is 28.3 percent. These results are important because they suggest that the low rate of use among minorities is not simply due to a lack of interest in having access to the Internet among this group.

It is also noteworthy that so few minorities report issues related to their ability to use the Internet. For example, only a small percentage of Mexican-Americans and blacks report the main reason as "not user friendly, too difficult," " problems with service provider," "computer not capable," or "lack of computer knowledge." Apparently, relatively low rates of Internet use among minorities are not simply due to a lack of their own ability or hardware/software capabilities.

DIFFERENCES IN PRICES

[17] Specifically, only individuals who report currently having a computer at home, but who also report living in a household in which no one currently uses or has ever used the Internet from home are asked this question.

The cost of personal computers and the Internet appear to be a major deterrent for minorities. Income is clearly an important determinant of who has a home computer and access to the Internet. Furthermore, a large percentage of non-Internet users report that cost was the main reason they did not subscribe for service from an Internet provider.

The price of computers may differ by geographical location. If blacks and Mexican-Americans are more likely to be located in geographic areas with higher prices then they will be less likely to purchase computers than whites who have comparable income levels. This explanation for racial differences, however, depends on the existence of at least some geographical variation in computer prices. Using data on computer purchases from a 1998 Forrester survey, Goolsbee (2000) finds evidence of cross-city variation in the prices paid by computer purchasers, and that this variation influences whether individuals purchase their computers online versus in stores. This finding, however, implies that the geographical differences in actual computer prices faced by all potential consumers are mitigated by the presence of online or mail-order computer manufacturers. In fact, Goolsbee (2000) reports that approximately 30 percent of computers were purchased from a catalog, direct from the manufacturer or over the Internet from 1996 to 1998 with Dell and Gateway comprising nearly half of these computers. More recent data from the second quarter of 2000 from the IDC indicate that Dell and Gateway alone comprise 28.5 percent of the market share of computers in the United States.[18] Furthermore, it is likely that many consumers purchase computers from large retailers that set nation-wide prices.

Although these patterns suggest that the geographic variation in prices may not be large, nevertheless, it is useful to investigate the hypothesis more thoroughly with the CPS data. Unfortunately, the 2000 CPS Computer and Internet Use Supplement does not provide information on the cost of computers. I can examine this issue further, however, by including metropolitan area fixed effects in the logit regressions. These fixed effects will capture the

effects of price differences across metropolitan areas. Specification 2 of Table 11 reports logit results for the probability of having a home computer after including fixed effects for the 18 identified CMSAs in the 2000 CPS. Specification 1 reports results using the same sample, but excluding the CMSA fixed effects. Conditioning on residence in an identified CMSA reduces the sample size by nearly 65 percent. For brevity, only the coefficients (marginal effects) for the race dummies are reported.

The inclusion of CMSA dummies has little effect on the racial dummies. The black coefficient estimate increases only slightly. It remains large, negative and statistically significant. The Mexican-American coefficient increases more, but remains relatively large and negative. The coefficient increases from -0.1660 to -0.1564. Apparently, cross-CMSA variation in computer prices and other unobservable characteristics cannot account for the large racial disparities in computer ownership reported above.

Geographical variation in prices for Internet services may contribute to racial differences in Internet use.[19] In particular, blacks and Mexican-Americans may be more likely to reside in areas in which prices are higher. Fortunately, the 2000 CPS Computer and Internet Use Supplement includes information on monthly costs of Internet service. Table 12 reports results by race. Average costs are separated by type of service. I focus on the results for regular or "dial-up" telephone service because it comprises roughly 90 percent of all Internet services. At least among Internet service purchasers, there do not appear to be any glaring racial inequalities. In fact, Mexican-Americans, on average, pay slightly less than whites for regular Internet service. The estimates indicate that blacks pay slightly more, but the difference is negligible.

I also calculate average Internet costs across my sample of 18 CMSAs. I do not find large differences. The average cost ranges from a low of $15.09 in Portland-Salem to $18.46 in

[18] Note that Goolsbee's data include consumer purchases only.
[19] A related idea is that geographical differences in local sales taxes have an effect on online purchases, and thus on the net cost of using the Internet (Goolsbee 1999). Goolsbee (1999), however, does not find evidence that higher taxes increase the probability of going online.

New York-Northern New Jersey-Long Island - a maximum difference of only $3.37 per month.[20] The lack of substantial variation across CMSAs may be due to the dominance of large Internet service providers that have national pricing plans and aggressive promotional offers (e.g. AOL).

In the comparisons, however, I am forced to condition on Internet use. A measure of local prices faced by all potential purchasers of Internet services would be preferred. Instead of including this type of measure, I include CMSA fixed effects in a logit regression for the probability of Internet use conditional on having a home computer. Specification 3 of Table 11 reports the "baseline" results without the CMSA fixed effects and Specification 4 reports the results that include the CMSA fixed effects. The coefficient estimates on the black and Mexican-American dummy variables are not sensitive to the inclusion of these fixed effects. The change in coefficient estimates from including the CMSA fixed effects are negligible.

Although I admittedly do not provide direct evidence on the issue, it does not appear as though blacks and Mexican-Americans face higher prices for computers and Internet service than do whites. Surely, if price differentials exist they are small, and the CMSA fixed effect results suggest that they have little effect on racial differences in computer and Internet use rates. Furthermore, racial discrimination in the pricing of computers and Internet services should be nonexistent or at least very small because their prices are typically non-negotiable and are often purchased from a catalog or online.

THE EFFECTS OF SCHOOL DIFFERENCES

Racial disparities in exposure to computers and the Internet in school may have an effect on differences in home computer and Internet use rates.[21] The logit regression results indicate that the presence of school-age children has a large positive effect on the probability of having a

[20] The differences by central city status are even smaller. The mean costs are $16.79 in the central city, $17.17 in the suburbs, and $17.40 outside of metropolitan areas.

home computer. Interestingly, the National Center for Education Statistics (2001) recently reported that "there were virtually no differences in school access to the Internet by school characteristics (e.g. poverty level and metropolitan status) in 1999 or 2000," and that 98 percent of all public schools were connected in Fall 2000. These numbers, however, are somewhat deceiving. The study continues by reporting the percentage of instructional rooms connected to the Internet by school characteristics and finds large disparities by poverty level, metropolitan status, and minority enrollment. For example, 64 percent of instructional rooms were connected to the Internet in schools with minority enrollments of 50 percent or more compared to 85 percent of instructional rooms in schools with minority enrollments of less than 6 percent. The study also finds that the average number of students per instructional computer with Internet access is higher for schools with large concentrations of minority students.

If computer and Internet use is less prevalent among minority students than white students in school then minority families may be less likely to see the need for purchasing home computers or Internet service. One method of addressing this issue is to examine whether racial differences in home computer rates and conditional Internet use are smaller among adults who do not have children. Specification 1 of Table 13 reports results for a logit regression for the probability of having a computer using a sample of adults who do not have children. The coefficient estimates are slightly smaller in absolute value using the sample of adults without children than the original estimates. This partly reflects the fact that the average probability in the sample is now smaller. Specification 1 of Table 14 reports results for the probability of conditional Internet use. The disparity between blacks and whites is slightly smaller, but the disparity between Mexican-Americans and whites is now slightly larger. These results indicate that racial differences in access to computers and the Internet at school are not driving the results for working-age adults.

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[21] As noted in Goolsbee and Klenow (1999), schools in high-computer use neighborhoods may draft curricula to encourage residents to buy computers. This policy combined with residential sorting by race

LANGUAGE BARRIERS

Language may be an important factor limiting computer and Internet use among Mexican-Americans and other Latinos (Spooner and Rainie 2001). The 2000 CPS includes a question on whether Spanish is the only language spoken among adults in the household. I use this information to examine whether Mexican-Americans and other Latinos in Spanish-speaking households are less likely to use computers and the Internet.[22] Specifications 3 and 4 of Table 13 reports results for Logit regressions that include interactions between the Spanish speaking variable and the Mexican-American and other Latino variables. Mexican-Americans in Spanish-speaking households are much less likely to have a home computer and use the Internet at home conditional on having a home computer than other Mexican-Americans, all else equal. Relative to whites, these Mexican-Americans have a computer use rate that is 0.3233 less than whites and a conditional Internet use rate that is 0.3471 less than whites. Thus, even after controlling for income and education, Mexican-Americans in Spanish-speaking households are roughly half as likely as whites to own a computer or use the Internet. Clearly, language makes a large difference.

But, to return to the main point on whether language barriers can explain part of the remaining gap between Mexican-Americans and whites we need to compare the coefficient on the main Mexican-American dummy variable to the original Mexican-American dummy variable. For computer use, language appears to make a difference. The Mexican-American dummy variable decreases in absolute value from -0.1805 to -0.1548 (a decline of 14.2 percent). For conditional Internet use the decline is smaller, but still noteworthy (-0.1636 to -0.1513 or 7.5 percent). Apparently, language barriers limit computer and Internet use among Mexican-Americans.

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could lead to large disparities in computer ownership and Internet use.

For other Latinos, speaking Spanish is also very important. Other Latinos in Spanish-speaking households are much less likely than other Latinos to have a home computer or use the Internet at home. Furthermore, the coefficient on the other Latino dummy variable declines after controlling for the interaction with speaking Spanish. For home computer use, language appears to be very important as the coefficient on the other Latino dummy variable drops in absolute value from -0.0795 to -0.0487 (38.7 percent) after controlling for Spanish-speaking households.

8. Conclusions

Using data from the Computer and Internet Use Supplements to the August 2000 Current Population Survey (CPS), I find that blacks and Latinos are substantially less likely to have a home computer and use the Internet than are white, non-Latinos. I find further differences in use rates among Latinos. Mexican-Americans have the lowest rates of computer and Internet use. Estimates from the CPS indicate that Mexican-Americans are roughly one-half as likely to own a computer and one-fourth as likely to use the Internet at home than are whites. The black home computer rate is 58 percent of the white rate and the black home Internet use rate is 46 percent of the white rate.

I also estimate logit regressions for the probability of having a home computer and the probability of using the Internet at home conditional on having a home computer. I find that education, income and occupation are important determinants of computer ownership and Internet use. Using a special non-linear decomposition technique, I find that racial differences in these factors contribute substantially to the black/white and Mexican-American/white gaps in home computer and Internet use rates. As expected, the most important factor is income. Low levels of income explain 25.1 to 31.0 percent of the black/white gap in home computer rates and roughly a

[22] In the sample, 24.9 percent of Mexican-Americans are in Spanish-speaking households and 21.6 percent of other Latinos are in Spanish-speaking households.

quarter of the Mexican-American/white gap. Racial differences in income explain roughly one tenth of the gaps in Internet use conditional on having a home computer.

Racial differences in education are also important, especially for Mexican-Americans. Low levels of education among blacks explain 6.0 to 11.0 percent of their low rate of computer ownership and 3.3 to 8.3 percent of their low rate of home Internet use. For Mexican-Americans, group differences in education explain 20.2 to 26.6 percent of the home computer rate gap and 19.7 to 25.8 percent of the conditional Internet use rate gap. Related to education differences, occupational differences also explain part of the gap. They explain roughly 7 percent of black/white gaps in the two measures and 10 percent of the Mexican/white gaps.

Overall, the decomposition results indicate that group differences in all measurable characteristics explain approximately 50 percent of the racial gaps in home computer rates and 11.7 to 31.4 percent of the racial gaps in conditional Internet use rates. I also investigate a few explanations for the remaining differences. I do not find evidence that price or school differences are responsible for the remaining gaps. I do find some evidence, however, that language barriers may be important in explaining low rates of computer and Internet use among Mexican-Americans.

What is the policy significance of these findings? Should we view the digital divide simply as a disparity in utilization of goods and services arising from income differences just as we might view disparities in purchases of other electronic goods, such as cameras, stereos, or televisions? Or, should we view the digital divide as a disparity in a good that has important enough externalities, such as education, healthcare, or job training, that it warrants redistributive policies.[23] Although there is some disagreement among academics about this issue (see Noll, et al. (2000) and Crandall (2000) for example), the federal government views raising the level of digital inclusion among disadvantaged groups as a "vitally important national goal" (U.S.

[23] Access to information technology may also help disadvantaged minorities overcome some of these other problems by enabling them to earn more (Noll, et al. 2000).

Department of Commerce 2000). In fact, the Department of Agriculture, Commerce, Education, Health and Human Services, Housing and Urban Development, Justice and Labor, each have programs addressing the digital divide. The potential effectiveness of these policies and others depends on how they address the underlying causes uncovered by this analysis.

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Figure 1
Percent of Persons (Ages 18+) with Access to a Home Computer by Race/Ethnicity
CPS (1984-2000)

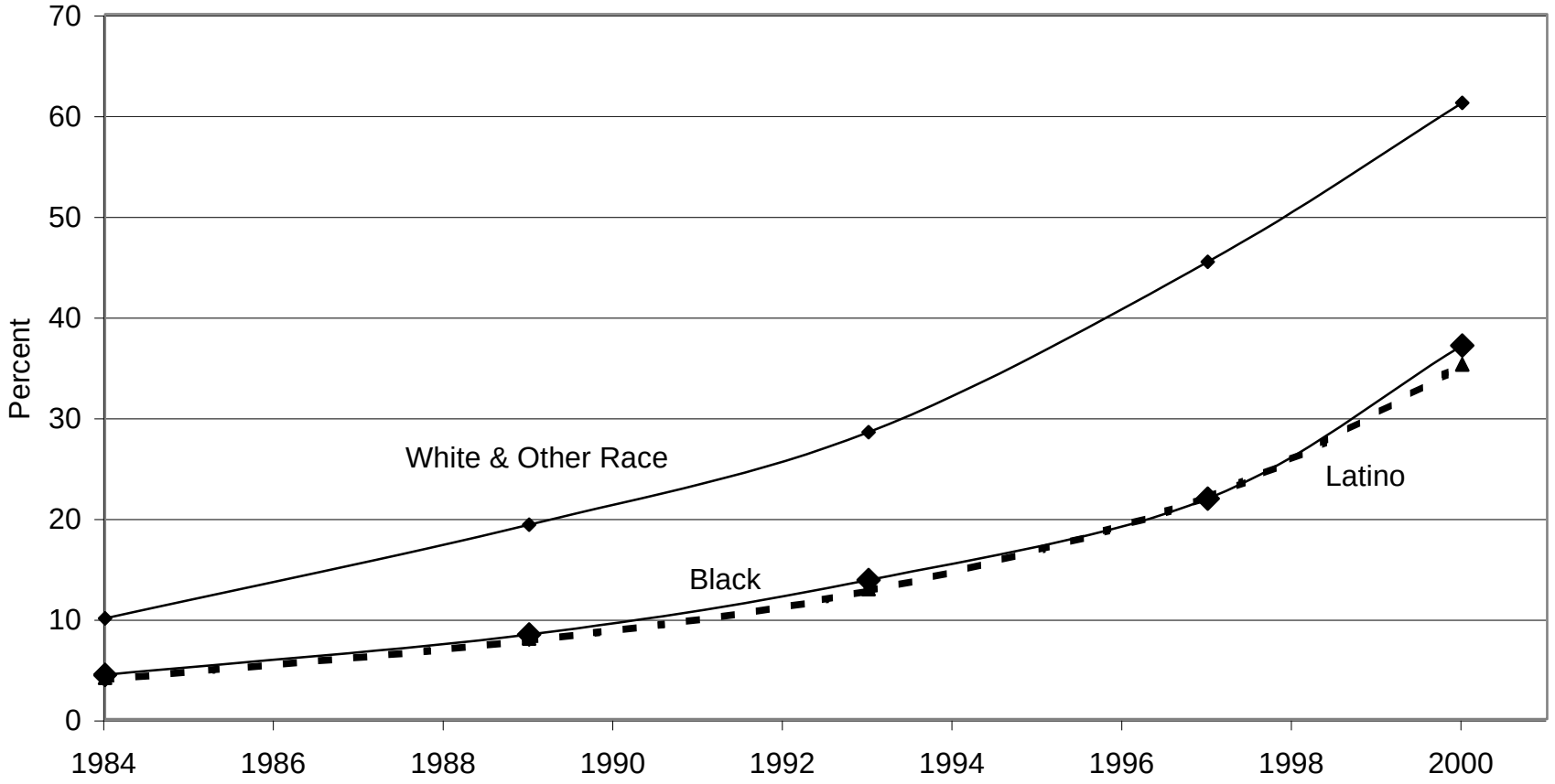

Table 1
Home Computer and Internet Use Rates by Race/Ethnicity
CPS (2000)

	Black	Latinos	Whites
Percent of adults who have a home computer	41.3%	38.8%	70.9%
Sample size	5,433	5,339	39,385
Percent of computer owners who use the Internet at home (conditional)	57.4%	50.3%	72.9%
Sample size	2,276	2,044	28,016
Percent of adults who use the Internet at home (unconditional)	23.7%	19.5%	51.7%
Sample size	5,433	5,339	39,385

Notes: (1) The sample consists of adults ages 25-55. (2) All estimates are calculated using sample weights provided by the CPS.

Table 2
Home Computer and Internet Use Rates for Various Latino Groups
CPS (2000)

	Mexican	Puerto Rican	Cuban	Central & South American	Other Latino
Percent of adults who have a home computer	33.0%	47.7%	49.7%	49.0%	55.0%
Sample size	3,362	465	238	877	397
Percent of computer owners who use the Internet at home (conditional)	44.9%	60.7%	66.0%	53.7%	54.2%
Sample size	1,072	222	121	414	215
Percent of adults who use the Internet at home (unconditional)	14.8%	29.0%	32.8%	26.3%	29.9%
Sample size	3,362	465	238	877	397

Notes: (1) The sample consists of adults ages 25-55. (2) All estimates are calculated using sample weights provided by the CPS.

Table 3
Black|White Unconditional Internet Use Rate Simulations

Home Computer Rate	Internet Use Rates Conditional on Home Computer		
	Black(=0.574)	White(=0.729)	Difference
Black (=0.413)	0.237	0.301	0.064
White (=0.709)	0.407	0.517	0.109
Difference	0.170	0.215	0.279

Notes: (1) The sample consists of adults ages 25-55. (2) All estimates are calculated using sample weights provided by the CPS.

Table 4
Mexican|White Unconditional Internet Use Rate Simulations

Home Computer Rate	Internet Use Rates Conditional on Home Computer		
	Mexican (=0.449)	White(=0.729)	Difference
Mexican (=0.330)	0.148	0.240	0.092
White (=0.709)	0.318	0.517	0.198
Difference	0.170	0.276	0.369

Notes: (1) The sample consists of adults (ages 25-55). (2) All estimates are calculated using sample weights provided by the CPS.

Table 5

Home Internet Activity Use by Race/Ethnicity

CPS (2000)

Explanatory Variables	Blacks	Mexican/ Americans	Whites
For E-mail	83.3%	79.9%	88.2%
To take educational courses, or do research for school	27.8%	27.0%	19.5%
To check news, weather, or sports	52.5%	48.5%	55.3%
For making phone calls	8.8%	7.9%	5.8%
To search for information such as business, government, health or education	67.3%	63.2%	67.3%
To search for jobs	30.7%	23.3%	20.1%
To do job-related tasks	40.6%	33.1%	39.6%
To shop, pay bills or other commercial activities	38.4%	34.8%	44.7%
For any other purpose	8.6%	8.7%	9.0%
Sample Size	1,296	486	20,083

Notes: (1) The sample consists of adults ages 25-55 who are currently using the Internet at home. (2) All estimates are calculated using sample weights provided by the CPS.

Table 6
Logit Regressions for Probability of Having a Home Computer

Explanatory Variables	Specification (1)	(2)	(3)	(4)
Black	-0.2665	-0.1313	-0.1314	-0.1268
	(0.0067)	(0.0064)	(0.0064)	(0.0070)
Mexican	-0.3533	-0.1805	-0.1813	-0.1718
	(0.0084)	(0.0081)	(0.0082)	(0.0091)
Other Latino	-0.2016	-0.0795	-0.0798	-0.0757
	(0.0103)	(0.0095)	(0.0095)	(0.0104)
Native American	-0.2606	-0.1185	-0.1175	-0.1084
	(0.0164)	(0.0148)	(0.0149)	(0.0167)
Asian	-0.0346	-0.0626	-0.0625	-0.0608
	(0.0103)	(0.0095)	(0.0095)	(0.0106)
Female		0.0013	0.0037	-0.0172
		(0.0038)	(0.0039)	(0.0047)
Age		-0.0003	-0.0002	0.0001
		(0.0002)	(0.0002)	(0.0003)
Married		0.0747	0.0733	0.0703
		(0.0056)	(0.0056)	(0.0060)
Previously married		0.0062	0.0045	0.0008
		(0.0064)	(0.0064)	(0.0069)
Number of children		0.0012	0.0016	0.0053
		(0.0027)	(0.0027)	(0.0030)
Children ages 6 to 17		0.1190	0.1186	0.1154
		(0.0061)	(0.0061)	(0.0068)
High school graduate		0.1157	0.1142	0.1007
		(0.0066)	(0.0066)	(0.0076)
Some college		0.2167	0.2147	0.1833
		(0.0068)	(0.0069)	(0.0080)
College graduate		0.2773	0.2758	0.2215
		(0.0078)	(0.0078)	(0.0093)
Graduate degree		0.3332	0.3309	0.2594
		(0.0103)	(0.0104)	(0.0122)

(continued)

Table 6 (continued)
Logit Regressions for Probability of Having a Home Computer

Explanatory Variables	Specification (1)	(2)	(3)	(4)
Family Income: $10,000 to $15,000		0.0519 (0.0114)	0.0496 (0.0115)	0.0308 (0.0142)
Family Income: $15,000 to $20,000		0.0789 (0.0113)	0.0758 (0.0113)	0.0588 (0.0138)
Family Income: $20,000 to $25,000		0.0735 (0.0106)	0.0699 (0.0108)	0.0498 (0.0131)
Family Income: $25,000 to $30,000		0.1181 (0.0103)	0.1155 (0.0105)	0.0974 (0.0127)
Family Income: $30,000 to $35,000		0.1581 (0.0102)	0.1551 (0.0104)	0.1274 (0.0126)
Family Income: $35,000 to $40,000		0.1744 (0.0105)	0.1709 (0.0106)	0.1448 (0.0128)
Family Income: $40,000 to $50,000		0.2192 (0.0098)	0.2153 (0.0100)	0.1885 (0.0122)
Family Income: $50,000 to $60,000		0.2396 (0.0100)	0.2361 (0.0102)	0.2001 (0.0124)
Family Income: $60,000 to $75,000		0.2745 (0.0102)	0.2709 (0.0104)	0.2323 (0.0125)
Family Income more than $75,000		0.3542 (0.0099)	0.3510 (0.0101)	0.3160 (0.0123)
In MSA but not in central city		0.0051 (0.0051)	0.0061 (0.0051)	0.0058 (0.0056)
Rural area		-0.0186 (0.0059)	-0.0179 (0.0059)	-0.0103 (0.0065)
Central city status not identified		0.0068 (0.0064)	0.0072 (0.0064)	0.0081 (0.0070)
Unemployed			-0.0179 (0.0111)	-0.0164 (0.0111)
Not in the labor force			-0.0084 (0.0054)	
Region Controls	No	Yes	Yes	Yes
Occupation Controls	No	No	No	Yes
Mean of Dependent Variable	0.6590	0.6590	0.6580	0.6793
Sample Size	46,322	46,322	46,093	38,805

Notes: (1) The sample consists of adults ages 25-55. (2) Marginal effects (sample average of individual marginal effects) and their standard errors are reported.

Table 7

Logit Regressions for Probability of Internet Use at Home
Conditional on Having a Home Computer

	Specification			
Explanatory Variables	(1)	(2)	(3)	(4)
Black	-0.1383	-0.1199	-0.1176	-0.1134
	(0.0099)	(0.0100)	(0.0100)	(0.0106)
Mexican	-0.2323	-0.1636	-0.1634	-0.1539
	(0.0135)	(0.0138)	(0.0137)	(0.0149)
Other Latino	-0.1415	-0.1008	-0.1015	-0.0946
	(0.0145)	(0.0144)	(0.0143)	(0.0154)
Native American	-0.1371	-0.0697	-0.0690	-0.0716
	(0.0248)	(0.0241)	(0.0240)	(0.0256)
Asian	-0.0619	-0.1071	-0.1085	-0.0983
	(0.0120)	(0.0121)	(0.0121)	(0.0132)
Female		0.0118	0.0038	-0.0254
		(0.0050)	(0.0052)	(0.0060)
Age		-0.0046	-0.0050	-0.0044
		(0.0003)	(0.0003)	(0.0004)
Married		0.0096	0.0203	0.0104
		(0.0087)	(0.0087)	(0.0092)
Previously married		0.0282	0.0351	0.0229
		(0.0105)	(0.0104)	(0.0109)
Number of children		-0.0138	-0.0138	-0.0104
		(0.0034)	(0.0034)	(0.0038)
Children ages 6 to 17		0.0052	0.0039	0.0005
		(0.0077)	(0.0077)	(0.0082)
High school graduate		0.1209	0.1228	0.1103
		(0.0121)	(0.0119)	(0.0135)
Some college		0.2200	0.2245	0.1915
		(0.0121)	(0.0120)	(0.0136)
College graduate		0.3022	0.3048	0.2486
		(0.0127)	(0.0126)	(0.0145)
Graduate degree		0.3359	0.3475	0.2741
		(0.0142)	(0.0142)	(0.0166)

(continued)

Table 7 (continued)

Logit Regressions for Probability of Internet Use at Home
Conditional on Having a Home Computer

	Specification			
Explanatory Variables	(1)	(2)	(3)	(4)
Family Income: $10,000 to $15,000		-0.0117	-0.0088	-0.0179
		(0.0225)	(0.0223)	(0.0270)
Family Income: $15,000 to $20,000		0.0098	0.0142	0.0084
		(0.0219)	(0.0217)	(0.0259)
Family Income: $20,000 to $25,000		0.0146	0.0220	0.0126
		(0.0206)	(0.0206)	(0.0245)
Family Income: $25,000 to $30,000		0.0312	0.0360	0.0324
		(0.0197)	(0.0196)	(0.0235)
Family Income: $30,000 to $35,000		0.0474	0.0526	0.0394
		(0.0192)	(0.0191)	(0.0230)
Family Income: $35,000 to $40,000		0.0599	0.0659	0.0522
		(0.0192)	(0.0192)	(0.0230)
Family Income: $40,000 to $50,000		0.0664	0.0728	0.0578
		(0.0181)	(0.0181)	(0.0220)
Family Income: $50,000 to $60,000		0.0746	0.0790	0.0630
		(0.0182)	(0.0182)	(0.0220)
Family Income: $60,000 to $75,000		0.1196	0.1216	0.0995
		(0.0182)	(0.0182)	(0.0220)
Family Income more than $75,000		0.1459	0.1468	0.1239
		(0.0177)	(0.0177)	(0.0216)
In MSA but not in central city		-0.0136	-0.0159	-0.0160
		(0.0070)	(0.0070)	(0.0075)
Rural area		-0.0241	-0.0273	-0.0196
		(0.0083)	(0.0083)	(0.0089)
Central city status not identified		-0.0018	0.0004	0.0037
		(0.0088)	(0.0088)	(0.0094)
Unemployed			0.0456	0.0473
			(0.0177)	(0.0177)
Not in the labor force			0.0024	
			(0.0076)	
Region Controls	No	Yes	Yes	Yes
Occupation Controls	No	No	No	Yes
Mean of Dependent Variable	0.6994	0.6994	0.7040	0.7100
Sample Size	30,524	30,524	30,327	26,361

Notes: (1) The sample consists of adults ages 25-55. (2) Marginal effects (sample average of individual marginal effects) and their standard errors are reported.

Table 8
Decomposition of Racial/Ethnic Gaps in Home Computer Rates

	Specification			
	Black		Mexican	
Explanatory Variables	(1)	(2)	(3)	(4)
White/minority gap in home computer rate	0.303	0.281	0.401	0.400
Contributions from racial differences in:				
Sex and age	0.000 -0.1%	0.001 0.5%	-0.001 -0.2%	-0.001 -0.3%
Marital status and children	0.017 5.7%	0.013 4.8%	-0.012 -3.0%	-0.010 -2.6%
Education	0.033 11.0%	0.017 6.0%	0.107 26.6%	0.081 20.2%
Income	0.094 31.0%	0.070 25.1%	0.111 27.7%	0.098 24.6%
Region	0.009 3.0%	0.009 3.0%	-0.013 -3.2%	-0.010 -2.5%
Central city status	-0.002 -0.5%	0.000 -0.2%	-0.002 -0.6%	-0.001 -0.2%
Unemployment		0.001 0.2%		0.000 0.1%
Occupation		0.020 7.1%		0.039 9.7%
All included variables	0.152 50.1%	0.131 46.6%	0.190 47.2%	0.196 49.0%

Notes: (1) The sample consists of adults ages 25-55. (2) Contribution estimates are mean values of the decomposition using 1000 subsamples of whites. See text for more details

Table 9
Decomposition of Racial/Ethnic Gaps in Conditional Internet Use Rates

	Specification			
	Black		Mexican	
Explanatory Variables	(1)	(2)	(3)	(4)
White/minority gap in home computer rate	0.151	0.141	0.265	0.254
Contributions from racial differences in:				
Sex and age	-0.003 -1.7%	-0.001 -0.8%	-0.010 -3.6%	-0.010 -4.0%
Marital status and children	-0.001 -0.5%	0.000 0.2%	0.004 1.6%	0.003 1.4%
Education	0.013 8.3%	0.005 3.3%	0.068 25.8%	0.050 19.7%
Income	0.018 12.1%	0.012 8.3%	0.028 10.7%	0.022 8.8%
Region	-0.003 -2.1%	-0.004 -3.2%	-0.010 -3.6%	-0.008 -3.1%
Central city status	-0.005 -3.2%	-0.004 -3.0%	-0.004 -1.4%	-0.003 -1.2%
Unemployment		-0.001 -0.4%		0.000 -0.1%
Occupation		0.010 7.3%		0.025 9.9%
All included variables	0.019 12.9%	0.016 11.7%	0.078 29.5%	0.080 31.4%

Notes: (1) The sample consists of adults ages 25-55. (2) Contribution estimates are mean values of the decomposition using 1000 subsamples of whites. See text for more details.

Table 10
Main Reasons for Not Using the Internet at Home by Race/Ethnicity

Explanatory Variables	Blacks	Mexican/ Americans	Whites
Can use it somewhere else	7.0%	7.9%	12.2%
Cost, too expensive	19.2%	23.4%	16.6%
Not enough time to use it	12.1%	7.4%	9.3%
Not useful	3.5%	3.8%	4.6%
Not user friendly, too difficult	3.3%	2.6%	2.2%
Problems with service provider	1.5%	0.0%	1.1%
Concern about how children use it	6.0%	9.3%	7.8%
Don't want it	32.8%	23.7%	28.3%
Other	5.1%	8.9%	5.4%
Future access planned	3.1%	3.8%	3.4%
Computer not capable	5.8%	5.3%	8.2%
Lack of computer knowledge	0.5%	3.8%	1.0%
Sample Size	529	301	3587

Notes: (1) The sample consists of computer owners ages 25-55 who live in households in which no one currently uses or has ever used the Internet from home. (2) All estimates are calculated using sample weights provided by the CPS.

Table 11
Logit Regressions for Home Computer and Internet Use Probabilities

	Specification			
	(1)	(2)	(3)	(4)
Dependent Variables	Home Computer	Home Computer	Conditional Internet	Conditional Internet
Black	-0.1424	-0.1393	-0.1166	-0.1169
	(0.0092)	(0.0092)	(0.0137)	(0.0137)
Mexican	-0.1660	-0.1564	-0.1813	-0.1798
	(0.0118)	(0.0121)	(0.0187)	(0.0190)
Other Latino	-0.0969	-0.0910	-0.1096	-0.1129
	(0.0117)	(0.0121)	(0.0176)	(0.0183)
Native American	-0.1291	-0.1264	-0.0711	-0.0705
	(0.0377)	(0.0379)	(0.0616)	(0.0617)
Asian	-0.0522	-0.0498	-0.0942	-0.0961
	(0.0128)	(0.0129)	(0.0156)	(0.0158)
CMSA Controls	No	Yes	No	Yes
Mean of Dependent Variable	0.6767	0.6767	0.7158	0.7158
Sample Size	16571	16571	11214	11214

Notes: (1) The sample consists of adults ages 25-55 who live in one of the 18 CMSAs identified in the 2000 CPS. (2) Marginal effects (sample average of individual marginal effects) and their standard errors are reported. (3) All specifications include controls for sex, age, marital status, children, education, income, central city status, and region.

Table 12

Average Monthly Cost for Internet Service by Race/Ethnicity
CPS (2000)

	Blacks	Mexican/ Americans	Whites
Regular or "dial-up" telephone service	$17.43	$16.73	$17.07
Sample Size	1506	666	21099
High-speed service	$21.14	$22.60	$26.86
Sample Size	167	66	2545

Notes: (1) The sample consists of adults ages 25-55 who currently use the Internet at home. (2) High-speed service includes DSL, cable modems, and ISDN. (3) All estimates are calculated using sample weights provided by the CPS.

Table 13
Logit Regressions for Home Computer and Internet Use Probabilities

	Specification			
	(1)	(2)	(3)	(4)
Dependent Variables	Home Computer	Conditional Internet	Home Computer	Conditional Internet
Black	-0.1311	-0.1209	-0.1318	-0.1203
	(0.0105)	(0.0150)	(0.0063)	(0.0100)
Mexican	-0.1841	-0.1298	-0.1548	-0.1513
	(0.0153)	(0.0236)	(0.0087)	(0.0142)
Other Latino	-0.0744	-0.1009	-0.0487	-0.0928
	(0.0164)	(0.0227)	(0.0106)	(0.0150)
Native American	-0.0642	-0.0964	-0.1193	-0.0700
	(0.0265)	(0.0364)	(0.0147)	(0.0241)
Asian	-0.0696	-0.0974	-0.0646	-0.1075
	(0.0157)	(0.0190)	(0.0095)	(0.0121)
Mexican - Spanish speaking at home			-0.1685	-0.1958
			(0.0215)	(0.0591)
Other Latino - Spanish speaking at home			-0.1757	-0.0978
			(0.0247)	(0.0494)
Mean of Dependent Variable	0.6174	0.7223	0.6590	0.6994
Sample Size	20,027	12,364	46,322	30,524

Notes: (1) The sample consists of adults ages 25-55. Specifications 1 and 2 include only adults wihtout children. (2) Marginal effects (sample average of individual marginal effects) and their standard errors are reported.

Appendix 1
Sample Means of Analysis Variables for Home Computer Logit Regressions

Variable	Black	Mexican	White
Female	0.562	0.479	0.511
Age	39.511	36.898	40.410
Married	0.439	0.666	0.696
Previously married	0.217	0.127	0.150
Number of children	0.844	1.288	0.907
Children ages 6 to 17	0.369	0.481	0.380
High school graduate	0.364	0.274	0.306
Some college	0.307	0.171	0.300
College graduate	0.126	0.069	0.225
Graduate degree	0.056	0.019	0.106
Family income: $10,000 to $15,000	0.086	0.109	0.033
Family income: $15,000 to $20,000	0.075	0.094	0.035
Family income: $20,000 to $25,000	0.081	0.108	0.049
Family income: $25,000 to $30,000	0.088	0.100	0.057
Family income: $30,000 to $35,000	0.073	0.101	0.067
Family income: $35,000 to $40,000	0.064	0.074	0.065
Family income: $40,000 to $50,000	0.099	0.092	0.111
Family income: $50,000 to $60,000	0.087	0.079	0.115
Family income: $60,000 to $75,000	0.083	0.051	0.132
Family income: more than $75,000	0.129	0.092	0.300
Middle Atlantic	0.145	0.021	0.125
East North Central	0.164	0.080	0.155
West North Central	0.033	0.032	0.120
South Atlantic	0.315	0.045	0.148
East South Central	0.100	0.011	0.055
West South Central	0.109	0.235	0.078
Mountain	0.030	0.206	0.125
Pacific	0.075	0.366	0.104
In MSA but not in central city	0.289	0.358	0.412
Not MSA	0.116	0.122	0.250
Not identified	0.128	0.149	0.167
Sample Size	4,555	2,985	34,386

Note: The sample consists of adults ages 25-55.

Appendix 2
Sample Means of Analysis Variables for Conditional Internet Use Logits

Variable	Black	Mexican	White
Female	0.552	0.512	0.514
Age	39.808	38.128	40.515
Married	0.595	0.735	0.759
Previously married	0.162	0.106	0.116
Number of children	0.962	1.359	1.017
Children ages 6 to 17	0.447	0.540	0.431
High school graduate	0.265	0.309	0.259
Some college	0.362	0.277	0.316
College graduate	0.204	0.151	0.262
Graduate degree	0.106	0.046	0.131
Family income: $10,000 to $15,000	0.033	0.052	0.019
Family income: $15,000 to $20,000	0.040	0.044	0.022
Family income: $20,000 to $25,000	0.045	0.061	0.032
Family income: $25,000 to $30,000	0.068	0.062	0.043
Family income: $30,000 to $35,000	0.063	0.098	0.058
Family income: $35,000 to $40,000	0.069	0.072	0.059
Family income: $40,000 to $50,000	0.121	0.135	0.111
Family income: $50,000 to $60,000	0.114	0.147	0.122
Family income: $60,000 to $75,000	0.142	0.095	0.149
Family income: more than $75,000	0.258	0.202	0.369
Middle Atlantic	0.146	0.014	0.126
East North Central	0.144	0.095	0.153
West North Central	0.036	0.037	0.118
South Atlantic	0.341	0.027	0.144
East South Central	0.073	0.004	0.050
West South Central	0.086	0.233	0.074
Mountain	0.036	0.171	0.128
Pacific	0.097	0.414	0.114
In MSA but not in central city	0.362	0.396	0.437
Not MSA	0.078	0.102	0.226
Not identified	0.137	0.153	0.166
Sample Size	1,939	978	25,055

Note: The sample consists of adults ages 25-55.